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# FUNDAÇÃO TROPICAL DE PESQUISAS E TECNOLOGIA "ANDRE TOSELLO"

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## REHABILITATION OF YEAST FACTORIES

Project No. DP/MOZ/85/016  
UNIDO Contract No. 86/99

Final Report

Presented to:

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION - UNIDO

February, 1989

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**CONTENTS**

Summary ..... 01

Engineering part .... 02

I - Assistance and Coordination on Installation of  
Equipments from Beira ..... 03

II - Installation of Westfalia Separator ..... 07

III - Installation of Glycol-water Cooling System ..... 08

IV - Analysis of Rehabilitated Plant ..... 09

V - Control of Yeast Quality and Production ..... 10

Economical Parts ..... 13

Economical Results ..... 14

Estimation of Investments and Cost of Production ..... 15

Estimation of Total Cost and the Unit Production  
Cost of Pressed Baker Yeast By SIPAQ ..... 19

Estimation of Total Income and Gross Profit  
of Industry ..... 22

Determination of Break Even Point ..... 23

Determination of Internal Rate of Return ..... 25

Sensitivity Analysis ..... 29

Results and Conclusions Obtained with Internal Rate  
of Return and Sensitivity Analysis ..... 30

Summary of Economical Indicators ..... 35

Conclusion ..... 36

Recommendations ..... 38

Annexes ..... 39

## SUMARY

The following points must be emphasized in this project:

1. After correcting steps by different parts of the project, the installation of pressed baker yeast plant SIPAQ may be considered technically rehabilitated, since it may produce yeast of good quality.
2. There are some weak points which deserve to be mentioned and demand a special attention and some measures at near future. They are: (1) boilers; (2) filter press; (3) packaging; (4) production of mother yeast; (5) cleaning and sanitation; (6) training for production and control personnel.
3. The economical analysis shows the following points: (1) the investment is profitable if it is operated near the nominal capacity; (2) the fair price is much higher than current practised price in Maputo; (3) it is essential to keep economical follow up by the industry as well as by Government authority (UDRA); (4) it is of the almost importance a training program for Government personnel on economical analysis using modern means and methods. A program for this training is shown in Annex IV.
4. The measures listed on item 2 will allow production of pressed baker yeast of high quality international standard. The plant for dry yeast needs a technical and economical pre-viability project for the assessment of basic steps by the Government.

2

**ENGINEERING PART**

**I - Assistance and Coordination on Installation of Equipments  
from Beira.**

The following equipments were examined and set in usable conditions, whenever possible:

**1 - Yeast pump for filtration**

**Make: National Pump Model 4375, serial nº 3771**

**National Pump & Engineering Works.**

The equipment was totally dismantled, cleaned and tested for performance. The electrical motor (Hawker Seddley Electric 5,5 Kw, 1440 rpm) was also tested. It was installed in production line to replace other two small pumps. A leakage in piston stuffing box was detected which must be replaced.

**2. Yeast press filter.**

**Make: National Pump & Engeneering Works.**

The general appearance of equipments was satisfactory, but required cleaning and painting for rust protection. Some steel plate were not in good conditions and some units were missing (18 were found but it requires 25).

The equipments was thoroughly cleaned and painted and it was suggested to purchase the missing plates.

**3. Air compressor.**

**Make: George Walker & Sons Ltd.**

**Stront, Gloucestershire**

**Set nº 4171; 150 H.P.; 5500 cmh.**

The general appearance was reasonable. During transportation some damage was observed, such as breakage of lubrication system and rust on rotor.

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The lubrication system was fixed and rotor was oiled for maintenance . The motor was tested and it was in good working conditions. The equipment was placed in stand by to be used for replacement of compressors currently in use (whenever it is required) or for expansion program.

4. Diluted molasses pumps.

Make: no name plate

Motor; 4 H.P.

The unit was revised and it was in workable condition. It was stored for use whenever necessary.

5. Positive replacement pump.

Make: Mono-Pump (PTY) Ltd.

Motor: Relmo; 2 H.P.; 1460 rpm.

The unit was thoroughly revised. All bearings and packings were replaced. It was stored for use whenever required.

6. Sanitary pumps (2 units)

Make: Worthington - Simpson

Stewarts and Lloids of So. Africa Ltd.

Size: 1 1/2" ESF; 1425 rpm; 2 H.P.

They were completely revised. All bearings were replaced and the main shafts were adjusted. After servicing they were placed in stock for replacing the pumps currently in use if required.

7. Water circulation pump (centrifugal type).

Make: KSB; type EIA-040K.

Motor: First Electric Corporation; 20 H.P.; 1460 rpm.

The pump was completely revised and bearings were replaced. It was installed next to water cooling tower BAC model VAT-200.



8. Water pump, centrifugal type.

Make: no name plate

Motor: Induction Motor; Serial nº 4317; 5,5 H.P.;  
1430 rpm.

The pump was completely revised. Bearing needed to be replaced. It is used for yeast cream recirculation in storage tank.

9. Water Cooling Tower.

Make: BAC - Model VAT 200; NE 71365.

Some damages on steel plates occurred during transportation, which were easily repaired. The unit was installed on top of building, besides an existing concrete tower. Before its placement it was built a concrete foundation. The unit was ready to be placed in operation, but it has not been connected because Grenco cooling system has capacity more than currently required for the factory.

10. Yeast pressing machine.

Two units were brought from Beira. One of them has control of exit aperture to be operated with automatic cutter. They were completely revised and roller bearings, couplers, alignments and bronze bearing were fixed.

11. Refrigeration System - Freon 22 (2 incomplete units)

Make: no name plate

Motor: Kapal South Africa; 11 Kw; 1460 rpm.

After complete revision, it was found that they are not economically recoverable.

12. Automatic yeast cutting table.

The automatic cutting device needed a substancial repare works and it would be difficult to repare due to lack on

replacement parts. The stainless steel table may be used for manual wrapping of yeast block.

13. Plate type heat exchanger.

Three units were brought from Beira. Two units were complete and one has some plates missing.

Two complete units were revised and they were ready to put in operation.

14. Laboratory equipments.

One clinical type centrifuge was brought from Beira and it was found to be in satisfactory condition.

The pH-meter brought at same time was not in usable condition and its repair was not recommended because it was an old and out dated equipment.

II -Installation of Westfalia Separator

The installation of Westfalia Separator HDA-50 has been finished by equipmentsupplying company. It is in good operating condition.

The old separators (Alfa Laval DX-309-38B and Westfalia HFG-8006) are also in place to be used whenever necessary.

### III - Installation of Glycol water-Cooling System

The Grenco cooling system (glycol-water system) has been bought by UDRA, and installed in ground floor where was "Production Office" due to easy access and maintenance . The cold room (not currently in use) next to this office was also dismantled to give enough space for the system. It is over dimensioned for current plant capacity of production, but it is in perfect operating condition.

#### IV - Analysis of Rehabilitated Plant

Technically, the plant is in adequate operating condition after all the works and repairs performed. The control of temperature in fermentation vat can be effectively carried out by coil type cooling system. The tubings are in reasonable conditions and all the pumps for transferring materials and products are adequate.

As all the industries, it is necessary a continuous maintenance of equipments and remodel those parts and lines which become outdated or wornout. It must be established a preventive maintenance program to avoid unexpected and undesirable stoppage. For this purpose pumps and parts brought from Beira are very important.

Furthermore, it is necessary to establish a plant remodeling program to improve its efficiency and quality of products. Some points may be stressed:

1. Replacement of boilers currently in use. They are old and well wornout and not suitable for repairing. They must be replaced with a new modern boiler which uses a more economical fuel.
2. Replacement of packaging section including pressing and packaging of yeast blocks. The method currently in use is almost totally manual and uses an ordinary wrapping paper to pack yeast blocks. It is not suitable on higienic point of view and it affects adversely the shelf life of product.

There is currently good semi or totally automatic equipment that performs these tasks with a minimum of manual contact, using appropriate wrapping paper.

3. Replacement of yeast filtration and pressing system.

Filter press and pumps are old and outdated, besides being well wornout.

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Their replacement with new and with right dimension will reduce loss of yeast cells during filtration and will improve quality of yeast by reducing contamination and causing less damage to yeast cells. Some new equipments of this kind allow addition of special additives for improving fermentation and keeping quality.

4. Installation of yeast cultivation from laboratory test tubes. It will enable the factory to become independent of mother yeast importation.

Currently, mother dry yeast is imported from United States and kept under refrigeration. There are some problems with importation and the period and temperature of storage. With the installation of yeast cultivation section the yeast culture can be kept indefinitely in Laboratory, and grown it to the amount of mother yeast whenever required. Parallel to installation of this section, it is necessary to find a trained technicians for the job, because it demands a special knowledge and skills. The Fundação Tropical de Pesquisas e Tecnologia of Campinas, S.P., Brazil is capable of carrying out a training program on the subject.

5. Rearrangement of cooling system for fermentation vat, with activation of cooling tower BAC-model VAT 200.

The Gresco System will be used for yeast cream cooling and for an auxiliary cooling device for fermentation vat. This will allow to reduce cost of yeast production since the cooling tower (BAC-model VAT-200) is less expensive and its operation is much simpler and economical than Gresco System. The use of Gresco System will be restricted for cooling yeast cream for maintenance of fermentation power during yeast separation, filtration and storage.

## 6. Control of molasses and nitrogen feeding during fermentation

There are automatic or semi-automatic systems for controlling molasses and nitrogen feeding during yeast growth in fermentation vat. These devices allow an optimum control of feeding rate which improves the following: (1) yield of baker yeast; (2) yeast productivity, and (3) quality of product. These installations must also be coupled with training program for operation with these equipments and for control with laboratory tests.

## 7. Cleaning and sanitation of plant.

The current sanitary conditions of plant are not satisfactory for production of good quality yeast. The sanitation is a complex system and demands a broad analysis and corrections, such as: (1) correct site of plant construction; (2) sanitary construction of plant and other facilities; (3) sanitary construction and design of equipments; (4) cleaning and sanitation of plant; (5) effective control of rodents and insects; and (6) training program for improving workers hygiene and consciousness.

This must be established by a correct program and applied constantly to be successful. It is very hard task.

## 8. Installation of Second Westfalia Separator.

With another Westfalia separator HDA-50 (similar to new separator) installed in series the yeast cream that comes out from first separator is washed in second unit. This allows the yeast separation and washing in one single passing. This reduces yeast loss in this step and faster separation improving productivity of the industry.

## V - Control of Yeast Quality and Production

In order to detach this section from main body of this report, the detail of method is shown in Annex III. This allows one to take apart and use as "Handbook of Yeast Quality and Production Control".

The following parts are shown in Annex III:

1. Determination of Fermentation Power
2. Measurement of viable cells
3. Determination Quality of yeast produced
4. Determination soluble solids in molasses
5. Acid treatment of yeast suspension for reducing bacterial contamination.

These techniques are chosen because they are simple and easily performed at current laboratory equipments and facilities except pH-meter, because those found in laboratory were not in good operative conditions.

For complete control, other parameters must be determined in laboratory, such as; (1) total sugar content in molasses; (2) total reducing sugar in fermented broth; (3) sulfite content in molasses; (4) amount of ammonium nitrogen during fermentation; (5) protein content in yeast, etc. They are not feasible at current laboratory facilities, and the benefit one can take from those analysis are relative because there is no effective control of fermentation vat regarding molasses, nitrogen and air supply to cope with yeast cultivation demand.



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**ECONOMICAL PARTS**

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## ECONOMICAL RESULTS

In this part, the economical results of pressed baker yeast factory SIPAQ (Sociedade Industrial de Produtos Alimentícios Químicos Ltda) at Maputo - Mozambique, is discussed.

In the calculation, it is assumed that the industry is working 312 days a year (26 days per month) in continuous operation system (24 hours per day) with three shifts a day.

The factory needs 1716 metric ton of molasses and produces 936 metric ton of pressed baker yeast a year according to its nominal capacity.

## ESTIMATION OF INVESTMENT AND COST OF PRODUCTION

The required investments of the industry was estimated from basic quantitative flow sheet shown in figure 1. The total investments was divided into two items:

(1) Fixed investment and (2) working capital, The table 1 shows fixed investment predicted according to the items, and the table 2 shows the working capital.

The fixed investment refers to the items which are not involved in everyday transactions. Working capital allows the industry to start production. In its estimation the minimum quantity of sale, period of delivery, non divisibility of expenses and storage capability of the industry are considered.

The basic financial resources may come from owner investments, or from financial loans at short or long periods.

Short period loans are usually applied for working capital, and long loans with the period longer than one year are applied for fixed investments.

The fixed investment charges on cost of production regardless of production level (within certain range) and it is required for structure and normal function of the industry.

The working capital varies according to the amount of production. It has direct relationship with the quantity of yeast produced (within certain limits).

The overall sum of fixed and working investments gives the total investment (Table 1 and 2) which in this study it amounts to \$ 595,253,831.64 MT or an equivalent of US\$ 960,086.02.

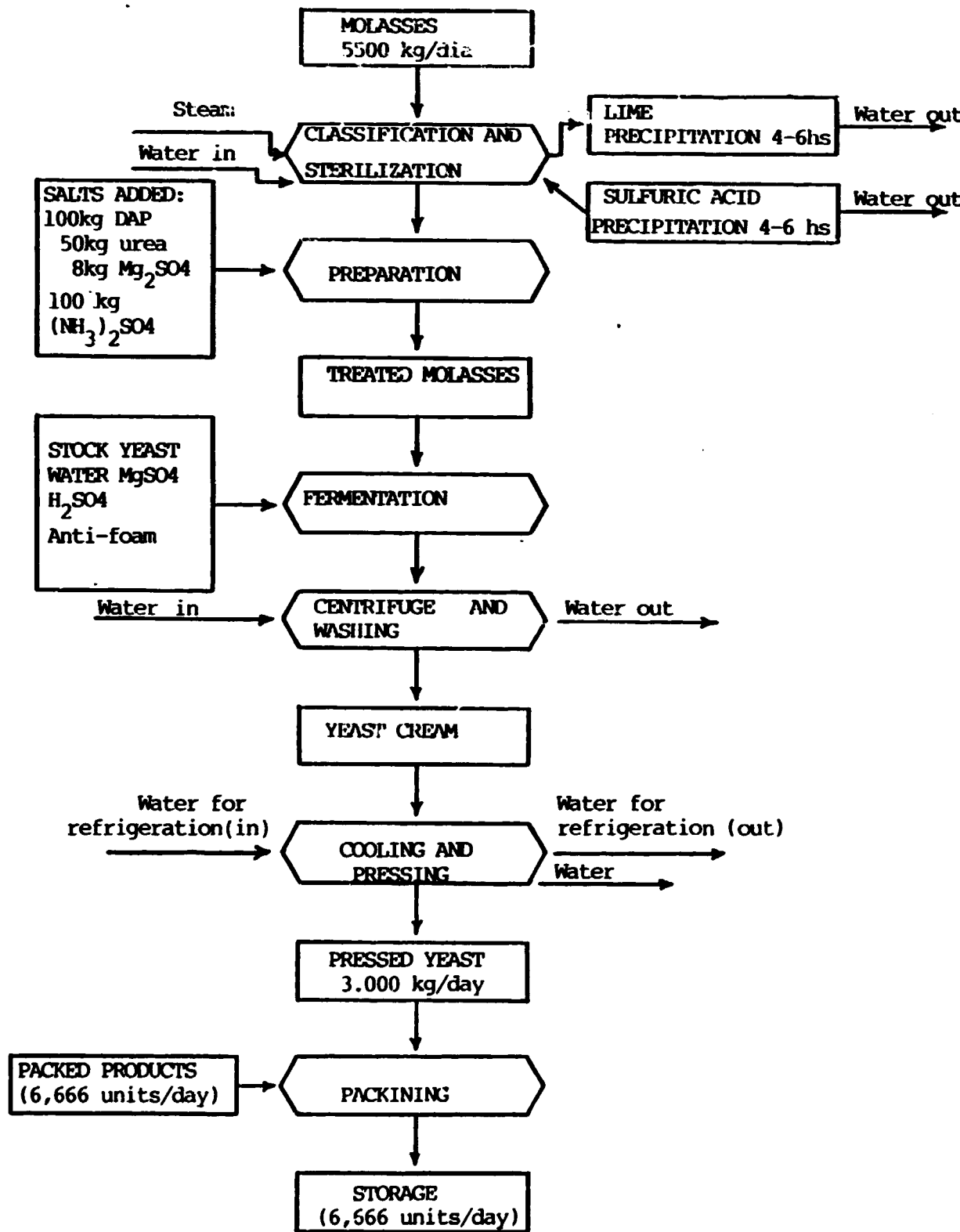


Figure 1: Basic Flow sheet for pressed baker yeast production at SIPAQ at Maputo - Moz.

TABLE 1: Estimation of fixed investment for pressed baker yeast processing unit at Maputo (SIPAQ)

| Fixed investment                   | US\$*             | MT \$                 |
|------------------------------------|-------------------|-----------------------|
| External wiring, electricity, etc. | 9,159.50          | 5,678,890.00          |
| Buildings                          | 183,190.00        | 113,577,800.00        |
| Processing equipments              | 375,514.00        | 232,818,680.00        |
| Auxiliary equipments               | 219,596.00        | 136,149,520.00        |
| Laboratory equipments              | 6,800.00          | 4,216,000.00          |
| Vehicles                           | 49,942.42         | 30,694,300.00         |
| Furniture and office facilities    | 2,789.00          | 1,729,180.00          |
| Installations and fixture          | 50,191.00         | 37,318,420.00         |
| Others                             | 27,215.46         | 16,873,585.20         |
| <b>TOTAL</b>                       | <b>934,397.38</b> | <b>579,326,375.60</b> |

\* 1 US\$ = 620.00 MT

TABLE 2: Estimation of working capital required for pressed baker yeast production industry - SIPAQ at Maputo-Mozambique.

| Floating capital                        | US\$*            | MT \$                |
|---|------------------|----------------------|
| Raw materials (Molasses)                | 4,732.84         | 2,934,360.00         |
| Fuel                                    | 754.04           | 467,506.00           |
| Cleaning materials +<br>special clothes | 50.00            | 31,000.00            |
| Finished products                       | 10,368.00        | 6,428,160.00         |
| Ingredients (salts)                     | 2,255.77         | 1,398,575.36         |
| Packaging materials                     | 151.29           | 93,737.60            |
| Filtering linens                        | 13.57            | 8,414.89             |
| Replacing parts                         | 6,621.00         | 4,105,026.20         |
| Office facilities +<br>communications   | 38.71            | 24,000.00            |
| Reagents                                | 200.00           | 124,000.00           |
| Cashing and banking                     | 504.22           | 312,651.99           |
| <b>TOTAL</b>                            | <b>25,689.44</b> | <b>15,927,456.04</b> |

\* 1 US\$ = \$ 620,00 MT

**ESTIMATION OF TOTAL COST AND THE UNIT PRODUCTION COST OF PRESSED  
BAKER YEAST BY SIPAQ**

The total cost (T.C.) is calculated by sum of fixed cost (F.C.) and variable cost (V.C.), i.e.

$$T.C. = F.C. + V.C.$$

Replacing these values by figures shown in table 3 (fixed cost) and table 4 (variable cost) it results that:

$$C.T. = \$ 172,008,811.00 \text{ MT} + 162,258,115.10 \text{ MT}$$

$$C.T. = \$ 334,266,926.10 \text{ MT}$$

For the calculation of unit production cost (U.P.C.) of baker yeast, the total cost of production (T.C.) is divided by quantity of product out put (Q), i.e.

$$UPC = \frac{T.C.}{Q} = \frac{\$ 334,266,926.10 \text{ MT}}{936.000 \text{ Kg}} = \$ 357.12 \text{ MT/Kg}$$

This means that each package of 450g will cost \$ 160.70 MT.

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The fixed and working cost for processing 1,716 metric ton of molasses per year by SIPAQ are listed in table 3 and table 4 respectively:

TABLE 3: Estimation of fixed annual cost necessary of pressed baker yeast processing plant of SIPAQ in Maputo - Mo zambique.

| Annual fixed cost            | US\$*             | MT \$                 |
|------------------------------|-------------------|-----------------------|
| Fixed labor                  | 15,006.77         | 9,304,200.00          |
| Social cost                  | 1,575.71          | 976,941.00            |
| Depreciation                 | 86,094.96         | 53,378,874.58         |
| Insurance                    | 12,454.60         | 7,721,855.45          |
| Interest on invested capital | 158,847.56        | 98,485,483.85         |
| Others                       | 3,453.96          | 2,141,456.13          |
| <b>TOTAL</b>                 | <b>277,433.56</b> | <b>172,008,811.00</b> |

\* 1 US\$ = \$ 620.00 MT



TABLE 4: Estimation of annual variable cost required for the production of pressed baker yeast by SIPAQ in Maputo - Moz.

| Annual Variable cost                 | US\$*             | MT \$                 |
|--------------------------------------|-------------------|-----------------------|
| Variable labor                       | 5,806.45          | 3,600,000.00          |
| Social cost                          | 690.00            | 378,000.00            |
| Maintenance                          | 23,539.99         | 14,594,791.94         |
| Electricity                          | 27,466.03         | 17,028,942.00         |
| Raw materials (molasses)             | 156,322.06        | 96,919,680.00         |
| Water                                | 4,913.10          | 3,046,125.00          |
| Cleaning materials + special clothes | 600.00            | 372,000.00            |
| Fuel                                 | 9,048.50          | 5,610,072.00          |
| Ingredients                          | 27,069.20         | 16,782,904.32         |
| Office facilities + communications   | 464.52            | 288,000.00            |
| Packaging material                   | 1,815.44          | 1,125,571.20          |
| Filtering linens                     | 170.61            | 105,778.68            |
| Reagents                             | 2,400.00          | 1,488,000.00          |
| Others                               | 1,481.05          | 918,250.16            |
| <b>TOTAL</b>                         | <b>261,706.63</b> | <b>162,258,115.10</b> |

\* 1 US\$ = 620.00 MT

## ESTIMATION OF TOTAL INCOME AND GROSS PROFIT OF INDUSTRY

Assuming a profit of 20% over the production cost, for the calculation of total income, the price of pressed baker yeast produced by SIPAQ should be \$ 428,54 MT/Kg or \$ 192,84 MT/package of 450g.

We must emphasize that for calculation of consumer price a 5% sale tax must be added, resulting in a final price of \$ 449,97 MT or \$ 202,48 MT/package of 450g.

The total income (T.I.) of the industry will be calculated by multiplying the price of product (P) by annual production of baker yeast (Q), i.e.

$$T.I. = P \times Q$$

By replacing the symbols with corresponding figures, it comes:

$$T.I. = \$ 428.54 \text{ MT} \times 936,000 \text{ Kg}$$

$$T.I. = \$ 401,113,440.00 \text{ MT}$$

The gross profit (G.P.) of the industry is defined as total income (T.I.) minus total cost (T.C.) i.e.:

$$G.P. = T.I. - T.C.$$

By replacing the symbols with corresponding figures it results:

$$G.P. = \$ 401,113,440.00 \text{ MT} - \$ 334,266,926.10 \text{ MT}$$

$$G.P. = \$ 66,846,513.90 \text{ MT}$$

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### DETERMINATION OF BREAK EVEN POINT

With the data calculated at this point the break even point (BIP) could be figured out for the industry. This shows the point in which the cost of levels up the total income or, the percentage of nominal capacity required for the industry to operate without loss or profit.

This point (BIP) is mathematically defined as:

$$BIP = \frac{F.C.}{T.I. - V.C.} \times 100$$

By replacement of symbols with corresponding figures, one obtains:

$$BIP = \frac{\$ 172,008,811.00 \text{ MT}}{\$ 401,113,440.00 \text{ MT} - \$ 162,258,11.00 \text{ MT}} \times 100$$

$$BIP = 72,01\%$$

This is equivalent to an annual production of 674,013.6 Kg of product.

Figure 2 shows graphycal illustration of BIP point.

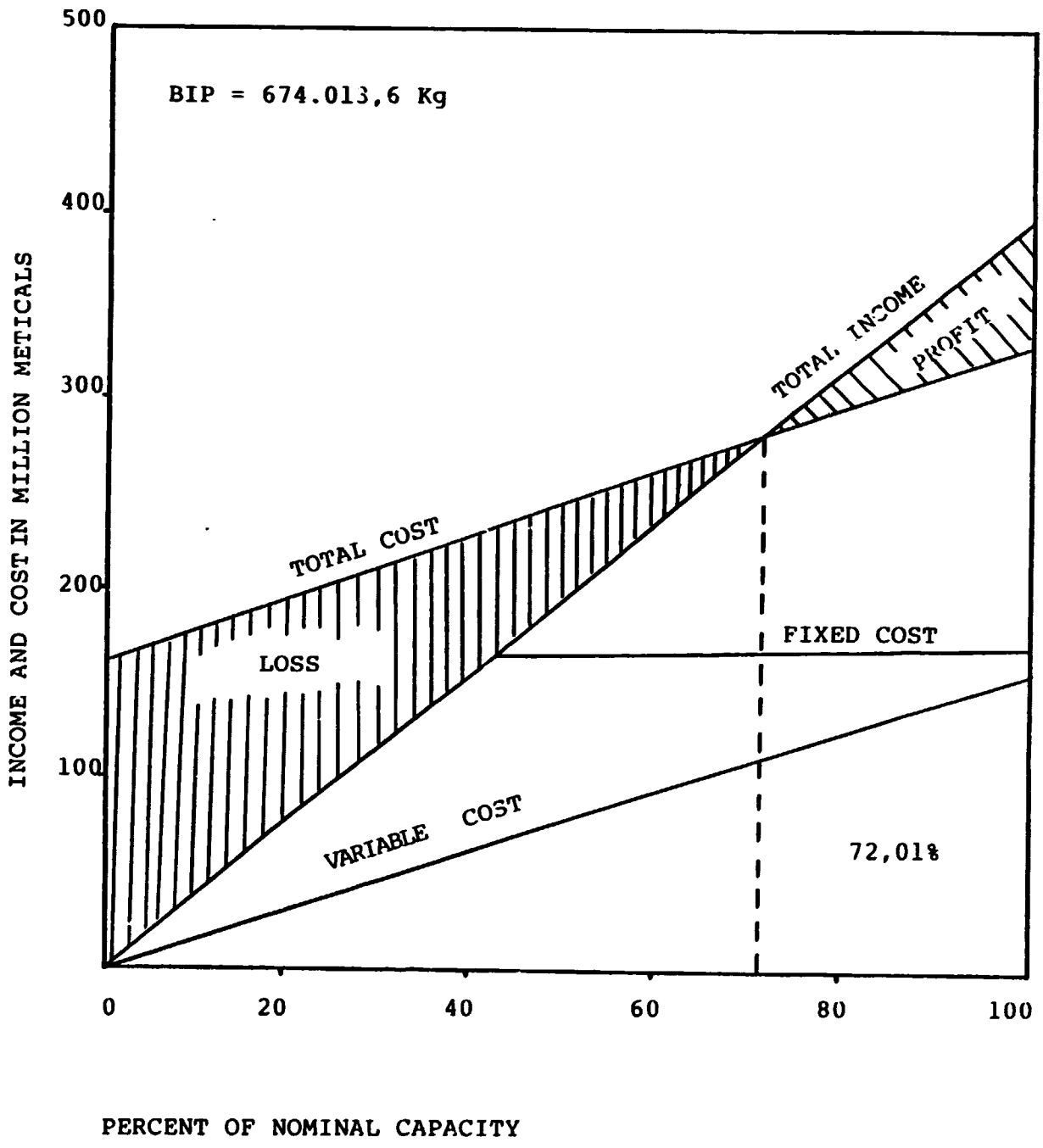


Figure 2: Break even point of pressed baker yeast factory SIPAQ at Maputo - Mozambique

## DETERMINATION OF INTERNAL RATE OF RETURN

The economic evaluation of investment was carried out by internal rate of return

$$\sum_{j=0}^N x_j (1+i)^{-j} = 0$$

Where:  $x$  = cash flow at the end of each period

$j = 0, 1, \dots, N$

$i$  = internal rate of return (IRR)

$N$  = Number of periods considered in the project

The internal rate of return (IRR) may be interpreted as a deduction rate which makes the current net cash flow value of the investment equal to zero.

If IRR of the project is higher than current interest rate of market, the investment is profitable and it is considered viable. Conversely if current interest rate of market is higher than IRR calculate, the investment is not favorable.

The other way of analysis is to compare IRR of the industry with other investments, such as saving accounts and deposits for fixed period. According to Noronha "one of the major difficulties relating the evaluation of the cost of investment for certain funds is the fact that practically all the external application of funds, besides agricultural business, is safer than to agricultures enterprise". Therefore, we can not compare directly with the project. However, it serves as a reference. Hence, in this study, the interest of 17% is established only as a reference to analyse the calculated IRR values.

The economic range of the project was fixed in 20 years, assuming that the price quotation at year 0 (zero) is unchanged throughout the period. This assumes that inflation

affects equally the price of incoming raw materials and ingredients as well as out going products.

It was established investment programs, expected income and operational cost for each year of the project, according to proposed production alternatives. This programming gives cash flow at the end of each period.

The cash flow is calculated, subtracting investments and operational cost from total income:

$$X = R - (I \div C)$$

Where X = cash flow  
R - total income  
I = total initial investment  
C = operational costs

The cash flow accounts for annual depreciation of investments, including buildings, equipments, vehicles and office facilities.

The method used for depreciation was linear, i.e., an annual monetary devaluation was adapted.

$$d = \frac{r - R}{n}$$

Where: d = annual depreciation  
r = initial investment  
R = residual value  
n = useful life span (years)

The operational cost, i.e., the total cost of production minus depreciation, previously induced in fixed cost, includes the interest on fixed investment and income tax. Their exclusions from the study is justified as following: (a) depreciation is excluded to avoid double accounting since it is included in fixed investment and in cash flow; (b) the interest on investment is excluded to make possible a comparison of IRR with the interest practised in current market and also to evaluate the profitability of invested capital, regardless of the method used for its calculation and annual reimbursement; (c) the income tax is not included because it is a form of net profit distribution rather than an operational cost, and in the case of feasibility study,

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it is of little value the knowledge to whom the profit is directed.

As the time 0 (zero), the cash flow has negative value because total income is zero and the cash flow value is equal to initial investment with negative sign. At the following periods, the cash flow may be positive or negative, depending upon the total income and operational and investment cost.

The table 5 exemplifies how cash flow is found.

TABLE 5: Cash flow

|                               | Useful life<br>(years) | 0       | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10         |           |
|-------------------------------|------------------------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------|-----------|
| Land                          |                        | $-T_0$  |        |        |        |        |        |        |        |        |        |            |           |
| Buildings                     | 20                     | $-ED_0$ |        |        |        |        |        |        |        |        |        |            |           |
| Equipments                    | 10                     | $-EQ_0$ |        |        |        |        |        |        |        |        |        | $-EQ_{10}$ |           |
| Vehicles                      | 5                      | $-V_0$  |        |        |        |        | $-V_5$ |        |        |        |        |            |           |
| Office facilities             | 10                     | $-M_0$  |        |        |        |        |        |        |        |        |        | $-M_{10}$  |           |
| Pre-project                   | -                      | $E_s$   |        |        |        |        |        |        |        |        |        |            |           |
| Others                        | -                      | $E_v$   |        |        |        |        |        |        |        |        |        |            |           |
| Total initial investments (I) |                        | $-I_0$  |        |        |        |        | $-I_5$ |        |        |        |        | $-EQ_{10}$ | $-M_{10}$ |
| Operational cost (C)          |                        | 0       | $-C_1$ | $-C_2$ | $-C_3$ | $-C_4$ | $-C_5$ | $-C_6$ | $-C_7$ | $-C_8$ | $-C_9$ | $-C_{10}$  |           |
| Total income (R)              |                        | 0       | $+R_1$ | $+R_2$ | $+R_3$ | $+R_4$ | $+R_5$ | $+R_6$ | $+R_7$ | $+R_8$ | $+R_9$ | $+R_{10}$  |           |
| Cash flow (X)                 |                        | $-x$    | $+X_1$ | $+X_2$ | $+X_3$ | $+X_4$ | $+X_5$ | $+X_6$ | $+X_7$ | $+X_8$ | $+X_9$ | $+X_{10}$  |           |

$X=R-(I-C)$



## SENSITIVITY ANALYSIS

The sensitivity analysis of economical feasibility project is used as the method of examining change in profitability of investment, when a variation in items of the cost structure and/or in the income occurs. It attempts to make an analysis of project more realistic and it is a way to work with uncertainties.

The methodology applied simulates the variations of certain components of the cost and/or income, keeping other items unchanged. This variation makes change in expense and/or profit, and consequently changes in cash flow and it creates new values of internal rate of return.

The comparison of new rate with the one obtained at basic case analysis gives information on sensitivity if internal rate of return regarding the variation of certain parameters.

Also with the sensitivity analysis one can evaluate the existence of surplus and compare with a case which there is full usage of the capacity.

For this purpose, the variation must be introduced in variable cost and income keeping fixed investments, working capital and fixed cost unchanged. The working capital is kept unchanged to make the calculation easier, giving a subestimated IRR. This will happen because the working capital is higher than what is needed for operating the industry.

In this project, it was assumed that the industry is operating at 100% capacity during the second period of the project.

In the first period all the equipments are placed in position and put in operation.

For the calculation of residual value of project, at the end of 20 years period, the useful lifetime of building and installation is set to 20 years. At 20th year, 50% of invested value on building are considered being residual at the end of project.

For the equipments, the useful life span was estimated for 10 years. New investments will be considered at 10th year of operation assuming a residual value of 40% for new investments and at the end of project. Regarding to the vehicles, the useful life span is estimated to be 5 years and new investments are considered,

at 5th; 10th and 15th years of operation.

A residual value of 20% is considered at new investments and at the end of project.

The residual values plus the amount of working capital are added to the income at 20th year.

## RESULTS AND CONCLUSIONS OBTAINED WITH INTERNAL RATE OF RETURN AND SENSITIVITY ANALYSIS

The analysis of predicted cash flow for the pressed yeast factory, SIPAQ, shows that the project is of conventional type of investments. It involves one or more negative cash flow followed by one or more positive cash flow, according to Bierman Jr. & Smith (1975). As shown by De Faro (1971), the project of this kind has only one internal rate of return which means that only one solution comes from the following:

$$\sum_{j=0}^n a_j (1+i)^{-j} = 0$$

for:  $a_j \leq 0 \quad j = 1, 2, \dots, k$   
 $a_j \geq 0 \quad j = k+1, \dots, n$   
with:  $k+1 \leq n$

The calculation of this polynomial equation was carried out by computer analysis developed by Phillips Richards et.al. at "Food and Feed Grain Institute", Kansas State University, USA in 1977 and adapted to the system found in Fundação Tropical de Pesquisas e Tecnologia, Campinas, SP. The results showed an internal rate of return (IRR) of 35.58% per year which means that the project is highly interesting on the investments point, since the interest charged by National Bank of Mozambique for this kind of industry is from 17% to 23%, including service and tax.

For sensitivity analysis, the study was carried out changing the price of raw material (molasses) and other ingredients (salts) used for yeast production.

Among the annual cost for the production of baker yeast the following component are in decreasing order of importance: (1) molasses; (2) electricity + fuel; (3) salts + reagents + cleaning materials + special clothes; (4) maintenance + water; (5) fixed and variable labor + social expenses; (6) packaging materials + filtering linens + office materials + communications + insurance; and (7) general expenses (others), fixed and variables. The analysis of vulnerability of investments, due to the possible rise in cost of those items are shown as follows:

The effect of those variations is measured by change in practised price of one of the items, while others are kept unvariable. As a function of this, the expected expenses and cash flow is also changed. For new cash flow, it was calculated a new IRR and compared with the basic case.

The results obtained from this hypothesis are shown in table 6. One can see from the results that the effect of variation in price and ingredients (molasses and salts) and income is remarkable IRR. The price of molasses considered for basic study is the price practised in October 1988, i.e., \$ 56.48 MT/Kg.

It was possible to include the analysis of sensitivity in regard to molasses, in order to find the vulnerability of the investments to this component of cost, which is responsible for 29% of total production cost. Simulated increase in 40% on cost of molasses (keeping other cost and income unchanged) reduces internal rate of return (IRR) of the project to 28,69% per year, which means a 24% reduction on IRR.

The second most important item of cost in production of baker yeast at SIPAQ is electricity and fuel. Simulated increase in 50% on the cost these items (with other items unchanged) reduces IRR to 33,60% per year. The reduction in profit is 6% as compared to the basic case (IRR=35,6%).

The third most important item in the cost of SIPAQ industry is taken by salts + reagents + cleaning materials + special clothes.

**Table 6: Results of sensitivity analysis of pressed baker yeast industry SIPAQ in Maputo - Mozambique**

| ITEM   | Price variation (%) | Tax of return IRR (%per year) |
|--|---------------------|-------------------------------|
| Basic case   | 0                   | 35,58                         |
| Raw material (molasses)  | + 20                | 32,15                         |
|  | + 40                | 28,69                         |
| Electricity + fuel   | + 30                | 34,38                         |
|  | + 50                | 35,58                         |
| Ingredients + reagents +<br>cleaning materials + special<br>clothes                          | + 30                | 34,59                         |
|  | + 50                | 33,94                         |
| Maintenance + water  | + 50                | 34,02                         |
| Labor(fixed and variable) +<br>social costs  | + 50                | 34,32                         |
| Packaging materials + office<br>materials + filtering linens +<br>insurance + communications | + 50                | 34,77                         |
| General costs (fixed and<br>variable)  | + 50                | 35,31                         |
| Total income   | - 10                | 28,45                         |
|  | - 5                 | 32,03                         |
|  | + 5                 | 39,10                         |
|  | + 10                | 42,59                         |
| Total income   | + 10                |                               |
| Raw material   | + 50                | 34,10                         |
| Total income   | + 10                |                               |
| Electricity + fuel   | + 50                | 40,62                         |
| Total income   | + 20                | 43,22                         |
| Total operational cost   | + 20                | 29,10                         |

Increase in 50% of these items reduces IRR to 33,9% per year, which makes clear that this investment is of great economical interest in relation to these items.

Other important item is the cost of labor. It is an investment which uses approximately 33 direct man power, and it has a considerable expenses with this item . Increase in 50% on wage causes a reduction on IRR to 34,3% per year. The reduction in profit of investment is 40% with an increase in 50% of labor cost.

Other important ingredient on cost is maintenance + water. An increase in 50% of its cost reduces IRR of the project to 34% per year.

Other items of SIPAQ, such is packing and office materials + filtering linens + insurance + communication named as general expenses (others) of fixed and variable cost do not affect considerably IRR of the project even if it increased 50% on its cost.

On the other hand, it is important to notice that an increase in total income is considered, due to increase in the price of product at rate of 5%, the IRR of the project becomes 39% per year, and if this increase is 10%, the IRR of the project becomes 42,6% per year, which corresponds to 19,50% increase in profit.

Conversely, a reduction in income of 5% gives an IRR value of 32% per year, and a reduction in 10%, an IRR value of 28.45% per year.

If there is an increase in all the operational cost at the rate of 20%, and if the same rate is applied to the sale price of the product, the IRR is increased to 43,2% per year, which means that the rate of profit rises approximately 21%.

If there is a 20% increase in all operational cost of SIPAQ, the IRR is reduced to 29,1% per year, which still shows a considerable profit on investment.

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It may be concluded by the results, taking in account the current interest paid in Mozambique, that the project has a great possibility of success and, as it has been proved by this analysis that the subject of major concern is the price of molasses to be profitable.

## Summary of Economical Indicators

The table 7 below shows a summary of economical indicators of yeast producing industry - SIPAQ in Maputo.

TABLE 7: Summary of economical indicators of yeast producing industry SIPAQ in Maputo.

|                          | \$ MT                 | US\$*          |
|--------------------------|-----------------------|----------------|
| Use of raw material      |                       |                |
| molasses yeast           | 1.716 ton             |                |
| Production capacity/year | 936.000 Kg            |                |
| Pressed yeast            | 2.080.000 pks of 450g |                |
| Fixed investment         | 579.326.375,60        | 934,397.38     |
| Working capital          | 15.927.456,04         | 25,689.44      |
| Total investment         | 595.253.831,64        | 960,086.82     |
| Annual fixed cost        | 172.008.811,00        | 277,433.56     |
| Annual working cost      | 162.258.115,10        | 261,706.63     |
| Total annual cost        | 334.266.926,10        | 539,140.19     |
| Unit production cost     | 357,12/Kg             | 0.58/kg        |
| Sale price               | 428,54/Kg             | 0.69/Kg        |
| Consumer sale price      | 449,97/Kg             | 0.73/Kg        |
|                          | 202,48/pcte 450g      | 0.33/pcte 450g |
| Total annual income      | 401.113.440,00        | 646,957.16     |
| Gross annual profit      | 66.846.513,90         | 107,816.96     |
| Break even point         |                       | 72,01%         |
| Internal rate of return  | 35,58                 | % per year     |

\* 1 US\$ = \$ 620,00 MT

1 P

## CONCLUSION

The importance of rehabilitation of baker yeast factory SIPAQ for Mozambique must be emphasized due to the following reasons:

- a) Avoidance of baker yeast importation to favors the external balance;
- b) Creation of employment opportunities, increasing population income which will enhance consumption of goods and services;
- c) Generation of sale Tax (\$ 21.43 MT/kg), in case of SIPAQ, the operation at 100% capacity (3.000 Kg/day) will generate a income of \$ 20,058,480.00 MT/year only with direct sale Tax.

For this, it is necessary that Mozambique Government controls baker yeast importation and gives necessary support to produce fresh baker yeast at SIPAQ. This company is capable of producing a high quality yeast. The fair retail price for fresh baker yeast at current conditions is \$ 449.97 MT/Kg or \$ 202.48 MT/package of 450g, including sale Tax, according to our economical studies.

In the consequence of correct economical policy, the Mozambique Government may expect the following results:

- a) Stable companies with good health.
- b) Companies do not need to be subsidized by Government in regard to the product price, or special financial support for new investments;
- c) Companies that are operating with profit will seek for increasing production with search for new market for the product, domestic or exportation.



Also, they will seek for new and better technologies with re-investment of profit in their own country, which is the most favorable for industrialization of Mozambique.

Finally, it must be emphasized that when SIPAQ starts to operate with full capacity, the company must establish some kind of marketing effort. This may be done through the meeting with local bakeries, or through a demonstration of product and special offer of product to potential customers for testing.

2

## RECOMMENDATIONS

It is highly recommended that, shortly after the full scale yeast production by SIPAQ, Mozambique Government, through UDRA, starts studies on dry yeast production for consumer living far from Maputo where the use of fresh yeast is not feasible.

For this purpose, it is recommended that a pre-viability study is carried out for dry yeast factory in Mozambique.

Other recommendation is the promotion of a special training for UDRA staff and other technical personnel of Mozambique Government to develop production cost analysis and economical evaluation of local industries, in order to control their efficiency as well as to assess a policy of fair price to their products.

One training program of this kind is shown in Annex IV at the end of this report.

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**ANNEXES**

12

**ANEXX I**

**BASIC FOR CALCULATIONS**

**Table 8: Buildings required for production of pressed baker yeast - SIPAQ in Maputo.**

| Buildings                    | Area<br>(m <sup>2</sup> ) | Price for m <sup>2</sup><br>US\$ | TOTAL<br>US\$     |
|------------------------------|---------------------------|----------------------------------|-------------------|
| Entrance and office          | 90                        | 175.00                           | 15,750.00         |
| Manager office               | 90                        | 175.00                           | 15,750.00         |
| Laboratory                   | 35                        | 180.00                           | 6,300.00          |
| Preparation of raw materials | 45                        | 170.00                           | 7,650.00          |
| Lime deposit                 | 6                         | 150.00                           | 900.00            |
| Fermentation area            | 300                       | 175.00                           | 52,500.00         |
| Yeast treatment area         | 80                        | 175.00                           | 14,000.00         |
| Cold room                    | 35                        | 190.00                           | 6,650.00          |
| Compressors                  | 30                        | 134.00                           | 4,020.00          |
| Refrigeration system         | 60                        | 175.00                           | 10,500.00         |
| Machine shop                 | 60                        | 175.00                           | 10,500.00         |
| Cold room                    | 50                        |                                  | 8,750.00          |
| Land                         | 2125                      | 14.08                            | 29,920.00         |
| <b>TOTAL</b>                 |                           | <b>US\$</b>                      | <b>183,190.00</b> |

Table 9: Processing equipments required for yeast processing plant - SIPAQ in Maputo



I-2

| Description  | H.P. | Working Period/day | Price<br>US\$     |
|--|------|--------------------|-------------------|
| 1 molasses storage tank, black steel, 1000 liter                   | -    |                    |                   |
| 1 molasses storage tank, black steel, 30.000 liter capacity        | -    |                    |                   |
| 1 mono D-60 pump   | 4.0  | 2                  |                   |
| 1 Gear pump, Vicking   | 7.5  | 4                  |                   |
| 2 molasses treatment tank, stainless steel 8,5 m <sup>3</sup>      | -    |                    |                   |
| 1 centrifugal pump Hilge (4 Kw)                                    | -    | 2                  |                   |
| 1 clarified molasses tank, stainless steel, 9,0m <sup>3</sup>      | -    |                    |                   |
| 1 mother yeast preparation tank, stainless steel, 10m <sup>3</sup> | -    |                    |                   |
| 1 centrifuge pump APV - pump                                       | 3.0  | 1                  |                   |
| 1 main fermentation vat, stainless steel 60,0m <sup>3</sup>        | -    |                    |                   |
| 1 salt preparation tank, stainless steel, 2.0m <sup>3</sup>        | -    |                    |                   |
| 1 centrifugal (pump for salt solution to fermentor)                | 5.5  | 1                  |                   |
| 1 centrifuge pump, Westphalia                                      | 30.0 | 3                  | 120,000.00        |
| 1 strainer filter, Westphalia (0,37 Kw)                            |      | 3                  |                   |
| 1 centrifugal separator, Westphalia type HDA 50-06-006             | 50.0 | 3                  |                   |
| 1 centrifugal pump (cream recirculation, AVP-PUMA (4 Kw)           |      | 3                  |                   |
| 1 heat exchanger (cream-glicol+water) Klaus Flensborger            | -    |                    |                   |
| 1 centrifugal pump (cream recirculation)                           | 1.5  | 6                  |                   |
| 1 cream deposit, stainless steel 12,0 m <sup>3</sup>               | -    |                    |                   |
| 2 piston pump for filter press, National Pump (5,5 Kw)<br>(5,5 Cv) |      | 6                  |                   |
| 2 filter press, National Pump                                      | -    |                    | 5,760.00          |
| 3 extruders (yeast molder)   | 2.0  | 2 + 2              |                   |
| <b>TOTAL</b>   |      |                    | <b>375,514.00</b> |

6

Table 10: Auxiliary equipments required for baker yeast processing plant - SIPAQ in Maputo

| Description  | Steam/charcoal   | H.P. | Working Hours/day | Price US\$        |
|--|------------------|------|-------------------|-------------------|
| 1 Boiler-charcoal type, capacity 4 to 5 kg/h   | 450kg/day        | 1    | no                | 13,646.00         |
| 2 Colds rooms temperature 4°C, Grenco Mod.<br>HU 250H compressor DWM tipo DCRG 0250<br>(4,8 Kw each)   | -                | -    | 12                | 20,000.00         |
| 1 Refrigeration system-water glicol, GRENCO<br>2 compressors (55,0 Kw each)<br>4 pumps 2(2,2 Kw each) + 2(3,0 Kw each)<br>1 pump for glicol recirculation (4 Kw)<br>1 cooling tower-BAC (2 Kw) | -                | -    | 8.0               | 169,000.00        |
| 2 Air Compressors make Holmes 3500m³h/each<br>(75 Kw each)   | -                | -    | 11.5              | 11,050.00         |
| 1 Electrical breakers  | -                | -    | -                 | 2,900.00          |
| 1 Transformer 300 KVA  | -                | -    | -                 | 3,000.00          |
| <b>TOTAL</b>   | <b>450Kg/day</b> |      |                   | <b>219,596.00</b> |

I-3

Work  
66,2Kw each

b

Table 11: Laboratory equipments required for yeast processing plant - SIPAQ in Maputo

| Equipments   | Price US\$ |
|--|------------|
| pH meter (to be purchased)   | 500.00     |
| Analytical balance   | 800.00     |
| Semi analytical balance (to be purchased)                              | 800.00     |
| Microscope   | 1,200.00   |
| Incubator (30 - 60°C)  | 250.00     |
| Water bath (30 - 60°C)   | 200.00     |
| Clinical centrifuge  | 400.00     |
| Vertical autoclave (to be purchased)                                   | 1 000 00   |
| Water distil (to be purchased)   | 400.00     |
| Cabinet for drying and sterilization (70 - 180°C)<br>(to be purchased) | 250.00     |
| Glassware and utensils   | 1.000,00   |
| TOTAL  | 6,800.00   |





Table 12: Vehicles required for baker yeast processing plant - SIPAQ in Maputo

| Description   | \$ MT                | US\$*            |
|---|----------------------|------------------|
| 1 Truck DAF truck Chassis 4x2 · 250 S DH-S-Heavy Duty version | 29,438,000.00        | 47,480.64        |
| 1 Tank type trailer, cap 23 ton                               | 410,000.00           | 661.29           |
| 1 Pick up truck SAVIEM (1980)                                 | 706,300.00           | 1,139.20         |
| 1 Motorcycle HONDA 50cc (1988)                                | 410,000.00           | 661.29           |
| <b>TOTAL</b>  | <b>30 964 300 00</b> | <b>49,942.42</b> |

5-1

\* 1 US\$ = \$ 620,00 MT

**Table 13: Furniture and Office installation required for baker yeast processing plant - SIPAQ in Maputo.**

| Materials                           | Unit Price<br>US\$ | Quantity | Total Price<br>US\$  |
|-------------------------------------|--------------------|----------|----------------------|
| Manager desk                        | 100                | 2        | 200.00               |
| Manager chair                       | 30                 | 2        | 60.00                |
| Desk office type<br>3 drawers       | 65                 | 7        | 455.00               |
| Desk for typewriter                 | 45                 | 2        | 90.00                |
| Arm chair                           | 12                 | 14       | 168.00               |
| Book case                           | 60                 | 3        | 180.00               |
| Paper storage drawers               | 80                 | 5        | 400.00               |
| Typewriter                          | 400                | 1        | 440.00               |
| Electrical calculator,<br>desk type | 90                 | 2        | 180.00               |
| Portable calculator,<br>electrical  | 10                 | 1        | 10.00                |
| Telephone cable                     | 73                 | 1        | 73.00                |
| Intercommunication wire             | 1                  | 300      | 300.00               |
| Telephone apparatus                 | 40                 | 5        | 200.00               |
| <b>TOTAL</b>                        |                    |          | <b>US\$ 2,789.00</b> |

P

**Table 14: Fixed Labor estimation required for baker yeast production plant  
SIPAQ - in Maputo.**

| <b>Fixed Labor</b>                  | <b>Basic Wages<br/>\$ MT</b> | <b>Total<br/>\$MT</b> |
|-------------------------------------|------------------------------|-----------------------|
| 2 Directors                         | 150,000.00                   | 300,000.00            |
| 1 Production - head                 | 68,000.00                    | 68,000.00             |
| 1 Molasses treatment - encharged of | 26,000.00                    | 26,000.00             |
| 1 Fermentation head                 | 33,750.00                    | 33,750.00             |
| 3 Fermentation encharged of         | 30,000.00                    | 90,000.00             |
| 1 Filtration encharged of           | 20,250.00                    | 20,250.00             |
| 1 Packaging encharged of            | 20,250.00                    | 20,250.00             |
| 1 Electricity encharged of          | 27,000.00                    | 27,000.00             |
| 1 Mechanical encharged of           | 27,000.00                    | 27,000.00             |
| 1 Driver                            | 33,000.00                    | 33,000.00             |
| 1 Storage encharged of              | 22,100.00                    | 22,100.00             |
| 1 Book keeping - head               | 27,000.00                    | 27,000.00             |
| 1 Book Keepper                      | 40,000.00                    | 40,000.00             |
| 1 Cashier                           | 20,500.00                    | 20,500.00             |
| 1 External services                 | 20,500.00                    | 20,500.00             |
| <b>TOTAL MONTHLY PAYMENTS</b>       |                              | <b>775,350.00</b>     |

Table 15: Estimation of variable labor cost for baker yeast production plant  
SIPPAQ in Maputo.

| Variable Labor       | Number of employees |
|----------------------|---------------------|
| Molasses treatment   | 1                   |
| Fermentation helpers | 5                   |
| Pressing units       | 1                   |
| Packaging units      | 3                   |
| Mechanical helpers   | 1                   |
| Driver (helpers)     | 1                   |
| Security             | 3                   |

10

**ANNEX II**

**LIST OF COMPUTER OUTPUT**

7

LIBRO DE DATOS  
4 1 1 7 116 0 2

UNIDADE DE INDUSTRIALIZACION DE FERROMENTO IRESCO

| PERIODO | EDIFICIO | INVESTIMIENTO EQUIPAMIENTO | VEICULOS | OUTROS | CAPITAL DE GIRO | RECEITA TOTAL | NO P+V+EN | MAT+PRIN | 0.0 | COSTO OPERACIONAL ELE+COMB INGR+ETC | 0.0 | LIB.+ETC | MARGEN | DESP. GER |
|---------|----------|----------------------------|----------|--------|-----------------|---------------|-----------|----------|-----|-------------------------------------|-----|----------|--------|-----------|
| 1       | 0        | 11237.                     | 41232.   | 30964. | 16874.          | 0.0           | 0.0       | 0.0      | 0.0 | 22639.                              | 0.0 | 9241.    | 0.0    | 0.0       |
| 2       | 1        | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 3       | 2        | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 4       | 3        | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 5       | 4        | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 6       | 5        | 0.0                        | 0.0      | 24771. | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 7       | 6        | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 8       | 7        | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 9       | 8        | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 10      | 9        | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 11      | 10       | 0.0                        | 24771.   | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 12      | 11       | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 13      | 12       | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 14      | 13       | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 15      | 14       | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 16      | 15       | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 17      | 16       | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 18      | 17       | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 19      | 18       | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 20      | 19       | 0.0                        | 0.0      | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 21      | 20       | 0.0                        | 164892.  | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |
| 22      | 21       | 0.0                        | 164892.  | 0.0    | 0.0             | 401113.       | 14257.    | 96720.   | 0.0 | 18643.                              | 0.0 | 9241.    | 17641. | 3060.     |

PERIODO DE ESCOLA EFECTIVO DE 30 DIAS DO PERIODO

7

ANÁLISE DE VIABILIDADE DE INVESTIMENTO  
 UNIDADE DE INDUSTRIALIZACAO DE FERMENTO FRESCO

TAXA INTERNA DE RETORNO SOBRE O CAPITAL TOTAL 35,579 PORCENTO

| PERIODO | INVESTIMENTO (RENTONIS) |             |         | OPERACIONAL (RENTONIS) |           |            | FATOR             |                    | VALOR PRESENTE |         |
|---------|-------------------------|-------------|---------|------------------------|-----------|------------|-------------------|--------------------|----------------|---------|
|         | NO. IDENT.              | INVESTIMENT | DE GIRO | RECEITA                | ** CUSTOS | DE OPERAC. | OU VALOR PRESENTE | OU VALOR INVESTIM. | TOTAL          | LIQUIDA |
| 1       | 0                       | 579327.     | 15927.  | 0.0                    | 0.0       | 0.0        | 1.0000            | 579327.            | 579327.        | 0.0     |
| 2       | 1                       | 0.0         | 0.0     | 401113.                | 182103.   | 182103.    | 0.7376            | 0.0                | 0.0            | 151313. |
| 3       | 2                       | 0.0         | 0.0     | 401113.                | 182403.   | 182403.    | 0.5460            | 0.0                | 0.0            | 118933. |
| 4       | 3                       | 0.0         | 0.0     | 401113.                | 182103.   | 182103.    | 0.4013            | 0.0                | 0.0            | 87750.  |
| 5       | 4                       | 0.0         | 0.0     | 401113.                | 182403.   | 182403.    | 0.2859            | 0.0                | 0.0            | 64730.  |
| 6       | 5                       | 24771.      | 0.0     | 401113.                | 182103.   | 182103.    | 0.2133            | 5107.              | 5107.          | 47749.  |
| 7       | 6                       | 0.0         | 0.0     | 401113.                | 182403.   | 182403.    | 0.1510            | 0.0                | 0.0            | 35213.  |
| 8       | 7                       | 0.0         | 0.0     | 401113.                | 182103.   | 182103.    | 0.1133            | 0.0                | 0.0            | 25973.  |
| 9       | 8                       | 0.0         | 0.0     | 401113.                | 182403.   | 182403.    | 0.0876            | 0.0                | 0.0            | 19157.  |
| 10      | 9                       | 0.0         | 0.0     | 401113.                | 182103.   | 182103.    | 0.0646            | 0.0                | 0.0            | 14130.  |
| 11      | 10                      | 222110.     | 0.0     | 401113.                | 182403.   | 182403.    | 0.0477            | 12587.             | 12587.         | 10422.  |
| 12      | 11                      | 0.0         | 0.0     | 401113.                | 182103.   | 182103.    | 0.0361            | 0.0                | 0.0            | 7637.   |
| 13      | 12                      | 0.0         | 0.0     | 401113.                | 182403.   | 182403.    | 0.0259            | 0.0                | 0.0            | 5670.   |
| 14      | 13                      | 0.0         | 0.0     | 401113.                | 182103.   | 182103.    | 0.0191            | 0.0                | 0.0            | 4133.   |
| 15      | 14                      | 0.0         | 0.0     | 401113.                | 182403.   | 182403.    | 0.0141            | 0.0                | 0.0            | 3055.   |
| 16      | 15                      | 24771.      | 0.0     | 401113.                | 182103.   | 182103.    | 0.0104            | 250.               | 250.           | 2273.   |
| 17      | 16                      | 0.0         | 0.0     | 401113.                | 182403.   | 182403.    | 0.0077            | 0.0                | 0.0            | 1676.   |
| 18      | 17                      | 0.0         | 0.0     | 401113.                | 182103.   | 182103.    | 0.0057            | 0.0                | 0.0            | 1292.   |
| 19      | 18                      | 0.0         | 0.0     | 401113.                | 182403.   | 182403.    | 0.0042            | 0.0                | 0.0            | 913.    |
| 20      | 19                      | 0.0         | 0.0     | 401113.                | 182103.   | 182103.    | 0.0031            | 0.0                | 0.0            | 573.    |
| 21      | 20                      | 222110.     | 15927.  | 401113.                | 182403.   | 182403.    | 0.0023            | 250.               | 250.           | 457.    |
| TOTAL   |                         | 670330.     | 0.0     | 3321150.               | 1546860.  | 1546860.   |                   | 613323.            | 613323.        | 313323. |

| RENTONIS/PERIODO |       | VALOR PRESENTE EM RENTONIS |          |
|------------------|-------|----------------------------|----------|
| RECEITA          | TAXA  | RECEITA                    | CUSTOS   |
| 10.000           | 3,317 | 100000.                    | 993317.  |
| 20.000           | 3,653 | 1900000.                   | 1770000. |
| 30.000           | 3,988 | 2700000.                   | 2400000. |
| 40.000           | 4,327 | 3500000.                   | 3000000. |
| 50.000           | 4,673 | 4300000.                   | 3600000. |
| 60.000           | 5,017 | 5100000.                   | 4200000. |

OS VALORES PRESENTES  
 FORAM CALCULADOS COM BASE EM TAXA DE 35,579%  
 CASO BASE DE INDUSTRIALIZACAO DE FERMENTO FRESCO SEM ALTERNACAO

LISTA DE CARGOS

4 1 1 7 118 0 2

UNIDADE DE INDUSTRIALIZACAO DE FERMENTO FRESCO

| PLANO | INVESTIMENTO |              | CAPITAL DE GIRO | RECEITA TOTAL | CUSTO OPERACIONAL |          | LUBRIFICANTES | ELETRICIDADE | MATERIAL | DESPESAS |
|-------|--------------|--------------|-----------------|---------------|-------------------|----------|---------------|--------------|----------|----------|
|       | EDIFICACAO   | EQUIPAMENTOS |                 |               | FIXO              | VARIAVEL |               |              |          |          |
| 1     | 119237.      | 412252.      | 15727.          | 0.0           | 0.0               | 0.0      | 0.0           | 0.0          | 0.0      | 0.0      |
| 2     | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 3     | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 4     | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 5     | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 6     | 0.0          | 24771.       | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 7     | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 8     | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 9     | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 10    | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 11    | 0.0          | 24771.       | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 12    | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 13    | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 14    | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 15    | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 16    | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 17    | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 18    | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 19    | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 20    | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |
| 21    | 0.0          | 0.0          | 0.0             | 401113.       | 14259.            | 116304.  | 22639.        | 18643.       | 9241.    | 17641.   |

TOTAL DO INVESTIMENTO EM BENS MATERIAIS 15727.



7

ANALISE DE VIABILIDADE DO INVESTIMENTO  
 UNIDADE DE INDUSTRIALIZACAO DE FENILENO PRECO

TAXA INTERNA DE RETORNO SOBRE O CAPITAL TOTAL 32.10% PORCENTO

| PERIODO | NO. IDENT. | INVESTIMENTO (RECURSOS) |         |         | OPERACIONAL (RECURSOS) |          | FAZOR DO VALOR PRESENTE | VALOR PRESENTE |         |
|---------|------------|-------------------------|---------|---------|------------------------|----------|-------------------------|----------------|---------|
|         |            | INVESTIMENT             | DE GIRO | TOTAL   | RECEITA                | * CUSTOS |                         | RECEITA        | RECEITA |
| 1       | 0          | 599327.                 | 104227. | 599324. | 0.0                    | 0.0      | 1.0000                  | 599324.        | 0.0     |
| 2       | 1          | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.72587                 | 0.0            | 120330. |
| 3       | 2          | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.57206                 | 0.0            | 114134. |
| 4       | 3          | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.43333                 | 0.0            | 85443.  |
| 5       | 4          | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.32379                 | 0.0            | 65123.  |
| 6       | 5          | 24721.                  | 0.0     | 24721.  | 401113.                | 201787.  | 0.22491                 | 3169.          | 47453.  |
| 7       | 6          | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.16121                 | 0.0            | 37421.  |
| 8       | 7          | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.11070                 | 0.0            | 28315.  |
| 9       | 8          | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.08313                 | 0.0            | 21417.  |
| 10      | 9          | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.06216                 | 0.0            | 16417.  |
| 11      | 10         | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.04616                 | 16747.         | 12237.  |
| 12      | 11         | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.03502                 | 0.0            | 9021.   |
| 13      | 12         | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.02657                 | 0.0            | 7021.   |
| 14      | 13         | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.02010                 | 0.0            | 5415.   |
| 15      | 14         | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.01510                 | 0.0            | 4115.   |
| 16      | 15         | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.01113                 | 0.0            | 3115.   |
| 17      | 16         | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.00837                 | 0.0            | 2315.   |
| 18      | 17         | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.00626                 | 0.0            | 1715.   |
| 19      | 18         | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.00466                 | 0.0            | 1215.   |
| 20      | 19         | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.00350                 | 0.0            | 921.    |
| 21      | 20         | 0.0                     | 0.0     | 0.0     | 401113.                | 201787.  | 0.00265                 | 0.0            | 702.    |
| TOTAL   |            | 599327.                 | 104227. | 599324. | 3212360.               | 1635700. |                         | 617273.        | 317923. |

TAXA PERCENTO

|              |         |        |
|--------------|---------|--------|
| INVESTIMENTO | 599327. | 100.00 |
| DE GIRO      | 104227. | 17.39  |
| TOTAL        | 599324. | 100.00 |

VALOR PRESENTE EM RECURSOS

|          |          |        |
|----------|----------|--------|
| RECEITA  | 3212360. | 100.00 |
| * CUSTOS | 1635700. | 50.92  |
| RECEITA  | 1576660. | 49.08  |

TAXA PERCENTO

|          |          |        |
|----------|----------|--------|
| RECEITA  | 3212360. | 100.00 |
| * CUSTOS | 1635700. | 50.92  |
| RECEITA  | 1576660. | 49.08  |

CONSIDERANDO O RENDIMENTO DE 30% ANUAL  
 O INVESTIMENTO EM CAPITAL DE 599327.  
 O VALOR PRESENTE EM RECURSOS É DE 617273.  
 O VALOR PRESENTE EM RECURSOS É DE 317923.



ANALISE DE VALIA LÍQUIDA DE INVESTIMENTO

UNIDADE DE INVESTIMENTOS DE FÉRMENTO FRESCO

TAXA INTERNA DE RETORNO SOBRE O CAPITAL TOTAL 28.69% PORCENTO

| PERÍODO | NO. IDENT. | INVESTIMENTO (RETCINAS) |         | OPERACIONAL (RETCINAS) |           | FAZOR   |          | VALOR PRESENTE |         |
|---------|------------|-------------------------|---------|------------------------|-----------|---------|----------|----------------|---------|
|         |            | INVESTIMENTO            | DE GIRO | RECEITA                | ** CUSTOS | RECEITA | CO VALOR | INVESTIM.      | RECEITA |
| 1       | 0          | 579327                  | 19527   | 0.0                    | 599254    | 0.0     | 1.0000   | 599254         | 0.0     |
| 2       | 1          | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.7770   | 0.0            | 137822  |
| 3       | 2          | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.6032   | 0.0            | 107642  |
| 4       | 3          | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.4666   | 0.0            | 80424   |
| 5       | 4          | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.3646   | 0.0            | 60601   |
| 6       | 5          | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.2823   | 7017           | 50774   |
| 7       | 6          | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.2201   | 0.0            | 34609   |
| 8       | 7          | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.1710   | 0.0            | 27073   |
| 9       | 8          | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.1325   | 0.0            | 20918   |
| 10      | 9          | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.1033   | 0.0            | 16034   |
| 11      | 10         | 27210                   | 0.0     | 40113                  | 22171     | 17942   | 0.0822   | 21637          | 12440   |
| 12      | 11         | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.0655   | 0.0            | 9321    |
| 13      | 12         | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.0513   | 0.0            | 7073    |
| 14      | 13         | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.0397   | 0.0            | 5294    |
| 15      | 14         | 24771                   | 0.0     | 40113                  | 22171     | 17942   | 0.0303   | 550            | 4021    |
| 16      | 15         | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.0232   | 0.0            | 3094    |
| 17      | 16         | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.0180   | 0.0            | 2275    |
| 18      | 17         | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.0140   | 0.0            | 1673    |
| 19      | 18         | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.0107   | 0.0            | 1241    |
| 20      | 19         | 0.0                     | 0.0     | 40113                  | 22171     | 17942   | 0.0083   | 0.0            | 9281    |
| 21      | 20         | -233213                 | -19527  | 40113                  | 22171     | 17942   | 0.0064   | -12537         | 62081   |
| 22      | 21         | 570336                  | 0.0     | 502250                 | 570336    | 423250  | 0.0000   | 570336         | 570336  |

TAXA VALOR PRESENTE EM LÍQUIDA TAXA VALOR PRESENTE EM LÍQUIDA

| PERCENTUAL | TAXA   | RECEITA | CUSTOS | VALOR PRESENTE |
|------------|--------|---------|--------|----------------|
| 100.000    | 2.2327 | 1231742 | 634214 | 634214         |
| 20.000     | 1.3660 | 87622   | 444331 | 444331         |
| 30.000     | 0.781  | 37691   | 20280  | 20280          |
| 40.000     | 0.736  | 44937   | 609132 | 609132         |
| 50.000     | 0.543  | 33778   | 60217  | 60217          |
| 60.000     | 0.500  | 34278   | 60007  | 60007          |

NOTA: O VALOR PRESENTE EM LÍQUIDA É O RESULTADO DA ANÁLISE DE VALIA LÍQUIDA DE INVESTIMENTO. O VALOR PRESENTE EM LÍQUIDA É O RESULTADO DA ANÁLISE DE VALIA LÍQUIDA DE INVESTIMENTO.





LISTA DE BENS

1 1 7 113 0 2

UNIDADE DE INDUSTRIALIZACAO DE FARMACOS PRECO

| ESCALAS | INVESTIMENTO |         | CAPITAL DE GIRO | OUTROS | RESERVA TOTAL | CUSTO OPERACIONAL |        | VALORES DE BENS | VALORES DE BENS | VALORES DE BENS |
|---------|--------------|---------|-----------------|--------|---------------|-------------------|--------|-----------------|-----------------|-----------------|
|         | 1.0000       | 1.0000  |                 |        |               | 1.0000            | 1.0000 |                 |                 |                 |
| 1       | 412241       | 30957   | 13927           | 13374  | 401113        | 0.0               | 0.0    | 0.0             | 0.0             | 0.0             |
| 2       | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 3       | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 4       | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 5       | 0.0          | 24771   | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 6       | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 7       | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 8       | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 9       | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 10      | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 11      | 0.0          | 24771   | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 12      | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 13      | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 14      | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 15      | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 16      | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 17      | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 18      | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 19      | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 20      | 0.0          | 0.0     | 0.0             | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |
| 21      | -37533       | -104374 | -13727          | 0.0    | 401113        | 96920             | 33959  | 17641           | 17641           | 3060            |

VALORES DE BENS DE BENS NO INICIO DO PERIODO

7

ANÁLISE DA VIABILIDADE DO INVESTIMENTO  
 CÁLCULO DE INVESTIMENTO DE FERTILIZANTE

| PERÍODO | INVESTIMENTO (RENTIS) |        | RECEITA DE RECEITA |         | OPERACIONAL (RENTIS) |         | RECEITA DE RECEITA |         | VALOR PRESENTE    |        |         |
|---------|-----------------------|--------|--------------------|---------|----------------------|---------|--------------------|---------|-------------------|--------|---------|
|         | NO.                   | IDEII  | INVESTIMENT        | DE GIRO | TOTAL                | RECEITA | ** CUSTOS          | LIQUIDA | OU VALOR PRESENTE | TOTAL  | LIQUIDA |
| 1       | 0                     | 57527  | 15727              | 0.0     | 59524                | 0.0     | 0.0                | 0.0     | 1.0000            | 57527  | 0.0     |
| 2       | 1                     | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.7425            | 37591  | 133254  |
| 3       | 2                     | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.5504            | 0.0    | 112224  |
| 4       | 3                     | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.4193            | 0.0    | 37006   |
| 5       | 4                     | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.3141            | 0.0    | 60133   |
| 6       | 5                     | 24721  | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.2351            | 8324   | 43754   |
| 7       | 6                     | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.1760            | 0.0    | 36502   |
| 8       | 7                     | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.1313            | 0.0    | 29496   |
| 9       | 8                     | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.0980            | 0.0    | 23513   |
| 10      | 9                     | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.0733            | 0.0    | 18564   |
| 11      | 10                    | 27210  | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.0553            | 15041  | 13684   |
| 12      | 11                    | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.0417            | 0.0    | 9331    |
| 13      | 12                    | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.0310            | 0.0    | 6427    |
| 14      | 13                    | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.0227            | 0.0    | 4509    |
| 15      | 14                    | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.0163            | 0.0    | 3272    |
| 16      | 15                    | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.0117            | 0.0    | 2372    |
| 17      | 16                    | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.0085            | 0.0    | 1723    |
| 18      | 17                    | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.0062            | 0.0    | 1253    |
| 19      | 18                    | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.0046            | 0.0    | 913     |
| 20      | 19                    | 0.0    | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.0034            | 0.0    | 663     |
| 21      | 20                    | 300713 | 0.0                | 40113   | 0.0                  | 193723  | 193723             | 207391  | 0.0025            | 3127   | 224     |
| TOTAL   |                       | 57527  | 0.0                | 202250  | 387420               |         |                    | 4217310 |                   | 512237 | 35237   |

| VALOR PRESENTE EM REENTRADA |        | VALOR PRESENTE EM REENTRADA |         |
|-----------------------------|--------|-----------------------------|---------|
| RECEITA                     | CUSTOS | RECEITA                     | CUSTOS  |
| 1733332                     | 634341 | 1733332                     | 1000017 |
| 1009905                     | 644371 | 1009905                     | 380074  |
| 687804                      | 623350 | 687804                      | 3211    |
| 517807                      | 609134 | 517807                      | 19179   |
| 416859                      | 603417 | 416859                      | 133391  |
| 345822                      | 589972 | 345822                      | 1000000 |

RECEITA DE RECEITA  
 INVESTIMENTO DE FERTILIZANTE  
 INVESTIMENTO DE FERTILIZANTE





ANÁLISIS DE VIABILIDAD DE INVERSIÓN

UNIDADE DE INDUSTRIALIZACAO DE FERTILIZANTE

| PERÍODO | INVESTIMENTO (MÉDICAS) |             |         | TAXA INTERNA DE RETORNO SOBRE O CAPITAL TOTAL |          |           | OPERACIONAL (MÉDICAS) |          |          | TAXA DE FORTALECIMENTO DE FERTILIZANTE |         |                |
|---------|------------------------|-------------|---------|---|----------|-----------|-----------------------|----------|----------|--|---------|----------------|
|         | NO. IDENT.             | INVESTIMENT | DE GIRO | TOTAL   | RECEITA  | ** CUSTOS | UL OPERAC.            | LIQUIDA  | RECEITA  | OU VALOR PRESENTE                      | FATOR   | VALOR PRESENTE |
| 1       | 0                      | 595254.     | 15327.  | 595254.                                       | 0.0      | 0.0       | 0.0                   | 0.0      | 0.0      | 1.0000                                 | 595254. | 0.0            |
| 2       | 1                      | 0.0         | 0.0     | 401113.                                       | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.7430                                 | 0.0     | 123592.        |
| 3       | 2                      | 0.0         | 0.0     | 401113.                                       | 187596.  | 187596.   | 187596.               | 213117.  | 213117.  | 0.5530                                 | 0.0     | 111645.        |
| 4       | 3                      | 0.0         | 0.0     | 401113.                                       | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.4101                                 | 0.0     | 37408.         |
| 5       | 4                      | 0.0         | 0.0     | 401113.                                       | 187596.  | 187596.   | 187596.               | 213117.  | 213117.  | 0.3047                                 | 0.0     | 64762.         |
| 6       | 5                      | 24771.      | 0.0     | 24771.  | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.2284                                 | 5666.   | 68211.         |
| 7       | 6                      | 0.0         | 0.0     | 401113.                                       | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.1682                                 | 0.0     | 35547.         |
| 8       | 7                      | 0.0         | 0.0     | 401113.                                       | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.1280                                 | 0.0     | 28230.         |
| 9       | 8                      | 0.0         | 0.0     | 401113.                                       | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.0929                                 | 0.0     | 17763.         |
| 10      | 9                      | 0.0         | 0.0     | 401113.                                       | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.0670                                 | 0.0     | 10924.         |
| 11      | 10                     | 222110.     | 0.0     | 222110.                                       | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.0361                                 | 0.0     | 9144.          |
| 12      | 11                     | 0.0         | 0.0     | 401113.                                       | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.0283                                 | 0.0     | 5330.          |
| 13      | 12                     | 0.0         | 0.0     | 401113.                                       | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.0210                                 | 0.0     | 3254.          |
| 14      | 13                     | 0.0         | 0.0     | 401113.                                       | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.0156                                 | 0.0     | 2074.          |
| 15      | 14                     | 0.0         | 0.0     | 401113.                                       | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.0119                                 | 0.0     | 1332.          |
| 16      | 15                     | 24771.      | 0.0     | 24771.  | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.0086                                 | 0.0     | 882.           |
| 17      | 16                     | 0.0         | 0.0     | 401113.                                       | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.0064                                 | 0.0     | 422.           |
| 18      | 17                     | 0.0         | 0.0     | 401113.                                       | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.0048                                 | 0.0     | 232.           |
| 19      | 18                     | 0.0         | 0.0     | 401113.                                       | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.0039                                 | 0.0     | 107.           |
| 20      | 19                     | 0.0         | 0.0     | 401113.                                       | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.0032                                 | 0.0     | 59.            |
| 21      | 20                     | 252713.     | 0.0     | 252713.                                       | 187996.  | 187996.   | 187996.               | 213117.  | 213117.  | 0.0026                                 | -649.   | 49.            |
| TOTAL   |                        | 570255.     | 0.0     | 570255.                                       | 3757513. | 3757513.  | 3757513.              | 4252342. | 4252342. |  | 614430. | 614430.        |

| PERÍODO | VALOR PRESENTE EM MÉDICAS |         | VALOR PRESENTE EM MÉDICAS |          |
|---------|---------------------------|---------|---------------------------|----------|
|         | RECEITA                   | CUSTOS  | RECEITA                   | BALANÇO  |
| 1       | 1814336.                  | 694317. | 1814336.                  | 1120022. |
| 2       | 1037791.                  | 644331. | 1037791.                  | 393460.  |
| 3       | 705522.                   | 520350. | 705522.                   | 33802.   |
| 4       | 532156.                   | 609132. | 532156.                   | -76976.  |
| 5       | 425439.                   | 603117. | 425439.                   | -177111. |
| 6       | 305165.                   | 600092. | 305165.                   | -244526. |

... DEPENDENTES  
 ... DEPENDENTES ...  
 ... DEPENDENTES ...

LISTA DE DATOS

4 1 7 113 0 2

UNIDADE DE INDUSTRIALIZACAO DE FERRUGEM FUSAO

| PERIODO          | CONSTRUCOES | INVESTIMENTO | OUTRAS   | CAPITAL | RECEITA | NO-IV-EN | INT-PRIN | ELL+CCMS | INGR+DTC | EMB-RETC | AMRACALUM | DESI-GER |
|------------------|-------------|--------------|----------|---------|---------|----------|----------|----------|----------|----------|-----------|----------|
| ESCALAS : 1.0005 | 1.0000      | 1.0000       | 1.0000   | 1.0000  | 1.0000  | 1.0000   | 1.0000   | 1.0000   | 1.5000   | 1.0000   | 1.0000    | 1.0000   |
| 1                | 0           | 119257.      | 412232.  | 30754.  | 13874.  | 15927.   | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0      |
| 2                | 1           | 0.0          | 0.0      | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 3                | 2           | 0.0          | 0.0      | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 4                | 3           | 0.0          | 0.0      | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 5                | 4           | 0.0          | 0.0      | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 6                | 5           | 0.0          | 0.0      | 24771.  | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 7                | 6           | 0.0          | 0.0      | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 8                | 7           | 0.0          | 0.0      | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 9                | 8           | 0.0          | 0.0      | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 10               | 9           | 0.0          | 0.0      | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 11               | 10          | 0.0          | 24771.   | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 12               | 11          | 0.0          | 0.0      | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 13               | 12          | 0.0          | 0.0      | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 14               | 13          | 0.0          | 0.0      | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 15               | 14          | 0.0          | 0.0      | 24771.  | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 16               | 15          | 0.0          | 0.0      | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 17               | 16          | 0.0          | 0.0      | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 18               | 17          | 0.0          | 0.0      | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 19               | 18          | 0.0          | 0.0      | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 20               | 19          | 0.0          | 0.0      | 0.0     | 0.0     | 0.0      | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |
| 21               | 20          | -39823.      | -134392. | -6193.  | 0.0     | -15927.  | 40113.   | 14259.   | 27965.   | 9241.    | 17641.    | 3060.    |

ENTRADA DE BOMBA APLICADOS NO INICIO DO PERIODO 1



CP

LISTA DE DATOS

4 1 - 7 113 0 2

URBE-DE DE INDUSTRIALIZACION DE IARRIENNO IRESCO

| PERIODO   | EDIFICAC | INVESTIMIENTO | OUTROS   | CAPITAL | RECEITA | NO-FUEER | INT-PRGR | COSTO OPERACIONAL | LIBR.+ETC | MANHACON | DEEF.  | GER.   |
|-----------|----------|---------------|----------|---------|---------|----------|----------|-------------------|-----------|----------|--------|--------|
| ESCALAS : | 1.0000   | 1.0000        | 1.0000   | 1.0000  | 1.0000  | 1.0000   | 1.0000   | 1.0000            | 1.0000    | 1.0000   | 1.0000 | 1.0000 |
| 1         | 0        | 112257.       | 412252.  | 30754.  | 15227.  | 0.0      | 0.0      | 0.0               | 0.0       | 0.0      | 0.0    | 0.0    |
| 2         | 1        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 3         | 3        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 4         | 3        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 5         | 3        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 6         | 5        | 0.0           | 24771.   | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 7         | 5        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 8         | 5        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 9         | 5        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 10        | 5        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 11        | 5        | 0.0           | 247537.  | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 12        | 5        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 13        | 5        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 14        | 5        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 15        | 5        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 16        | 5        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 17        | 5        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 18        | 5        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 19        | 5        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 20        | 5        | 0.0           | 0.0      | 0.0     | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |
| 21        | 5        | -39222.       | -134672. | -6113.  | 0.0     | 14259.   | 96920.   | 22639.            | 15643.    | 26462.   | 3060.  | 3060.  |

ESTADO DE CUENTA MILENARES NO MILENARES PERIODO 1

10

ANÁLISE DE VIABILIDADE DE INVESTIMENTO  
 UNIDADE DE INDUSTRIALIZAÇÃO DE FERRIMENTO FRESCO

TAXA INTERNA DE RETORNO SOBRE O CAPITAL TOTAL 34,02% PORCENTO

| PERÍODO | INVESTIMENTO (RENTABILIS) |         |         | OPERACIONAL (RENTABILIS) |            |         | FAIXA   |          |           |         |
|---------|---------------------------|---------|---------|--------------------------|------------|---------|---------|----------|-----------|---------|
|         | INVESTIMENT               | DE GIRO | CAPITAL | TOTAL                    | DE OPERAC. | RECEITA | % VALOR | PRESENTE | INVESTIM. | RECEITA |
| 0       | 575327                    | 15927   | 595254  | 0.0                      | 0.0        | 0.0     | 1.0000  | 595254   | 0.0       | 0.0     |
| 1       | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.7461  | 0.0      | 0.0       | 138807  |
| 2       | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.7567  | 0.0      | 0.0       | 116350  |
| 3       | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.7671  | 0.0      | 0.0       | 97187   |
| 4       | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.7771  | 0.0      | 0.0       | 80008   |
| 5       | 24771                     | 0.0     | 24771   | 401113                   | 191224     | 209890  | 0.7871  | 3727     | 0.0       | 65557   |
| 6       | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.7971  | 0.0      | 0.0       | 52177   |
| 7       | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.8071  | 0.0      | 0.0       | 39702   |
| 8       | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.8171  | 0.0      | 0.0       | 27027   |
| 9       | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.8271  | 0.0      | 0.0       | 15044   |
| 10      | 272110                    | 0.0     | 272110  | 401113                   | 191224     | 209890  | 0.8371  | 14553    | 0.0       | 11225   |
| 11      | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.8471  | 0.0      | 0.0       | 0.0     |
| 12      | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.8571  | 0.0      | 0.0       | 0.0     |
| 13      | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.8671  | 0.0      | 0.0       | 0.0     |
| 14      | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.8771  | 0.0      | 0.0       | 0.0     |
| 15      | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.8871  | 0.0      | 0.0       | 0.0     |
| 16      | 24771                     | 0.0     | 24771   | 401113                   | 191224     | 209890  | 0.8971  | 308      | 0.0       | 0.0     |
| 17      | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.9071  | 0.0      | 0.0       | 0.0     |
| 18      | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.9171  | 0.0      | 0.0       | 0.0     |
| 19      | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.9271  | 0.0      | 0.0       | 0.0     |
| 20      | 0.0                       | 0.0     | 0.0     | 401113                   | 191224     | 209890  | 0.9371  | 0.0      | 0.0       | 0.0     |
| 21      | 370250                    | -15727  | 354523  | 303250                   | 361470     | 417770  | 0.9029  | 1700     | 0.0       | 0.0     |
| TOTAL   |                           |         |         |                          |            |         |         | 595254   |           | 612129  |

| PERCENTUAL | VALOR PRESENTE EM REAIS |                         |
|------------|-------------------------|-------------------------|
|            | RECEITA                 | VALOR PRESENTE EM REAIS |
| 10.000     | 1728708                 | 584314                  |
| 20.000     | 1022074                 | 377743                  |
| 30.000     | 675750                  | 25100                   |
| 40.000     | 524097                  | -85035                  |
| 50.000     | 417633                  | -183358                 |
| 60.000     | 347737                  | -250305                 |

VALOR PRESENTE EM REAIS  
 VALOR PRESENTE EM REAIS  
 VALOR PRESENTE EM REAIS











ANALISIS DE VIABILIDAD DE UN PLAN DE INVERSIONES  
 UNIDAD DE INDUSTRIALIZACION DE PERIODO PRECISO

TAMA INICIAL DE ALTISSIMO SOBRE CAPITAL TOTAL 34.76% PORCENTO

| PERIODO | NO. IDENT. | INVERSION | DE GASTO | TOTAL | OPERACIONAL (MEXICANOS) |          | FAJON  | VALOR PRESENTE |
|---------|------------|-----------|----------|-------|-------------------------|----------|--------|----------------|
|         |            |           |          |       | RECIBO                  | % CURSOS |        |                |
| 1       | 0          | 59000     | 10000    | 59000 | 0.0                     | 137027   | 1.0000 | 59000          |
| 2       | 1          | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.7400 | 0.0            |
| 3       | 2          | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.6006 | 0.0            |
| 4       | 3          | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.4659 | 0.0            |
| 5       | 4          | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.3330 | 0.0            |
| 6       | 5          | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.2250 | 0.0            |
| 7       | 6          | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.1667 | 0.0            |
| 8       | 7          | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.1250 | 0.0            |
| 9       | 8          | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0932 | 0.0            |
| 10      | 9          | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0699 | 0.0            |
| 11      | 10         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0517 | 0.0            |
| 12      | 11         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0385 | 0.0            |
| 13      | 12         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0285 | 0.0            |
| 14      | 13         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0212 | 0.0            |
| 15      | 14         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0158 | 0.0            |
| 16      | 15         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0117 | 0.0            |
| 17      | 16         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0084 | 0.0            |
| 18      | 17         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0062 | 0.0            |
| 19      | 18         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0046 | 0.0            |
| 20      | 19         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0034 | 0.0            |
| 21      | 20         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0025 | 0.0            |
| 22      | 21         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0018 | 0.0            |
| 23      | 22         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0013 | 0.0            |
| 24      | 23         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0009 | 0.0            |
| 25      | 24         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0007 | 0.0            |
| 26      | 25         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0005 | 0.0            |
| 27      | 26         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0004 | 0.0            |
| 28      | 27         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0003 | 0.0            |
| 29      | 28         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0002 | 0.0            |
| 30      | 29         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0001 | 0.0            |
| 31      | 30         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0001 | 0.0            |
| 32      | 31         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 33      | 32         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 34      | 33         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 35      | 34         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 36      | 35         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 37      | 36         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 38      | 37         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 39      | 38         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 40      | 39         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 41      | 40         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 42      | 41         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 43      | 42         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 44      | 43         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 45      | 44         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 46      | 45         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 47      | 46         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 48      | 47         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 49      | 48         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 50      | 49         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 51      | 50         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 52      | 51         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 53      | 52         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 54      | 53         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 55      | 54         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 56      | 55         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 57      | 56         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 58      | 57         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 59      | 58         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 60      | 59         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 61      | 60         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 62      | 61         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 63      | 62         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 64      | 63         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 65      | 64         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 66      | 65         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 67      | 66         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 68      | 67         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 69      | 68         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 70      | 69         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 71      | 70         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 72      | 71         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 73      | 72         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 74      | 73         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 75      | 74         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 76      | 75         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 77      | 76         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 78      | 77         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 79      | 78         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 80      | 79         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 81      | 80         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 82      | 81         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 83      | 82         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 84      | 83         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 85      | 84         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 86      | 85         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 87      | 86         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 88      | 87         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 89      | 88         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 90      | 89         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 91      | 90         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 92      | 91         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 93      | 92         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 94      | 93         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 95      | 94         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 96      | 95         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 97      | 96         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 98      | 97         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 99      | 98         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |
| 100     | 99         | 0.0       | 0.0      | 0.0   | 40113                   | 137027   | 0.0000 | 0.0            |

ANALISIS DE VIABILIDAD DE UN PLAN DE INVERSIONES  
 UNIDAD DE INDUSTRIALIZACION DE PERIODO PRECISO  
 TAMA INICIAL DE ALTISSIMO SOBRE CAPITAL TOTAL 34.76% PORCENTO

4

LISTA DE DATOS

5 1 1 7 113 0 2

UNDACTE DE INDUSTRIALIZACION DE PERUCHO TRESO

| FECHA  | FONDO DEFIJADO | INVESTIMIENTO | COMPRAS DE VEHICULOS | COMPRAS | CAPITAL DE GIRO | RESERVA | NO-IV-EP | BAT-FRAN | COSTO OPERACIONAL | EMO. ETC | NO-IV-EP | DESI. SEL. |
|--------|----------------|---------------|----------------------|---------|-----------------|---------|----------|----------|-------------------|----------|----------|------------|
| 1      | 2              | 3             | 4                    | 5       | 6               | 7       | 8        | 9        | 10                | 11       | 12       | 13         |
| 1.0000 | 1.0000         | 1.0000        | 1.0000               | 1.0000  | 1.0000          | 1.0000  | 1.0000   | 1.0000   | 1.0000            | 1.0000   | 1.0000   | 1.0000     |
| 1      | 0              | 119297.       | 412034.              | 60987.  | 10727.          | 0.0     | 0.0      | 0.0      | 0.0               | 0.0      | 0.0      | 0.0        |
| 2      | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 0.0        |
| 3      | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 4      | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 5      | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 6      | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 7      | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 8      | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 9      | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 10     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 11     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 12     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 13     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 14     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 15     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 16     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 17     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 18     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 19     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 20     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 21     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 22     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 23     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 24     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 25     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 26     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 27     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 28     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 29     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |
| 30     | 1              | 0.0           | 0.0                  | 0.0     | 0.0             | 40113.  | 14257.   | 96920.   | 22639.            | 16643.   | 9241.    | 4570.      |

INFORME DE RESULTADOS DE TRABAJO DE PERUCHO TRESO

ANALISE DE VALORES DE INVESTIMENTO  
 UNIDADE DE INDUSTRIALIZACAO DE FERRETO PRECO

TAXA INTERNA DE RETORNO SOBRE O CAPITAL TOTAL 30,30% PORCENTO

| PERIODO | INVESTIMENTO | DE GATO | TOTAL | OPERACIONAL (RECEITAS) |           | LÍQUIDA | PRESENTE | VALOR PRESENTE |          |
|---------|--------------|---------|-------|------------------------|-----------|---------|----------|----------------|----------|
|         |              |         |       | RECEITA                | A+ CUSTOS |         |          | RECEITA        | DO VALOR |
| 0       | 0,0          | 0,0     | 0,0   | 0,0                    | 0,0       | 0,0     | 1,0000   | 0,0            | 0,0      |
| 1       | 0,0          | 0,0     | 0,0   | 133234                 | 0,0       | 217180  | 0,7380   | 592294         | 133234   |
| 2       | 0,0          | 0,0     | 0,0   | 123233                 | 0,0       | 217180  | 0,5461   | 0,0            | 133233   |
| 3       | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,4037   | 0,0            | 133233   |
| 4       | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,2923   | 0,0            | 133233   |
| 5       | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,2139   | 0,0            | 133233   |
| 6       | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,1583   | 0,0            | 133233   |
| 7       | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,1163   | 0,0            | 133233   |
| 8       | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,0853   | 0,0            | 133233   |
| 9       | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,0623   | 0,0            | 133233   |
| 10      | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,0453   | 0,0            | 133233   |
| 11      | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,0333   | 0,0            | 133233   |
| 12      | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,0243   | 0,0            | 133233   |
| 13      | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,0173   | 0,0            | 133233   |
| 14      | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,0123   | 0,0            | 133233   |
| 15      | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,0083   | 0,0            | 133233   |
| 16      | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,0063   | 0,0            | 133233   |
| 17      | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,0043   | 0,0            | 133233   |
| 18      | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,0033   | 0,0            | 133233   |
| 19      | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,0023   | 0,0            | 133233   |
| 20      | 0,0          | 0,0     | 0,0   | 133233                 | 0,0       | 217180  | 0,0013   | 0,0            | 133233   |

| PERIODO | INVEST. | DE GATO | TOTAL | RECEITA | CUSTOS | SALDO |
|---------|---------|---------|-------|---------|--------|-------|
| 0       | 0,0     | 0,0     | 0,0   | 0,0     | 0,0    | 0,0   |
| 1       | 0,0     | 0,0     | 0,0   | 1,64    | 1,64   | 0,0   |
| 2       | 0,0     | 0,0     | 0,0   | 1,48    | 1,48   | 0,0   |
| 3       | 0,0     | 0,0     | 0,0   | 0,93    | 0,93   | 0,0   |
| 4       | 0,0     | 0,0     | 0,0   | 0,72    | 0,72   | 0,0   |
| 5       | 0,0     | 0,0     | 0,0   | 0,55    | 0,55   | 0,0   |
| 6       | 0,0     | 0,0     | 0,0   | 0,42    | 0,42   | 0,0   |
| 7       | 0,0     | 0,0     | 0,0   | 0,32    | 0,32   | 0,0   |
| 8       | 0,0     | 0,0     | 0,0   | 0,24    | 0,24   | 0,0   |
| 9       | 0,0     | 0,0     | 0,0   | 0,18    | 0,18   | 0,0   |
| 10      | 0,0     | 0,0     | 0,0   | 0,14    | 0,14   | 0,0   |
| 11      | 0,0     | 0,0     | 0,0   | 0,10    | 0,10   | 0,0   |
| 12      | 0,0     | 0,0     | 0,0   | 0,08    | 0,08   | 0,0   |
| 13      | 0,0     | 0,0     | 0,0   | 0,06    | 0,06   | 0,0   |
| 14      | 0,0     | 0,0     | 0,0   | 0,04    | 0,04   | 0,0   |
| 15      | 0,0     | 0,0     | 0,0   | 0,03    | 0,03   | 0,0   |
| 16      | 0,0     | 0,0     | 0,0   | 0,02    | 0,02   | 0,0   |
| 17      | 0,0     | 0,0     | 0,0   | 0,01    | 0,01   | 0,0   |
| 18      | 0,0     | 0,0     | 0,0   | 0,01    | 0,01   | 0,0   |
| 19      | 0,0     | 0,0     | 0,0   | 0,00    | 0,00   | 0,0   |
| 20      | 0,0     | 0,0     | 0,0   | 0,00    | 0,00   | 0,0   |

VALOR PRESENTE DO INVESTIMENTO  
 RECEITA  
 CUSTOS  
 SALDO





4

LISTA DE UNIDOS

4 1 1 7 115 0 2

UNION DE GOBIERNO FEDERAL DE FIDUCIARIO FIDUCIO

| PERIODO   | EDIFICIO | EQUIPAMIENTO | VEHICULOS | OTROS  | CAPITAL DE GIRO | RECEIJA TOTAL | NO-PAYEE | NO-TOTAL | COSTO OPERACIONAL | EMPLEADO | IMPORTE | DESP. GAST. |
|-----------|----------|--------------|-----------|--------|-----------------|---------------|----------|----------|-------------------|----------|---------|-------------|
| ESCALAS : | 1.0000   | 1.0000       | 1.0000    | 1.0000 | 1.0000          | 0.9000        | 1.0000   | 1.0000   | 1.0000            | 1.0000   | 1.0000  | 1.0000      |
| 1         | 412527   | 412522       | 307510    | 18374  | 18707           | U.J           | U.J      | U.J      | U.J               | U.J      | U.J     | U.J         |
| 2         | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 3         | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 4         | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 5         | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 6         | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 7         | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 8         | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 9         | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 10        | 0.0      | 247357       | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 11        | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 12        | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 13        | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 14        | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 15        | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 16        | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 17        | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 18        | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 19        | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 20        | 0.0      | 0.0          | 0.0       | 0.0    | 0.0             | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |
| 21        | -59231   | -181872      | -5133     | 0.0    | -15577          | 381057        | 14257    | 14257    | 56720             | 22537    | 18643   | 3060        |

IMPORTE DE ESCALA MILLONES EN INICIO DE PERIODO

10

ANÁLISIS DE VIABILIDAD DE INVERSIÓN  
 UNIDADE DE INDUSTRIALIZACAO DE FERRIMENTO FRESCO

| PERÍODO | INVESTIMENTO (MÊS) (MILHÕES) |                     | TAXA INTERNA DE RETORNO SOBRE O CAPITAL TOTAL |         | OPERACIONAL (MÊS) (MILHÕES) |           | PORCENTO  |         | VALOR PRESENTE |          |           |        |         |
|---------|------------------------------|---------------------|---|---------|-----------------------------|-----------|-----------|---------|----------------|----------|-----------|--------|---------|
|         | NO. IDEN.                    | INVESTIMENT DE GIRO | TOTAL   | DE GIRO | RECEITA                     | ** CUSTOS | DE OPLAC. | LIQUIDA | RECEITA        | DO VALOR | INVESTIM. | TOTAL  | LIQUIDA |
| 1       | 0                            | 576327              | 576327  | 15927   | 0.0                         | 0.0       | 0.0       | 173634  | 0.0            | 1.0000   | -576327   | 0.0    | 0.0     |
| 2       | 1                            | 0.0                 | 0.0   | 0.0     | 331057                      | 132403    | 132403    | 173634  | 0.0            | 0.7374   | 0.0       | 150423 | 150423  |
| 3       | 2                            | 0.0                 | 0.0   | 0.0     | 381057                      | 132403    | 132403    | 193654  | 0.0            | 0.5735   | 0.0       | 113953 | 113953  |
| 4       | 3                            | 0.0                 | 0.0   | 0.0     | 331057                      | 132403    | 132403    | 173634  | 0.0            | 0.4312   | 0.0       | 38306  | 38306   |
| 5       | 4                            | 0.0                 | 0.0   | 0.0     | 381057                      | 132403    | 132403    | 193654  | 0.0            | 0.3251   | 0.0       | 60333  | 60333   |
| 6       | 5                            | 24771               | 24771   | 24771   | 331057                      | 132403    | 132403    | 173634  | 0.0            | 0.2477   | 6173      | 49217  | 49217   |
| 7       | 6                            | 0.0                 | 0.0   | 0.0     | 381057                      | 132403    | 132403    | 193654  | 0.0            | 0.1858   | 0.0       | 37447  | 37447   |
| 8       | 7                            | 0.0                 | 0.0   | 0.0     | 331057                      | 132403    | 132403    | 173634  | 0.0            | 0.1430   | 0.0       | 23403  | 23403   |
| 9       | 8                            | 0.0                 | 0.0   | 0.0     | 381057                      | 132403    | 132403    | 193654  | 0.0            | 0.1053   | 0.0       | 21010  | 21010   |
| 10      | 9                            | 0.0                 | 0.0   | 0.0     | 331057                      | 132403    | 132403    | 173634  | 0.0            | 0.0620   | 0.0       | 19271  | 19271   |
| 11      | 10                           | 0.0                 | 0.0   | 0.0     | 381057                      | 132403    | 132403    | 193654  | 0.0            | 0.0291   | 16921     | 12377  | 12377   |
| 12      | 11                           | 0.0                 | 0.0   | 0.0     | 331057                      | 132403    | 132403    | 173634  | 0.0            | 0.0070   | 0.0       | 7321   | 7321    |
| 13      | 12                           | 0.0                 | 0.0   | 0.0     | 381057                      | 132403    | 132403    | 193654  | 0.0            | 0.0226   | 0.0       | 2073   | 2073    |
| 14      | 13                           | 0.0                 | 0.0   | 0.0     | 331057                      | 132403    | 132403    | 173634  | 0.0            | 0.0210   | 0.0       | 3221   | 3221    |
| 15      | 14                           | 0.0                 | 0.0   | 0.0     | 381057                      | 132403    | 132403    | 193654  | 0.0            | 0.0152   | 0.0       | 4533   | 4533    |
| 16      | 15                           | 24771               | 24771   | 24771   | 331057                      | 132403    | 132403    | 173634  | 0.0            | 0.0137   | 363       | 363    | 363     |
| 17      | 16                           | 0.0                 | 0.0   | 0.0     | 381057                      | 132403    | 132403    | 193654  | 0.0            | 0.0117   | 0.0       | 2327   | 2327    |
| 18      | 17                           | 0.0                 | 0.0   | 0.0     | 331057                      | 132403    | 132403    | 173634  | 0.0            | 0.0037   | 0.0       | 1734   | 1734    |
| 19      | 18                           | 0.0                 | 0.0   | 0.0     | 381057                      | 132403    | 132403    | 193654  | 0.0            | 0.0067   | 0.0       | 1522   | 1522    |
| 20      | 19                           | 0.0                 | 0.0   | 0.0     | 331057                      | 132403    | 132403    | 173634  | 0.0            | 0.0051   | 0.0       | 1022   | 1022    |
| 21      | 20                           | -230213             | -15721  | -22660  | 381057                      | 132403    | 132403    | 193654  | 0.0            | 0.0039   | -251      | 1022   | 1022    |
| TOTAL   |                              | 370239              |   | 670239  | 7521147                     | 3548069   | 3548069   | 3773027 |                |          | 617751    | 617751 | 617751  |

| PERCENTO | TAXA  | VALOR PRESENTE EM RECURSOS |                            |
|----------|-------|----------------------------|----------------------------|
|          |       | RECEITA                    | VALOR PRESENTE EM RECURSOS |
| 10.000   | 2.470 | 1671233                    | 1000443                    |
| 20.000   | 1.450 | 967233                     | 323033                     |
| 30.000   | 1.061 | 506827                     | 37347                      |
| 40.000   | 0.814 | 496042                     | -113637                    |
| 50.000   | 0.633 | 377137                     | -206028                    |
| 60.000   | 0.533 | 331063                     | -257024                    |

VALOR PRESENTE EM RECURSOS  
 VALOR PRESENTE EM RECURSOS  
 VALOR PRESENTE EM RECURSOS





ANALISIS DE VIABILIDAD DE INVERSION  
 UNION DE INDUSTRIALIZADO DE PERIENIO PRECO

TASA INTERNA DE RENDIMIENTO 39.066 PORCIENTO

| PERIODO | NO. IDENT. | INVERSION | DE GASTO | TOTAL  | OPERACIONAL (MERCADOS) |        | LIQUIDA | PRESENTE | VALOR PRESENTE |           |
|---------|------------|-----------|----------|--------|------------------------|--------|---------|----------|----------------|-----------|
|         |            |           |          |        | RECEIBA **             | COSTOS |         |          | RECEIBA        | INVERSION |
| 1       | 0          | 595271    | 185271   | 595271 | 0.0                    | 0.0    | 233769  | 1.0000   | 595271         | 0.0       |
| 2       | 1          | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.7137   | 171936         | 171936    |
| 3       | 2          | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.5186   | 123403         | 123403    |
| 4       | 3          | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.3719   | 87821          | 87821     |
| 5       | 4          | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.2671   | 63782          | 63782     |
| 6       | 5          | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.1921   | 47271          | 47271     |
| 7       | 6          | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.1381   | 32946          | 32946     |
| 8       | 7          | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.0993   | 23700          | 23700     |
| 9       | 8          | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.0710   | 17000          | 17000     |
| 10      | 9          | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.0510   | 12300          | 12300     |
| 11      | 10         | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.0348   | 8927           | 8927      |
| 12      | 11         | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.0250   | 6300           | 6300      |
| 13      | 12         | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.0179   | 4500           | 4500      |
| 14      | 13         | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.0130   | 3200           | 3200      |
| 15      | 14         | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.0093   | 2300           | 2300      |
| 16      | 15         | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.0067   | 1600           | 1600      |
| 17      | 16         | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.0049   | 1100           | 1100      |
| 18      | 17         | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.0036   | 750            | 750       |
| 19      | 18         | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.0026   | 500            | 500       |
| 20      | 19         | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.0019   | 350            | 350       |
| 21      | 20         | 0.0       | 0.0      | 0.0    | 132403                 | 132403 | 233769  | 0.0014   | 250            | 250       |
| TOTAL   |            | 595271    | 185271   | 595271 | 0.0                    | 0.0    | 343303  | 0.0014   | 503303         | 607881    |

| PERIODO | INVERSION | DE GASTO | TOTAL  | RECEIBA | COSTOS | LIQUIDA | PRESENTE | VALOR PRESENTE |
|---------|-----------|----------|--------|---------|--------|---------|----------|----------------|
| 1       | 595271    | 185271   | 595271 | 0.0     | 0.0    | 233769  | 1.0000   | 595271         |
| 2       | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.7137   | 171936         |
| 3       | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.5186   | 123403         |
| 4       | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.3719   | 87821          |
| 5       | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.2671   | 63782          |
| 6       | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.1921   | 47271          |
| 7       | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.1381   | 32946          |
| 8       | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0993   | 23700          |
| 9       | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0710   | 17000          |
| 10      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0510   | 12300          |
| 11      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0348   | 8927           |
| 12      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0250   | 6300           |
| 13      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0179   | 4500           |
| 14      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0130   | 3200           |
| 15      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0093   | 2300           |
| 16      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0067   | 1600           |
| 17      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0049   | 1100           |
| 18      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0036   | 750            |
| 19      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0026   | 500            |
| 20      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0019   | 350            |
| TOTAL   | 595271    | 185271   | 595271 | 0.0     | 0.0    | 343303  | 0.0014   | 503303         |

| PERIODO | INVERSION | DE GASTO | TOTAL  | RECEIBA | COSTOS | LIQUIDA | PRESENTE | VALOR PRESENTE |
|---------|-----------|----------|--------|---------|--------|---------|----------|----------------|
| 1       | 595271    | 185271   | 595271 | 0.0     | 0.0    | 233769  | 1.0000   | 595271         |
| 2       | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.7137   | 171936         |
| 3       | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.5186   | 123403         |
| 4       | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.3719   | 87821          |
| 5       | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.2671   | 63782          |
| 6       | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.1921   | 47271          |
| 7       | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.1381   | 32946          |
| 8       | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0993   | 23700          |
| 9       | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0710   | 17000          |
| 10      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0510   | 12300          |
| 11      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0348   | 8927           |
| 12      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0250   | 6300           |
| 13      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0179   | 4500           |
| 14      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0130   | 3200           |
| 15      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0093   | 2300           |
| 16      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0067   | 1600           |
| 17      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0049   | 1100           |
| 18      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0036   | 750            |
| 19      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0026   | 500            |
| 20      | 0.0       | 0.0      | 0.0    | 132403  | 132403 | 233769  | 0.0019   | 350            |
| TOTAL   | 595271    | 185271   | 595271 | 0.0     | 0.0    | 343303  | 0.0014   | 503303         |

SE EXCEPTA DE LOS VALORES  
 REFERIDOS EN ESTE  
 ANALISIS LOS VALORES DE SUJETO DE 5%  
 INTERES DE LOS VALORES DE SUJETO DE 5%  
 INTERES DE LOS VALORES DE SUJETO DE 5%  
 INTERES DE LOS VALORES DE SUJETO DE 5%





ANALISIS DE VIABILIDAD DE INVERSIÓN  
 UNIDAD DE INDUSTRIALIZACION DE PENSAMIENTO

TAXA INTERNA DE RETORNO SOBRE O CAPITAL TOTAL 42.050 PORCIENTO

| PERIODO | INVERSIÓN (CIENTOS) |           |         | OPERACIONAL (CIENTOS) |           |                 | VALOR PRESENTE | VALOR FUTURE |
|---------|---------------------|-----------|---------|-----------------------|-----------|-----------------|----------------|--------------|
|         | NO. IDENT.          | INVERSIÓN | DE CARO | RECIBTA               | *# COSTOS | RECIBTA LIQUIDA |                |              |
| 0       | 1                   | 50000     | 0.0     | 0.0                   | 0.0       | 0.0             | 50000          | 0.0          |
| 1       | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.7015         | 121215       |
| 2       | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.6718         | 110257       |
| 3       | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.6447         | 100273       |
| 4       | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.6195         | 91210        |
| 5       | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.5957         | 83410        |
| 6       | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.5732         | 76574        |
| 7       | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.5519         | 70659        |
| 8       | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.5317         | 65619        |
| 9       | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.5126         | 61419        |
| 10      | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.4945         | 57919        |
| 11      | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.4774         | 55074        |
| 12      | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.4612         | 52849        |
| 13      | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.4459         | 51199        |
| 14      | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.4314         | 50074        |
| 15      | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.4177         | 49449        |
| 16      | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.4047         | 49319        |
| 17      | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.3924         | 49674        |
| 18      | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.3807         | 50519        |
| 19      | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.3695         | 51849        |
| 20      | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.3588         | 53774        |
| 21      | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.3485         | 56319        |
| 22      | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.3387         | 59519        |
| 23      | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.3293         | 63419        |
| 24      | 1                   | 0.0       | 0.0     | 441234                | 182403    | 259021          | 0.3203         | 68019        |
| TOTAL   |                     | 50000     | 0.0     | 0.0                   | 0.0       | 0.0             | 50000          | 0.0          |

| PERIODO | RECIBTA | COSTOS | SALUDCO |
|---------|---------|--------|---------|
| 0       | 0.0     | 0.0    | 0.0     |
| 1       | 441234  | 182403 | 259021  |
| 2       | 441234  | 182403 | 259021  |
| 3       | 441234  | 182403 | 259021  |
| 4       | 441234  | 182403 | 259021  |
| 5       | 441234  | 182403 | 259021  |
| 6       | 441234  | 182403 | 259021  |
| 7       | 441234  | 182403 | 259021  |
| 8       | 441234  | 182403 | 259021  |
| 9       | 441234  | 182403 | 259021  |
| 10      | 441234  | 182403 | 259021  |
| 11      | 441234  | 182403 | 259021  |
| 12      | 441234  | 182403 | 259021  |
| 13      | 441234  | 182403 | 259021  |
| 14      | 441234  | 182403 | 259021  |
| 15      | 441234  | 182403 | 259021  |
| 16      | 441234  | 182403 | 259021  |
| 17      | 441234  | 182403 | 259021  |
| 18      | 441234  | 182403 | 259021  |
| 19      | 441234  | 182403 | 259021  |
| 20      | 441234  | 182403 | 259021  |
| 21      | 441234  | 182403 | 259021  |
| 22      | 441234  | 182403 | 259021  |
| 23      | 441234  | 182403 | 259021  |
| 24      | 441234  | 182403 | 259021  |

VALOR PRESENTE EN MILLONES  
 VALOR FUTURE EN MILLONES  
 PERCENTUAL  
 VALOR PRESENTE EN MILLONES  
 VALOR FUTURE EN MILLONES



4

LISTA DE UNIDADES

1 1 7 113 0 2

UNIDADE DE INDUSTRIALIZACAO DE FERRIMENTO INTERCO

| PERIODO CONTABILIZADO | PERIODO DE REFERENCIA | RECEITA TOTAL | NO-M V-L-X | IMP-PIR | CUSTO OPERACIONAL | RECEITA TOTAL | NO-M V-L-X | IMP-PIR | CUSTO OPERACIONAL | RECEITA TOTAL | NO-M V-L-X | IMP-PIR | CUSTO OPERACIONAL | RECEITA TOTAL | NO-M V-L-X | IMP-PIR | CUSTO OPERACIONAL |
|-----------------------|-----------------------|---------------|------------|---------|-------------------|---------------|------------|---------|-------------------|---------------|------------|---------|-------------------|---------------|------------|---------|-------------------|
| 10/10                 | 10/10                 | 11727.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 11/10                 | 11/10                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 12/10                 | 12/10                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 01/11                 | 01/11                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 02/11                 | 02/11                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 03/11                 | 03/11                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 04/11                 | 04/11                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 05/11                 | 05/11                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 06/11                 | 06/11                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 07/11                 | 07/11                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 08/11                 | 08/11                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 09/11                 | 09/11                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 10/11                 | 10/11                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 11/11                 | 11/11                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 12/11                 | 12/11                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 01/12                 | 01/12                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 02/12                 | 02/12                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 03/12                 | 03/12                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 04/12                 | 04/12                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 05/12                 | 05/12                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 06/12                 | 06/12                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 07/12                 | 07/12                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 08/12                 | 08/12                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 09/12                 | 09/12                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 10/12                 | 10/12                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 11/12                 | 11/12                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| 12/12                 | 12/12                 | 0.00          | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |
| TOTAL                 | TOTAL                 | 11727.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 14257.00      | 0.00       | 0.00    | 0.00              | 17641.00      | 0.00       | 0.00    | 0.00              |

VALORES DE RECEITA E CUSTOS DO PERIODO

6

ANÁLISIS DE VIABILIDAD DE INVERSIÓN  
 UNIDAD DE INDUSTRIALIZACIÓN DE PERMIRO PRECO

TASA INTERNA DE RETORNO SOBRE EL CAPITAL TOTAL 34.107 PORCIENTO

| PERIODO | INVERSIÓN (RETCALIS) |           |                 | OPERACIONAL (RETCALIS) |           |         | VALOR PRESENTE    |                   |         |         |
|---------|----------------------|-----------|-----------------|------------------------|-----------|---------|-------------------|-------------------|---------|---------|
|         | NO. IDENT.           | INVERSIÓN | DE GAN. CAPITAL | RECEITA                | ++ COSTOS | LIQUIDA | CO VALOR PRESENTE | CO VALOR PRESENTE | DECRETA | LIQUIDA |
| 1       | 0                    | 57527.    | 15227.          | 0.0                    | 0.0       | 0.0     | 1.0000            | 57527.            | 0.0     | 0.0     |
| 2       | 1                    | 0.0       | 0.0             | 44123.1                | 230263.   | 210361. | 0.7407            | 0.0               | 153361. | 0.0     |
| 3       | 2                    | 0.0       | 0.0             | 44123.4                | 230263.   | 210361. | 0.5560            | 0.0               | 115922. | 0.0     |
| 4       | 3                    | 0.0       | 0.0             | 44123.4                | 230263.   | 210361. | 0.4119            | 0.0               | 37229.  | 0.0     |
| 5       | 4                    | 0.0       | 0.0             | 44123.4                | 230263.   | 210361. | 0.3072            | 0.0               | 63032.  | 0.0     |
| 6       | 5                    | 21771.    | 0.0             | 44123.4                | 230263.   | 210361. | 0.2207            | 21771.            | 43777.  | 0.0     |
| 7       | 6                    | 0.0       | 0.0             | 44123.4                | 230263.   | 210361. | 0.1713            | 0.0               | 30169.  | 0.0     |
| 8       | 7                    | 0.0       | 0.0             | 44123.4                | 230263.   | 210361. | 0.1280            | 0.0               | 26769.  | 0.0     |
| 9       | 8                    | 0.0       | 0.0             | 44123.4                | 230263.   | 210361. | 0.0952            | 0.0               | 20108.  | 0.0     |
| 10      | 9                    | 0.0       | 0.0             | 44123.4                | 230263.   | 210361. | 0.0713            | 0.0               | 14974.  | 0.0     |
| 11      | 10                   | 27210.    | 0.0             | 44123.4                | 230263.   | 210361. | 0.0500            | 27210.            | 11181.  | 0.0     |
| 12      | 11                   | 0.0       | 0.0             | 44123.4                | 230263.   | 210361. | 0.3373            | 0.0               | 3537.   | 0.0     |
| 13      | 12                   | 0.0       | 0.0             | 44123.4                | 230263.   | 210361. | 0.2550            | 0.0               | 6227.   | 0.0     |
| 14      | 13                   | 0.0       | 0.0             | 44123.4                | 230263.   | 210361. | 0.1929            | 0.0               | 4035.   | 0.0     |
| 15      | 14                   | 0.0       | 0.0             | 44123.4                | 230263.   | 210361. | 0.1429            | 0.0               | 3023.   | 0.0     |
| 16      | 15                   | 0.0       | 0.0             | 44123.4                | 230263.   | 210361. | 0.1059            | 0.0               | 2222.   | 0.0     |
| 17      | 16                   | 0.0       | 0.0             | 44123.4                | 230263.   | 210361. | 0.0789            | 0.0               | 1638.   | 0.0     |
| 18      | 17                   | 0.0       | 0.0             | 44123.4                | 230263.   | 210361. | 0.0594            | 0.0               | 1207.   | 0.0     |
| 19      | 18                   | 0.0       | 0.0             | 44123.4                | 230263.   | 210361. | 0.0442            | 0.0               | 977.    | 0.0     |
| 20      | 19                   | 0.0       | 0.0             | 44123.4                | 230263.   | 210361. | 0.0330            | 0.0               | 794.    | 0.0     |
| TOTAL   |                      | 57527.    | 0.0             | 332493.                | 491725.   | 429722. | 0.0000            | 57527.            | 310034. | 0.0     |

| TASA   | VALOR PRESENTE DE LOS COSTOS |                | VALOR PRESENTE DE LOS BENEFICIOS |                |
|--------|------------------------------|----------------|----------------------------------|----------------|
|        | RECEITA                      | VALOR PRESENTE | RECEITA                          | VALOR PRESENTE |
| 10.000 | 179024.                      | 500014.        | 179024.                          | 112011.        |
| 10.000 | 126271.                      | 360331.        | 126271.                          | 82001.         |
| 10.000 | 97731.                       | 270000.        | 97731.                           | 63000.         |
| 10.000 | 52520.                       | 150132.        | 52520.                           | 43000.         |
| 10.000 | 42079.                       | 100217.        | 42079.                           | 34000.         |
| 10.000 | 35003.                       | 80000.         | 35003.                           | 29000.         |

VALORES CORREGIDOS.  
 VALOR PRESENTE TOTAL CON UN TASA DE 10% E INTERIOR PRIMA CON AUMENTO DE 50%.  
 MANTENGO INCLUIDO LOS COSTOS DE OTROS ITEMS.

10

LISTA DE DATOS

4 1 1 7 113 J 2

UNIDAD DE INDUSTRIALIZACION DE FERRONIL PALSCO

| PERIODO   | EDIFICIO | INVESTIMIENTO EQUIPAR | VEICULOS | OUTROS | CAPITAL DE GIRO | RECEITA TOTAL | CO-FINANCIAMIENTO | OPERACIONAL | COSTO OPERACIONAL | UTILIDAD | IMPORTE | DESP. GER. |
|-----------|----------|-----------------------|----------|--------|-----------------|---------------|-------------------|-------------|-------------------|----------|---------|------------|
| ESCALAS : | 1.0000   | 1.0000                | 1.0000   | 1.0000 | 1.0000          | 1.0000        | 1.0000            | 1.0000      | 1.0000            | 1.0000   | 1.0000  | 1.0000     |
| 1         | 0        | 117257.               | 412224.  | 16374. | 15727.          | 0.0           | 0.0               | 0.0         | 0.0               | 0.0      | 0.0     | 0.0        |
| 2         | 1        | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 3         | 2        | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 4         | 3        | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 5         | 4        | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 6         | 5        | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 7         | 6        | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 8         | 7        | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 9         | 8        | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 10        | 9        | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 11        | 10       | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 12        | 11       | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 13        | 12       | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 14        | 13       | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 15        | 14       | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 16        | 15       | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 17        | 16       | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 18        | 17       | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 19        | 18       | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 20        | 19       | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 21        | 20       | 0.0                   | 0.0      | 0.0    | 0.0             | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |
| 22        | 20       | -59623.               | -164372. | -1123. | -10727.         | 441224.       | 14259.            | 96920.      | 33959.            | 18643.   | 17641.  | 3060.      |

FIGURAS DE ESPER. PRECISOS NO INICIO DO PERIODO 1

4

ANALISIS DE VIABILIDAD DE INVERSIÓN  
 UNIDAD DE INDUSTRIALIZACIÓN DE FERMENTO FRESCO

| PERIODO | TAXA INTERNA DE RETORNO SOBRE CAPITAL |             |         | OPERACIONAL (NETO) |            |        | 40.220 PORCENTO |        |                   |
|---------|---------------------------------------|-------------|---------|--------------------|------------|--------|-----------------|--------|-------------------|
|         | NO. IDEN.                             | INVESTIMENT | DE BIEN | TOTAL              | DE OPERAC. | RENTA  | LIQUIDA         | RENTA  | DE VALOR PRESENTE |
| 1       | 0                                     | 575254      | 15327   | 0.0                | 0.0        | 0.0    | 0.0             | 0.0    | 1.0000            |
| 2       | 1                                     | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.7111 | 174007            |
| 3       | 2                                     | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.5007 | 125155            |
| 4       | 3                                     | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.3373 | 89007             |
| 5       | 4                                     | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.2207 | 63297             |
| 6       | 5                                     | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.1317 | 40000             |
| 7       | 6                                     | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0753 | 26010             |
| 8       | 7                                     | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0430 | 17334             |
| 9       | 8                                     | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0255 | 16339             |
| 10      | 9                                     | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0160 | 11313             |
| 11      | 10                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0090 | 8336              |
| 12      | 11                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0051 | 5921              |
| 13      | 12                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0030 | 4240              |
| 14      | 13                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0017 | 3044              |
| 15      | 14                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0011 | 2074              |
| 16      | 15                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0005 | 1497              |
| 17      | 16                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 1059              |
| 18      | 17                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 7507              |
| 19      | 18                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 5207              |
| 20      | 19                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 3644              |
| 21      | 20                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 2574              |
| 22      | 21                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 1797              |
| 23      | 22                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 1259              |
| 24      | 23                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 887               |
| 25      | 24                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 623               |
| 26      | 25                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 441               |
| 27      | 26                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 313               |
| 28      | 27                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 221               |
| 29      | 28                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 157               |
| 30      | 29                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 111               |
| 31      | 30                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 78                |
| 32      | 31                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 55                |
| 33      | 32                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 39                |
| 34      | 33                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 28                |
| 35      | 34                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 20                |
| 36      | 35                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 14                |
| 37      | 36                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 10                |
| 38      | 37                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 7                 |
| 39      | 38                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 5                 |
| 40      | 39                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 3                 |
| 41      | 40                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 2                 |
| 42      | 41                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 1                 |
| 43      | 42                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 1                 |
| 44      | 43                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 45      | 44                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 46      | 45                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 47      | 46                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 48      | 47                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 49      | 48                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 50      | 49                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 51      | 50                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 52      | 51                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 53      | 52                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 54      | 53                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 55      | 54                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 56      | 55                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 57      | 56                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 58      | 57                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 59      | 58                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 60      | 59                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 61      | 60                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 62      | 61                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 63      | 62                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 64      | 63                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 65      | 64                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 66      | 65                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 67      | 66                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 68      | 67                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 69      | 68                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 70      | 69                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 71      | 70                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 72      | 71                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 73      | 72                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 74      | 73                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 75      | 74                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 76      | 75                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 77      | 76                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 78      | 77                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 79      | 78                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 80      | 79                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 81      | 80                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 82      | 81                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 83      | 82                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 84      | 83                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 85      | 84                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 86      | 85                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 87      | 86                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 88      | 87                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 89      | 88                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 90      | 89                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 91      | 90                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 92      | 91                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 93      | 92                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 94      | 93                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 95      | 94                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 96      | 95                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 97      | 96                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 98      | 97                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 99      | 98                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 100     | 99                                    | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 101     | 100                                   | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 102     | 101                                   | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 103     | 102                                   | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 104     | 103                                   | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 105     | 104                                   | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 106     | 105                                   | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 107     | 106                                   | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 108     | 107                                   | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 109     | 108                                   | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 110     | 109                                   | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 | 0                 |
| 111     | 110                                   | 0.0         | 0.0     | 441224             | 193723     | 247502 | 247502          | 0.0000 |                   |





ANALISE DE VIABILIDADE DO INVESTIMENTO  
 UNIDADE DE INDUSTRIALIZACAO DE FERRETO PRECO

TAXA INTERNA DE RETORNO SOBRE O CAPITAL TOTAL 42,000 PORCENTO

| PERIODO | NO. IDENT. | INVESTIMENT | DE GIRO | TOTAL  | OPERACIONAL (MERCADIS) |           | LÍQUIDO | VALOR PRESENTE | VALOR INVESTIM. | VALOR PRESENTE RECEITA |
|---------|------------|-------------|---------|--------|------------------------|-----------|---------|----------------|-----------------|------------------------|
|         |            |             |         |        | RECEITA                | DE CUSTOS |         |                |                 |                        |
| 0       | 575327     | 48927       | 0.0     | 575327 | 0.0                    | 0.0       | 0.0     | 575327         | 0.0             | 0.0                    |
| 1       | 0.0        | 0.0         | 0.0     | 0.0    | 491335.                | 0.0       | 1.0000  | 491335.        | 491335.         | 491335.                |
| 2       | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 197220.        | 985970.         | 147741.                |
| 3       | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 179220.        | 1166720.        | 327221.                |
| 4       | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 163220.        | 848472.         | 477222.                |
| 5       | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 149220.        | 529672.         | 627223.                |
| 6       | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 137220.        | 210872.         | 777224.                |
| 7       | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 127220.        | 90972.          | 927225.                |
| 8       | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 119220.        | 27072.          | 1077226.               |
| 9       | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 113220.        | 16072.          | 1227227.               |
| 10      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 108220.        | 7072.           | 1377228.               |
| 11      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 104220.        | 0.0             | 1527229.               |
| 12      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 101220.        | 0.0             | 1677230.               |
| 13      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 98220.         | 0.0             | 1827231.               |
| 14      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 95220.         | 0.0             | 1977232.               |
| 15      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 92220.         | 0.0             | 2127233.               |
| 16      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 89220.         | 0.0             | 2277234.               |
| 17      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 86220.         | 0.0             | 2427235.               |
| 18      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 83220.         | 0.0             | 2577236.               |
| 19      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 80220.         | 0.0             | 2727237.               |
| 20      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 77220.         | 0.0             | 2877238.               |
| 21      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 74220.         | 0.0             | 3027239.               |
| 22      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 71220.         | 0.0             | 3177240.               |
| 23      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 68220.         | 0.0             | 3327241.               |
| 24      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 65220.         | 0.0             | 3477242.               |
| 25      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 62220.         | 0.0             | 3627243.               |
| 26      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 59220.         | 0.0             | 3777244.               |
| 27      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 56220.         | 0.0             | 3927245.               |
| 28      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 53220.         | 0.0             | 4077246.               |
| 29      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 50220.         | 0.0             | 4227247.               |
| 30      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 47220.         | 0.0             | 4377248.               |
| 31      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 44220.         | 0.0             | 4527249.               |
| 32      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 41220.         | 0.0             | 4677250.               |
| 33      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 38220.         | 0.0             | 4827251.               |
| 34      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 35220.         | 0.0             | 4977252.               |
| 35      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 32220.         | 0.0             | 5127253.               |
| 36      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 29220.         | 0.0             | 5277254.               |
| 37      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 26220.         | 0.0             | 5427255.               |
| 38      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 23220.         | 0.0             | 5577256.               |
| 39      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 20220.         | 0.0             | 5727257.               |
| 40      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 17220.         | 0.0             | 5877258.               |
| 41      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 14220.         | 0.0             | 6027259.               |
| 42      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 11220.         | 0.0             | 6177260.               |
| 43      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 8220.          | 0.0             | 6327261.               |
| 44      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 5220.          | 0.0             | 6477262.               |
| 45      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 2220.          | 0.0             | 6627263.               |
| 46      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 0.0            | 0.0             | 6777264.               |
| 47      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 0.0            | 0.0             | 6927265.               |
| 48      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 0.0            | 0.0             | 7077266.               |
| 49      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 0.0            | 0.0             | 7227267.               |
| 50      | 0.0        | 0.0         | 0.0     | 0.0    | 421335.                | 218254.   | 0.4675  | 0.0            | 0.0             | 7377268.               |

| PERIODO | INVESTIMENT | DE GIRO | TOTAL  | RECEITA | DE CUSTOS | LÍQUIDO | VALOR PRESENTE | VALOR INVESTIM. | VALOR PRESENTE RECEITA |
|---------|-------------|---------|--------|---------|-----------|---------|----------------|-----------------|------------------------|
| 0       | 575327      | 48927   | 575327 | 0.0     | 0.0       | 0.0     | 0.0            | 575327          | 0.0                    |
| 1       | 0.0         | 0.0     | 0.0    | 491335. | 0.0       | 491335. | 1.0000         | 491335.         | 491335.                |
| 2       | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 985970.         | 147741.                |
| 3       | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 1166720.        | 327221.                |
| 4       | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 1347470.        | 507222.                |
| 5       | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 1528220.        | 687223.                |
| 6       | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 1708970.        | 867224.                |
| 7       | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 1889720.        | 1047225.               |
| 8       | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 2070470.        | 1227226.               |
| 9       | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 2251220.        | 1407227.               |
| 10      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 2431970.        | 1587228.               |
| 11      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 2612720.        | 1767229.               |
| 12      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 2793470.        | 1947230.               |
| 13      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 2974220.        | 2127231.               |
| 14      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 3154970.        | 2307232.               |
| 15      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 3335720.        | 2487233.               |
| 16      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 3516470.        | 2667234.               |
| 17      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 3697220.        | 2847235.               |
| 18      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 3877970.        | 3027236.               |
| 19      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 4058720.        | 3207237.               |
| 20      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 4239470.        | 3387238.               |
| 21      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 4420220.        | 3567239.               |
| 22      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 4600970.        | 3747240.               |
| 23      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 4781720.        | 3927241.               |
| 24      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 4962470.        | 4107242.               |
| 25      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 5143220.        | 4287243.               |
| 26      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 5323970.        | 4467244.               |
| 27      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 5504720.        | 4647245.               |
| 28      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 5685470.        | 4827246.               |
| 29      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 5866220.        | 5007247.               |
| 30      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 6046970.        | 5187248.               |
| 31      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 6227720.        | 5367249.               |
| 32      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 6408470.        | 5547250.               |
| 33      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 6589220.        | 5727251.               |
| 34      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 6769970.        | 5907252.               |
| 35      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 6950720.        | 6087253.               |
| 36      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 7131470.        | 6267254.               |
| 37      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 7312220.        | 6447255.               |
| 38      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 7492970.        | 6627256.               |
| 39      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 7673720.        | 6807257.               |
| 40      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 7854470.        | 6987258.               |
| 41      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 8035220.        | 7167259.               |
| 42      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 8215970.        | 7347260.               |
| 43      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 8396720.        | 7527261.               |
| 44      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 8577470.        | 7707262.               |
| 45      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 8758220.        | 7887263.               |
| 46      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 8938970.        | 8067264.               |
| 47      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 9119720.        | 8247265.               |
| 48      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 9300470.        | 8427266.               |
| 49      | 0.0         | 0.0     | 0.0    | 421335. | 218254.   | 202481. | 0.4675         | 9481220.        | 8607267.               |

LISTA DE DEBITOS  
4 1 1 7 112 0 2

GRUPO DE INVESTIMENTOS DE TIPO DE INLESCU

| PERIODO CONTABLE | INVESTIMENTOS | VEHICULOS | OFICIOS | CAPITAL | RECEITA | DEBITO   | IMPORTE  | IMPORTE  | IMPORTE  | IMPORTE  | IMPORTE  | IMPORTE  | IMPORTE  | IMPORTE  | IMPORTE  | IMPORTE  | IMPORTE  |
|------------------|---------------|-----------|---------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| ESCALAS : 1.0000 | 1.0000        | 1.0000    | 1.0000  | 1.0000  | JUNTA   | 10-11-12 | 10-11-12 | 10-11-12 | 10-11-12 | 10-11-12 | 10-11-12 | 10-11-12 | 10-11-12 | 10-11-12 | 10-11-12 | 10-11-12 | 10-11-12 |
| 1                | 0             | 11227     | 41222   | 30934   | 14374   | 15227    | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      |
| 1                | 1             | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 2             | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 3             | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 4             | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 5             | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 6             | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 7             | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 8             | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 9             | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 10            | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 11            | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 12            | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 13            | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 14            | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 15            | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 16            | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 17            | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 18            | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 19            | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |
| 1                | 20            | 0.0       | 0.0     | 0.0     | 0.0     | 0.0      | 401113.  | 17111.   | 116304.  | 27167.   | 22372.   | 11087.   | 21167.   | 2472.    | 0.0      | 0.0      | 0.0      |

IMPORTE DE DEBITOS - DEBITOS DE TIPO DE PERIODO



2

**ANNEX III**

**HANDBOOK OF PRODUCTION AND**

**QUALITY CONTROLS**

**(BASIC)**

10

## CONTENTS

|   |       |       |
|---|-------|-------|
| Quality Control   |       |       |
| 1. Determination of Fermentation Power .....                    | III-1 |       |
| 2. Percent of Viable Cells .....                                | III-2 |       |
| Process Control   |       |       |
| Amount of Yeast Produced .....                                  | III-3 |       |
| Raw Materials Control   |       |       |
| Determination of Solid Content in Molasses .....                | III-6 |       |
| Other Chemical Analysis .....                                   | III-7 |       |
| Acid Treatment for Reduction of Bacterial<br>Contaminants ..... |       | III-9 |

2

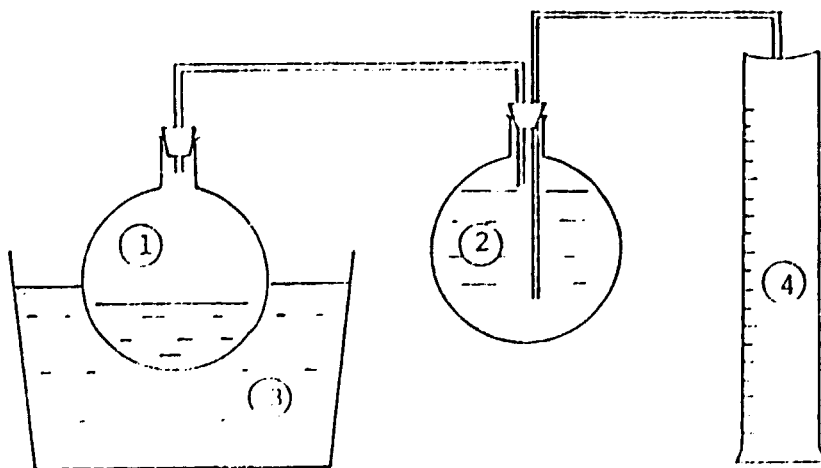
## QUALITY CONTROL

Two basic parameters are recommended for control of yeast quality because they can be performed in SIPAQ Laboratory with no extra investments and they are suitable for measuring a comparative quality of yeast. They are:

- 1 - Fermentation Power
- 2 - Percent of Viable Cells

### 1. Determination of Fermentation Power (Heydrick method).

The apparatus used for this method is schematically shown in figure below.



Legend: (1) Distillation flask nº 1; (2) Distillation flask nº 2; (3) Thermostatically controlled water bath; (4) Graduated cylinder. Care must be taken to avoid gas leakage during operation.

## Procedure:

In distillation flask nº 1 the following ingredients are placed:

- . 10 g of pressed yeast (or 3,5g of dry yeast)
- . 40 g of sugar (sucrose)
- . 400 ml distilled water

The flask is left in incubation for 30 minutes and then it is connected to flask nº 2 through rubber tubing with rubber plugs on each end. The liquid displaced from flask nº 2 is collected in a graduated cylinder and its volume is recorded each 30 minutes during consecutive 2 hours. The temperature of incubator is kept at 30°C, by a thermostatically controlled water bath (4).

The fermentation power is determined by the average between 2nd and 4th half hour readings. The results must be at least 200ml (ideal = 250 ml) for yeast samples. The total volume of liquid collected is about 800 ml or more.

## 2. Percent of viable cells

The technique is based on differential staining ability between viable and non viable cells. The methylene blue solution at certain concentration will stain in blue a "dead" cells but no color is shown with "alive" cells. The following methylene blue solution is used (Lee, Robinson and Wang. Biotec. Bioeng. Symp. 11: 1981).

|  |        |
|--|--------|
| Methylene blue   | 0.25g  |
| Sodium chloride  | 0.9g   |
| Potassium chloride   | 0.42g  |
| Calcium chloride ( $\text{CaCl}_2 \cdot 6\text{H}_2\text{O}$ ) | 0.048g |
| Sodium bicarbonate   | 0.02g  |
| Glucose  | 1.0g   |
| Distilled water  | 100 ml |

## Procedure

- . Place 0.9ml of methylene blue solution in a test tube.
- . Add 0.1 of yeast suspension (concentration approx.  $2.5 \times 10^8$  cells/ml) and shake gently.
- . Hold the tube for at least 15 minutes.
- . Place a drop of treated yeast suspension on a clean microscopic slide and cover it with a cover slip.
- . Examine with a compound microscope with magnification of 200X.
- . Count colored cells as dead and normal cells as alive cells.
- . Count all the cells in each microscopic field, and count a total of at least 200 cells.
- . Calculate a percent of viable cells (%VC) as:

$$\%VC = \frac{N_v}{N_v + N_d} \times 100$$

Where:  $N_v$  = number of viable cells (normal)

$N_d$  = number of dead cells (colored)

The result must be better than 90%.

## PROCESS CONTROL

### Amount of Yeast Produced

The yield of yeast is one of the most important control for the fermentation process.



**f**

This can be measured by determining amount of yeast cells by centrifuge technique. It is carried out at various steps of yeast production such as:

- (1) Amount of yeast inoculated into fermentation vat.
- (2) Amount of yeast produced after fermentation in the vat.
- (3) amount of yeast recovered in separator and filter units.

Procedure (with any samples):

1. 10 ml of yeast suspension (samples of wine, centrifuged cream, etc.), is placed in each of two conical graduate centrifuge tubes (15 ml capacity).
2. Place in centrifuge rotor and operate it for 15 minutes (approx. 4000 rpm).
3. Read the volume of pellet formed.
4. Knowing the correction factor (F), one can calculate the weight of yeast (W) in 10 ml of sample. In our experience, the factor F for fermented wine was 0.682. Since the 10 ml sample was taken the factor becomes 0.0682 for g/ml or kg/liter.

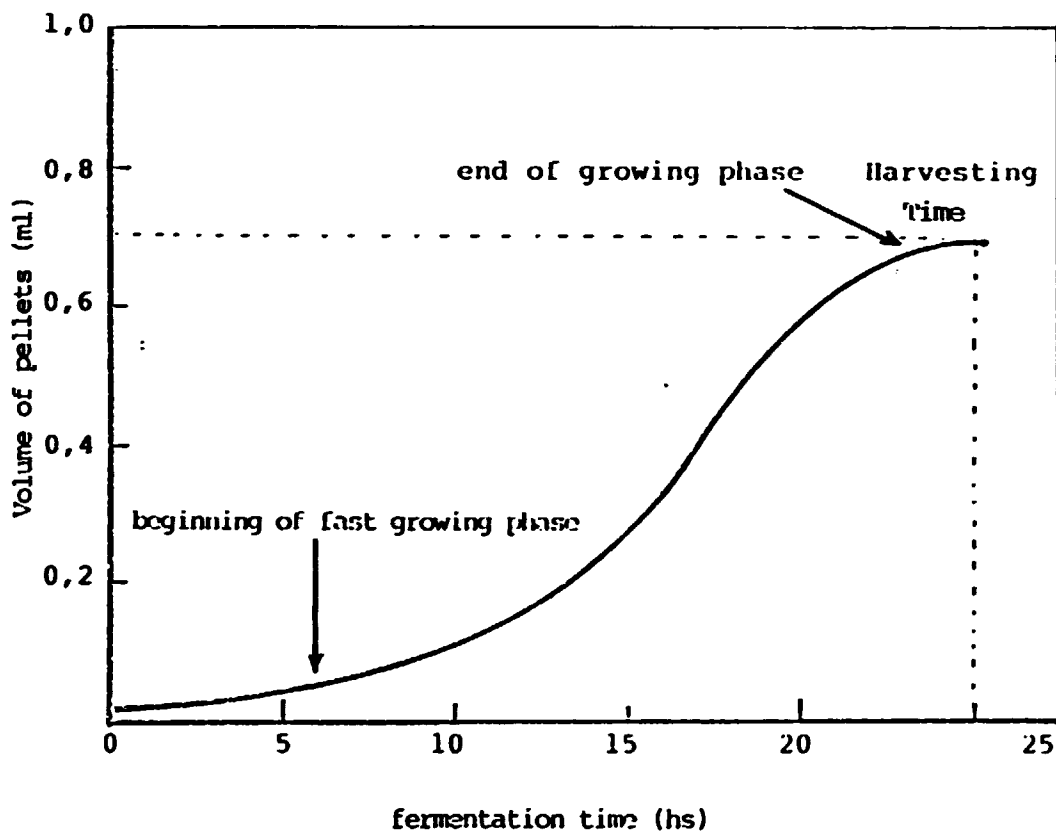
$$W = 0.0682 V \text{ (kg/liter)}$$

5. If one knows the total volume of fermented beer (or cream, or other yeast samples) one can figure out the total amount of yeast in that vat.

This method can be used to track the growth of yeast in fermentation vat.

By sampling at regular interval of time, (e.g. every hour) one can measure the amount of yeast cells in the broth.

A graph similar to the one shown below could be drawn. The right harvesting time is shown by the appearance of second shoulder in the curve (see figure below).



Another method of finding harvesting time is to proceed sampling every hour and the fermentation is ready when two successive samples show equal volume of pellets after fast growing phase.

In this example (see figure above) the end of fermentation is indicated at 25 hs and the volume (v) of pellets was 0.7 ml.

1 p

If the weight equation is applied (see procedure - step 4),  $W = 0.0682V$ , one can estimate the amount of baker yeast produced if volume of broth in the fermenter is known. Assuming that at the end of fermentation the volume of broth (M) is 45.000 l, the total amount of yeast (Y) would be:

$$Y = M \times W = M \times 0.0682V$$

$$\text{If } V = 0.7$$

$$Y = 45.000 \times 0.0682 \times 0.7$$

$$Y \cong \underline{\underline{2.150 \text{ kg}}}$$

#### **RAW MATERIALS CONTROL**

Since molasses is the major raw material for yeast production, it is extremely important to find out the content of soluble solids. The amount of soluble solids is responsible for the yield of yeast cells, hence it represents the commercial value of molasses.

#### **DETERMINATION OF SOLID CONTENT IN MOLASSES**

The amount of soluble solids in molasses can be determined by density of sample diluted to a point which an ordinary density measurement device becomes operative. A Brix or Balling densimeter is commonly used because they are inexpensive and easily handled.

**Procedure:**

1. Take 50 ml of molasses sample in a 500 ml graduate cylinder.
2. Complete the volume with distilled water and shake to obtain a homogeneous solution.
3. Transfer part of diluted solution into a 250 ml cylinder and place a densimeter (reading in  $^{\circ}$ Brix or  $^{\circ}$ Balling: interval of 0 to 30 $^{\circ}$  is adequate).
4. Record the reading and multiply a factor of 10 and one obtains the results in  $^{\circ}$ Brix or  $^{\circ}$ Balling.

**OTHER CHEMICAL ANALYSIS**

The ordinary technique could be used for determination of the following ingredients in the must or molasses samples. Some of them are very important for measurement of yield coefficient and establishing a minor corrections on yeast production process. Such analysis are:

1. Determination of percent of total sugar in raw molasses and diluted molasses (must).
2. Determination of sulfite content in molasses.
3. Determination of reducing sugar in wine (during and after yeast growth).
4. Determination of available ammonium nitrogen during and after yeast growth.

5. Determination of protein content in pressed yeast.

These analysis are not listed as recommended for present situation because they require equipments and techical knowledge that are not available at the moment. The analytical procedures for these methods are easily found in many technical books.

## ACID TREATMENT FOR THE REDUCTION OF BACTERIAL CONTAMINANTS

Bacterial contaminants in the production of baker yeast are the most important factor responsible for yield reduction due to loss in filtration and centrifugation, difficulties in pressing and reduction on quality of finished product.

When contamination is not in excess, one can correct at intermediary process (production yeast) by acid. This treatment is carried out by acidifying yeast suspension to pH between pH = 2.0 and pH = 2.5 and keeping at this pH for 30 to 60 minutes at room temperature. During this treatment the suspension is constantly agitated for complete homogenization.

Special care must be taken in adjusting pH value, using a good pH-meter, which is the most critical. If treatment is in excess (pH below 2.0) the mother yeast may be completely inactivated.

Conversely, if treatment is not enough the bacterial population may not be destroyed.

After treatment the mother yeast is used for vat inoculation in usual manner.

2

**ANNEX IV**

**TRAINING PROGRAM ON PREPARATION AND  
EVALUATION OF AGRO-INDUSTRY PROGRAMS  
FOR MOZAMBIQUE**

..

**TRAINING PROGRAM ON PREPARATION AND EVALUATION OF AGRO-INDUSTRY PROGRAMS FOR MOZAMBIQUE**

Objective: This Program is intend to make the technical staff at UDRA and other technical personnel of Mozambique capable of performing complete studies on cost of production and carry out an economical evaluation of food industries in the country.

The training would be carried out in two steps, first part being performed in Maputo during a period of 2 weeks and thought by an Engineer with specialization in food industries and an Economist especialized in food industry projects. The program involves theory and practical exercices with development of complete study on one industrial plant defined by UDRA.

The second part of training would be developed in Brazil for a period of one week and it would be carried out by a System Analyst. The objective is to make Mozambique technical staff capable of using software developed for microcomputers to calculated internalrate of return (IRR), current value, and sensitivity analysis of agro-industrial projects.

A complete written materials will be offered besides the computer programming in disquets.

The tentative program is the following:

**1. Theoretical parts:**

- . Engineering aspects of production.
- . Establishment of required investments.
- . Calculation of operational cost and income.
- . Methodology of economical evaluation of investment.
- . Project uncertainties.



**2. Practical parts:**

- . Definition of technology and development of basic quantitative flow-sheet.
- . Assessment of process equipments, auxiliaries, laboratory apparatus, vehicles, furniture and office facilities required for industrial plants.
- . Determination of utilities consumption of industrial plants, raw materials, water, energy, ingredients, packaging material and others.
- . Estimation of fixed investments, working capital and total investments.
- . Estimation of fixed cost, variable cost, total cost and unit cost of production.
- . Estimation of total income and gross profit of industrial plant.
- . Determination of break even point.
- . Determination of internal rate of return.
- . Sensitivity analysis of investment.
- . Results and conclusions obtained from internal rate of return and sensitivity analysis.
- . Summary of economical indicators.

**3. Program developed in Brazil will be the following:**

- . Relation cash flow/input data.
- . Input data per se.
- . Case study/output analysis.
- . Sensitivity analysis.