



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

RESTRICTED

DP/ID/SER.A/1211
5 June 1989
ORIGINAL: ENGLISH

17571

INDUSTRIAL ADVISORY SERVICES AND TRAINING

DP/JOR/87/009

JORDAN

Technical report: Appraisal of quality control,
standardization and metrology as they affect
the food industry in Jordan*

Prepared for the Government of Jordan
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of Dr. W.E. Fisher J.P.,
expert in food quality control

Backstopping officer: Mr. Koliakine,
Section for Integrated Industrial Projects

United Nations Industrial Development Organization
Vienna

* This document has not been edited.

V.89 56434

50

ABSTRACT.

FOOD QUALITY CONTROL CONSULTANT.

The project is aimed at strengthening the capabilities of the Ministry of Industry & Trade so as to support the industrial planning and development process of the country. Accordingly the project will produce analytical surveys and reports on the industrial Sector indicating the pace and pattern of growth, constraints & prospects at sectoral and sub-sectoral level. Quality Control programmes, as well as technical reports on transfer of technology and manuals of maintenance and production are also part of the project activities.

Duration of Activity - April 22nd to May 14th 1989.

Quality Control as applied to the Food Industry of Jordan is primarily concerned with the detection of mistakes. The basis of Quality Control as defined in I.S.O 9000 - 9004. is concerned with eliminating mistakes prior to their happening. During the second section of this Project this must be attacked by a series of lectures/seminars.

With two relatively new citrus concentrating plants in Jordan it is essential for these plants to function properly. They will require training of operatives, laboratory staff and key technical staff. While this aspect was outside the original objectives, they became increasingly important during the short term of the project.

RECOMMENDATIONS.

(1)

Develop a "Raw Material Register" in which raw material and packaging material specifications are available to the Food Industry. This may well become the yardstick for all purchases of materials for the food industry.

Presently, as far as I can ascertain, there is no mention of transfer of monomers from plastic films.

This register could be the source showing average amounts of

- (a) vinyl chloride monomer,
- (b) acrylonitrile monomer, and
- (c) vinylidene chloride monomer.

Such a register is to be developed by the Ministry of Industry & Trade and once compiled a copy should be available at import and export points.

(2) Recover the tomato seeds from the cold break at the AMPCO plant in the Jordan Valley. AS this is the tomato season it is the right time to collect the seeds and use them as the next crop of seedlings. A cheap, effective way of improving quality of the tomato crop.

To Al Shona Station - AMPCO via the Ministry of Industry & Trade.

(3) Conduct a series of lectures/seminars on the advantages of Quality Control.

Items to be emphasised -

- Management Responsibility
- Quality in Marketing.
- Quality in Design.
- Quality in Procurment (Purchasing)
- Quality in Production (Process Control)
- Material Control & Traceability.
- Control of Measuring & Test Equipment.
- Control of Non-conforming product. Hold Notes, Quarantine.
- Quality Documentation/Records.
- Personnel Training.

TOP Management must be vitally concerned and accept the concepts of Quality Control.

By U.N.I.D.O. Expert in later half of project.

RECOMMENDATIONS continued.

(4) There are pieces of laboratory equipment in the Ministry of Industry & Trade laboratory that are non-functional. Obtain the services of an experienced laboratory instrument technician(s) to make the equipment functional. Where such is impossible remove them from the laboratory or dispose of them.

For Government of Jordan - it may be necessary to co-opt U.N.D.P. to obtain the services of such a person.

(5) In consultation with Ministry of Health the Ministry of Industry is to consider what preservatives, if any, would be permitted in packaged Orange Juice.

(6) Recommend that both Citrus processing plants purchase an American Optical Refractometer with automatic temperature correction. Model No 10481 from V.W.R. Sales Office Zurich Phone 01 694650 and Telex 57059 FTZCH.

Ministry of Industry & Trade to contact firms.

(7) If a preservative is approved for Orange Juice it shall be -

either (1) Sodium Benzoate, or

(2) Sorbic Acid.

Both are relatively mild preservatives and will not affect people with asthma. Ministry of Health/ Ministry of Industry

(8) When Orange processing is recommenced both plants (ARAM & AMPCO, will require expertise for staff training and instruction.

It could well be that ARAM or AMPCO would NOT want the same person carrying out the training.

My estimate for ARAM is six weeks and two weeks at AMPCO.

A specialised expert from U.N.I.D.O./U.N.D.P.

(9) Ultimately, I believe when fully established and working closely with Foods & Food Legislation, the Laboratory should become a separate Government Department which is not under the aegis of another Government Department and possible influence.

RECOMMENDATIONS - continued.

(10) It is considered essential that the laboratory at the Ministry of Industry includes a Microbiological Laboratory. This to be proceeded with as soon as possible to enable bacterial counts to be determined on a wide range of foodstuff. The Government of Jordan through the Ministry of Industry & Trade with possible consultation with U.N.D.P.

The following recommendations apply directly to the Ministry of Industry & Trade - Food Laboratory. Their basis are my findings in the first half of the Quality Control Mission to Jordan.

(11) There are pieces of laboratory equipment that MUST be made operational. If this cannot be achieved then dispose of the equipment -- it CANNOT take up vital laboratory space.!.

(12) It should be a ongoing procedure for a Senior Laboratory person to make a regular(approx once every 10 days) inspection of the entire Laboratory areas. Look for cleanliness and good housekeeping within the laboratory. There should be a book in which the results of such inspection is recorded. Various laboratory department seniors are to countersign the report to shown that they are aware of areas that need attention. The same fault should NOT BE REPEATED. If So WHY?.

(13) The Chief, Department of Standardization and Quality Control should have available a duly signed and authorised clear and concise job descriptions for all laboratory staff. Such a Job Description will not remain a static item and should be revised approx once per year.

(14) The Chief of the laboratory to have detailed manuals concerning ALL analytical procedures. These procedures MUST be authorised by the Head of Department for Standardization & Quality Control.

(15) I have mentioned that Food Regulations/Specifications are currently in the 'recipe' stage. In the next four months obtain

RECOMMENDATIONS - continued.

by comparison with at least four (preferably more) revise and develop a new format for food specifications.

(16) Form a group (four persons maximum) to be involved in the preparation of new specifications. It should be considered a "developing period" when these persons will learn to assess the many tests that may be applied to a foodstuff To select those tests that should be applied, in order to maintain a standard, such standard as they consider the optimum for Jordan. This group must then consider if the equipment they have in the laboratory and the expertise is sufficient for those tests to be carried out.

(17) A further group, but from within those at the Ministry of Industry & Trade Laboratory shall have the responsibility of obtaining specifications for raw materials, semi processed materials, processed material and packaging material and develop reference manuals from all this material. A simple basis is the animal, vegetable or mineral basis for the manual.

(18) From the material in the manuals determine what tests cannot be adequately covered by the existing laboratory facilities.

Just to mention a few that come to mind --

- (a) can seam technology,
- (b) "gable top" carton sealing tests,
- (c) transpiration rates for different packaging films.
- (d) sealing methods for packages and assessing the effectiveness.
- (e) lug sealing of glass jars and specifications and methods for testing.
- (f) crown sealing of glass bottles and required specifications.
- (g) Mullen & Tear testing on paper/paper-board and water resistance (TAPPI) and Cobb Water absorption tests.

(19) The Laboratory Chief to devise a "Staffing Expertise Register" After suitable training there will be two persons in the laboratory that can carry out a specific test. If one is sick or on leave then the other can do the test and the test does not WAIT.

The major area is that of the Senior Analyst who carries out most of the "instrumental analysis. The laboratory chief should maintain this "confidential" register of each persons capability and plan according for leave etc.

7.
RECOMMENDATIONS - continued.

20)

When ALL laboratory equipment is fully functional and another person trained to do most of the work of the Senior Analyst, I strongly recommend that he go on a six to eight week course designed for the maximum usage of the "instrumental" equipment.

In view of my observations of the laboratory and my discussion with various people the order of priority for laboratory equipment is as follows -

1. Gas-fume cupboard for use with HF and HClO
2. Kjeldahl units for determination of Nitrogen⁴(Protein) in various products.
3. Abbe Type Refractometer American Optical Mark 2. with Automatic temperature correction and digital read out.
4. Gas Chromatograph for determining aflatoxins, anti-oxidants etc.
5. Automatic system for fibre determination in foods & feeds.
6. Automatic system for fat determination in foods & feeds.
7. Vacuum Oven with compressor.
8. Automatic flame photometer with automatic sampler for sodium, potassium calcium barium and lithium.
9. Top loading balance with digital read-out

This order of priority is also based on potential test demands.

1. Survey and Analyse the overall situation with regard to quality of industrial food products and identify the products having particular importance for the economy of Jordan.

The standard of the industrial food products were of an average quality in the places that were visited. (Refer Annex 2.) Too many of the materials were imported as raw, or semi-processed material. The actual final manufacturing and packaging were then completed in Jordan.

The exception was at the AMPCO plant in the Jordan Valley.

In the major proportion of products or packaging material, specifications were very embryonic or even non-existent. The manufacturers relied on some nebulous supplier to provide a "satisfactory" item. For that reason, raw materials were rarely checked against a specification. "How then do you order" was the question and in all instances the manufacturer indicated by word or gesture that he would know. If his supplier "cheated" he would soon know about it and discontinue future orders (Refer Recommendation 1.)

As with most Quality Control as applied throughout the world, the tendency is to develop a series of checks to see if the product conforms to an existing standard. What needs updating is the concept of Quality Control; or as is more recently known Quality Assurance.

It is in this Quality Assurance that, if and when, a deviation from standard is found, then a thorough investigation is undertaken to reveal its cause. Then true Quality Control is applied. There is devised a method that is intended to eliminate any future deviations from such a cause. In a summary the existing Quality Control in Jordan is looking for the errors after they have been made and not concentrating on preventing the errors in the first place.

(Refer Recommendation 3.)

Portion of the objective was to identify the food products having particular importance for the economy of Jordan.

In respect to this there was recently reported in the "Jordan Times" of 4th May 1989 on page 3. a statement by the Minister of Agriculture - Adnan Badran, urging greater production of all agricultural products "Not only has the country to produce

more but ought to be made to earn revenues far exceeding the amounts to pay for imported food supplies."

In this statement is it clear that a concerted effort must be made with ALL food products, however in my opinion the following would have the greater importance.

(a) fresh milk.

I have selected fresh milk because there is already a marked increase in this commodity. If this is produced in greater proportion and consumed by the populace in that form it would certainly minimise, if not eliminate imports of Skim Milk Powder (S.M.P.) and Full Cream Milk Powder (F.C.M.P.) Also such consumption will have a long term effect in improving the health especially of children, and thereby minimising subsequent health costs.

Recent improvements in the production of fresh milk has led to the need for a method to detect --

"adulteration of fresh milk with milk powders"

I am sure that there is such a method as I seem to remember it being mentioned at the I.D.F. Conference on Reconstituted Milk Products held in Singapore.

I have referred the Chief of the Laboratory to the International Dairy Federation - Brussels requesting such method.

One of the problems that would arise when fresh milk production is boosted is the fact that the dairy visited (see Annex 2.) would not at present have the facilities to cope with the stated intent of 100% fresh milk.

Such modifications however would not incur any serious delay as both my counterpart (Refer Annex 1) and self believed that within two to three months would be sufficient time to adapt the existing plant. The effective washing of the milk receival containers would be one of the remaining problems.

(b) cereals

The greatest number of small food businesses in Amman are engaged in the bakery/cake shop.

It is axiomatic that small business is the real basis for the economy of any country.

By increasing production of cereals, especially wheat and it being used in the small business there can result in a marked

economic advantage as well as substantial import savings.

The small bakery in Amman can draw upon a vast and varied experience in the use of various flours as they have been accustomed to using them for literally thousands of years.

My reason(s) for selecting cereals is that improved production can be utilized with the minimum of problems, which in itself is a considerable factor in making the decision.

True, milling may not be as sophisticated as experienced in fully developed countries, but in this area, during milling in Jordan more "fibre" is incorporated into the flours, which if one is to follow the gurus of modern health, is more beneficial to mankind.

(c) Tomatoes,

Already tomatoes have reached the stage where there is a considerable processing industry as well as an established export trade. While there has been substantial work on developing varieties suitable for processing I can see no evidence of using the processing plant as a source of seeds for the next season. This results in considerable savings and permits the processing plant to "control" the type of tomato that it will use.

This suggestion becomes much more realistic and indeed fortified when one considers that there are two crops per year of tomatoes here in Jordan.

(Refer Recommendation 2.).

With development of the existing technique for aseptic filling of tomato paste in approx 200 litre aseptic bags and then placed in substantial cartons there is a distinct future for the industry.

(d) Oranges and their Processing.

This, as I believe, is the most controversial. At present there are two relatively new processing plants in Jordan.

(1) Arabian American Food Manufacturing Co
and

(2) AMPCO at Al Shona Station in the Jordan Valley.

(Refer Annex 2. and Annex 7.)

The following is in some respects a comparison from one plant

to the other but is also intended to point out the necessary action that is needed on behalf of the Government Food Legislators.

Refer Recommendation 5.)

The siting of the AMPCO is more realistic as it is adjacent to the large citrus sources. This of course could become even bigger if fruit from the West Bank of the Jordan can be processed at AMPCO.

Both plants have just completed initial "running in trials" and both plants had "teething" problems.

The oil set up at AMPCO is quite good using Alfa Laval centrifuges. Both plants use APV evaporators but in both instances APV had little say if any in the installation of their plant.

The AMPCO is a two stage using thermocompression on one effect, while the ARAM is a three stage without thermocompression. ARAM has a very good "essence" recovery plant while AMPCO has no such equipment. Whereas AMPCO can in effect run any citrus, to the best of my knowledge the ARAM plant is devoted solely to Oranges.

Both plants (on the juices I tasted) incorporate more of the natural orange oil that I consider necessary as this leads to off flavours if stored for any length of time. The laboratories of both plants have only simplistic equipment for determining Brix and should purchase a reliable Refractometer. (Refer Recommendation 6.)

The single strength juice is packed in "Combibloc" at ARAM and in Nimco "Gable top" packs at AMPCO. Should AMPCO wish to extend the "shelf life" of the gable top they will have to add a preservative as gable top cartons are short term packages ONLY. (refer Recommendation 7.)

In both instances it was obvious that neither plant were aware of Acid Corrections as applied to concentrates.

I will forward a copy of the necessary corrections to Ms Nada Bitar, asking her to pass on a copy to each plant.

Further technical training is required at both plants and in some instances supervision of and correction of some of the

of the plant operatives, also some of the procedures as used by the laboratory staff. e.g. In neither factory were they aware of acid correction and at ARAM did not even test for acid. (Refer Recommendation 8.)

One thing that I would like to see is someone, say from the University or similar body do work on effective utilization of food factory waste water. I know that Jordan realizes that water is one of its precious resources, but there is still more that can be achieved in this area.

2. Review the standardization and metrology activities and assess the technical facilities available to undertake quality testing of industrial food products.

I requested an English translation of a food specification from the Laboratory Chief.

The food specification detailed twenty one quality parameters, where most other country's specification lists approx half that number.

It is clear that Jordan is at the "recipe" stage in its Food Legislation/Regulations/Standardization..

This in itself, is not a bad thing as just about all countries have been through, or in ,or approaching this "recipe" stage.

It indicates the typical paternalism shown by legislators in that they wish to control matters.

Once a country has confidence in its Food Testing Laboratories, then one finds the "recipe" format decreases.

The major problem with "recipe" legislation and standardization is that if kept for an excessive period it tends to inhibit innovation and will disillusion brilliant technology.

This does not mean that one can recommend a loosening of existing legislation/standardization. Rather that those people who are responsible for legislation and standardization MUST realise that there should be a continuous revision of standards. It is obvious that new additives, new processes and new packaging materials become available from day to day. The Department of Standardization CANNOT AFFORD to NEGLECT THESE NEW PRODUCTS/MATERIALS.

In the short to intermediate term Jordan will find that food products will become increasingly under consumer pressures. The consumer may want changes that are not currently catered for in the legislation.

The Government of Jordan must become increasingly sensitive to both the need of the manufacturers and to the needs and demands from the consumer and then balance these forces against the ultimate judge - FOOD SAFETY.

(Refer Recommendation 9.)

The present laboratory at the Ministry of Industry it is equipped

to cope with most of the tests. However some of the equipment is not working. (Recommendation 4.) It has on order equipment to extend this range of tests. There are two main areas still to be adequately covered from an analytical aspect.

(A) Microbiological Testing.

(Refer Annex 3.)and (Recommendation 10.

and

(B) Equipment and training for

Chemical Residues on Foodstuffs. (Recommendation 11.).

This is concerned with the many pesticides and chemicals used in farming. Although not used in any great variety by the Jordanian farmer this is an area that will become more important.

The area of Sampling and Sample procedure has been covered in Annex 4 & 5.

For any Food Laboratory to function effectively it should adopt after extensive testing over at least twelve months some form of "rating" for each manufacturer/supplier.

Tests can then be carried out on samples from previously reliable sources at a reduced frequency. However once a sample is found that does not conform to the standard the manufacturer/supplier reverts to normal testing.

Such a procedure once properly installed lessens the work load on the laboratory. This procedure can be found in any reliable Food Reference book. If not readily available then U.N.I.D.O. or the author can supply the details of the procedure.

The initial Work Plan as shown was devised in the first few days of the assignment. While it was basically adhered to, item No 5 and the cost of a Conference/Seminar Room for one day was obtained by phone. It was J.D. 150 per day. (refer Annex 6.)

Annex 1.

List of persons with whom direct contact was made at the Ministry of Industry and Trade.

Hassan Saudi. - Director, Standardization & Quality Control Department.

Ms Nada Bitar, Laboratory Chief - Standardization & Quality Control Laboratory.

Zaid Kelani, Senior Analyst of Laboratory.

Ahmed Al Rifai - Inspection and Sampling Department,
Standardization & Q.C. Laboratory.
(My counterpart for Plant Visits.)

Dr Bani - Hani, National CoOrdinator for Project. Ministry of Industry & Trade.

Mohamad Qashou, Head, Information & Studies - Ministry of Industry & Trade.

Sami Said - Head of Food Section - Directorate of Industry.

Shaker F. Halasa. Agricultural Engineer, Ministry of Industry and Trade.

Annex 2.

List of Establishments visited and names of persons contacted.

- (1) General Investment Co Ltd. - Jordan Breweries - "Amstel"
Mohamad Saleh Ali, - Production Manager.
J.W.C.Loeff - Brewery Manager.
- (2) M. Haddad & Sons
Nabil A. Abu Al Basal, Food Technologist, - Snack Food.
Dr Sami Al- Suana , Director Wine/ Arak Section.
- (3) Universal Industries Co Ltd. Canned Foods.
Hatem A. Zalloum, _ General Manager.
- (4) United Food Industries - Meat Products.
Hussein Al-Uzri , - Manager.
- (5) Arabian American Food Manufacturing Co (ARAM) Oranges.
Ghassan Batayneh - Director
Maher Abdullah Gheith - Plant Manager.
- (6) Jordan Dairy Co Ltd.
M.Awad - Deputy General Manager.
Potrus Ajluat , - Production Manager.
- (7) Lizaqza Factory - Nuts & Sweets.
Mohammad Marji, - General Manager.
- (8) AMPCO - Al Shona Station, Tomato & Citrus Processing.
Emil Masarweh, - Manager.
Dr Basem F. Awwad, Technical Manager.
- (9) Food Technology Dept, Jordan University - Amman.
Dr Ayad Amr & Dr Mohammad al Homad.
- (10) Royal Scientific Society, - Amman.
Dr Said Alloush, Head of Organic Technology Division.

Annex 3.

MICROBIOLOGICAL LABORATORY.

The room for the Micro Lab, should be a minimum of 30 square metres in floor area, but most laboratories are bigger than this and the normal can be considered as approx 50 sq. m. The room shall be air conditioned with units that are running during all working hours. The switch for these conditioning units shall be outside the room so that they can be switched on prior to entering the room. In NO CIRCUMSTANCES is the usual laboratory cleaner permitted to clean the micro laboratory unless under supervision from the Microbiologist..

The air filters on the air conditioning units shall be removed and cleaned thoroughly and then replaced every six weeks and a register of this action shall be maintained by the Laboratory Chief or by the Senior Microbiologist.

ALL windows shall be permanently closed in such a fashion that they cannot be opened. The entrance to the Micro Lab shall have an "air lock" which is a very short passage with a door at each end so that one door is closed all the time a person is entering or leaving the Micro Lab. The air conditioners must create a slight positive pressure inside the Micro Lab so that any air will flow out of the Lab rather than into the Laboratory. For say a 50 - 60 sq m. micro lab there shall not be more than two persons working in the laboratory continuously.

If and when either of the microbiologists is working on a sample that could be "dangerous" he/she is to switch on a red light that will show outside the laboratory and entrance by any other laboratory staff is then strictly limited while light is ON.

Walls of the laboratory are usually tiled to a height of approx two metres with plain white glazed tiles.

This facilitates easy wiping down of the wall with a sterilizing solution.

Cupboards are to have fronts faced with laminex or similar laminate and bench tops are to be of same material with the minimum of joins and joins are to be as close as possible,

Any floor drains MUST have a "S" or "P" trap so as to prevent egress of foul air and bacteria, and the same provision shall apply to sinks.

The services are :-

Electricity with earth.

Water both hot and cold.

Vacuum,

Air pressure,

Gas,

and if possible steam at 30 p.s.i.

The following items are considered essential for the laboratory but are by no means comprehensive, as the bacteriologist will have his or her own preferences for some equipment.

Equipment List (From V.W.R. Catalogue 1984/85.)

Sterlizer/Autoclave 58700 - 008

If steam unavailable then

one only OS 58624 - 180 and one only OS 58622-200

Sterile Bench Cabinet one only 21917 - 126.

Water Baths 2 only 1230 page 58.

Incubator Bath Coliforms 13307-094 page 80

Microscopes A.O.Series 150 one only

B&L Phase Contrast page 1150

Incubation Ovens One only OS 35827-021 page 1075

and one only 35824 - 056 220 Volt page 1074.

Membrane filtration unit capable of sterilization at 130 degree C. and membranes to fit same .Suggest 47 mm.

Howard Mold Count Cell, 3 only No 23649-006 page 703.

Detergent Sanitizer PHisoHex (3% hexachlorophene)

Face Masks _ Clean Room 21923 - 355.

Beret Caps 21920 -858 pages 682 and 683.

Petri Dishes Std Disposable Plastic

4 packs 100 x 15 mm. 25384-070 page 730.

two packs 100 x 15 glass 25353 - 281 page 729.

Pipet Washer 53582-006 page 1352.

Tissue Culturs Flasks 291085 - 076 page 866.

Glass jars with autoclavable closures for sterile media storage.

Pipette Fillers 5 only 53497-009 page 1327.

Color CodeD Serological Pipets 1 - 52961-010

1- 52961-075, 1 - 52961-111 page 1311.

Borosilicate glass pipets 14673-010 page 1308.

One only Dissecting Set 25620-005 page 742.

Bacti-Disc Cutter/Wilkens- Anderson Co 4525 W, Division St
Chicago Ill 60651.

OR.

Bacteriological Can Opener (Marmora Machine Co 1956 N Latrobe
Ave Chicago Ill 60639.

BBL Gas Pack jars equipped with gas pak (H + CO2 generator).
6 only.

DIFCO or SIMILAR .

Tryptone,

Agar,

Yeast Extract,

Peptone

Proteose Peptone No 3.

Gelatin

Beef Extract,

Trypticase,

Bacto - Peptone

Trypsin

Malt Extract,

Glucose, Dextrose, Maltose, galactose. Glycerol, Polypeptone,
D mannitol, and Soytone.

Soluble Starch, NaCl, K₂HPO₄, Na₂HPO₄.

Ferric ammonium sulphate, Sodium metabisulphite

D - cycloserine (from Sigma Chemical Co.)

Dehydrated ox gall,

Methylene Blue, Brilliant Green, Eosin Y , Phenol red,
Bromocresol purple.

Alpha Naphthol, Basic Fuchsin,

Sulphanilic acid,

Sodium Thioglycollate

Annex 4.

**SAMPLE PROCEDURES FOR MICROBIOLOGICAL/CHEMICAL &
WEIGHTS & MEASURES TESTING.**

The majority of samples that the Laboratory receives will be in set(s) of five samples.

Upon receipt of samples observe any special storage conditions necessary in order to comply with those conditions.

Where analysis cannot be commenced within a period of half a day then the storage conditions MUST BE FULLFILLED.

It is important to evaluate the set(s) of samples carefully upon receipt and to record ALL the details in the "SAMPLE RECEIVED REGISTER.

With an indelible marking pen or an acidified copper sulphate solution for cans, mark each sample with the selected code - (normally a consecutive number preceded by the final two figures for the current year, together with a subscript for each item in the set of samples).

Where cans have wrap around labels, remove the label so that the side seam can be inspected for leaks or evidence of leaks also, note any evidence of small dents round the top or bottom seam or both, as this is indicative of poor can handling.

Record ALL such information in the Sample register and affix a portion of the label which has the legal printed requirements thereon in the Sample Register.

ALL SAMPLES ARE TO BE TESTED -- IN A F.I.F.O. BASIS.
(FIFO means first in first out)

In the case of glass jars with lug closures and with the push on twist off (POTO) lid visually check just under the lid for any indications of possible leaks. This is normally indicated

by a dark coloration at or near the leak point.

Any untoward look, colour, stain or mark should be recorded in the Register Book at time of Receipt. During analysis (which may be a week later) such things may have changed or even been eliminated. As much of what is written in the Register can form vital evidence for subsequent action, this recording of sample information is of critical importance.

In the case of glass jars, plastic jars, or semi-transparent plastic containers, any cloudiness, in the normally clear syrup, is an indication that something may be amiss. White deposits or "spots" on the surface of the food should likewise be treated with suspicion and all such indicators included in the Sample Register.

After all visual evidence of the sample set(s) is duly recorded the next step is the actual gross weight of the sample. The gross weight should for each sample be recorded in the Register and the net weight can be subsequently determined during the microbiological/chemical testing.

This weighing on receipt of samples is just as important as the detailed examination described above. The details recorded in the Sample Register can and will on a number of instances provide vital information for the microbiologist, or analyst in their selection of tests they consider necessary.

The set(s) of samples are now ready for the microbiologist and the analyst to test. Normal procedure for the microbiologist is to read the details in the Sample Register. If no comments infer that there could be a bacterial problem then he/she shall take, at random, any two of the five samples. The Analyst shall take the other two and one shall be reserved for repeats on any specific test, if necessary.

F.B. This procedure shall be adhered to for all samples unless the microbiologist decides after reading the Sample Register that there is a need for specific testing/procedures.

Then, after the microbiologist, if the Analyst decides special testing may be necessary, such as lead etc in "baby food" the analyst may at his discretion request the remainder of the microbiologists sample after he has obtained his sample.

It is normal for an assistant analyst to undertake the weighing or volume determination on packages to ensure that the correct weight/volume is attained. Remember that the consumer purchases say for example 250 g. of Tomato Paste, not 249.2g.

ANY INSTANCE of an underweight or under volume in a set of five samples taken at random, must be viewed with grave doubts.

The laws of most countries now PROHIBIT ANY instance of weight or volume being less than the declared weight. However prior to any legal action arising from a single case of underweight obtain a further set of samples just for weight/volume tests and then conduct a statistical analysis on the weights/volumes measured. If statistically proven that there is a proportion (usually deemed at greater than 2.5%) of items below the declared net weight/volume then legal proceedings are the prerogative of the Head of the Department..

FOODSTUFF SAMPLING IN THE MARKETPLACE . (a)

Subject to the following procedure , any authorised person who takes or obtains samples of food with the intention that it be submitted for analysis , shall take or obtain a sample of such size and where appropriate, of such numbers of sample units as will enable the proposed analysis to be carried out .

The person (normally an authorised officer) who obtains the food sample for chemical/microbiological analysis :

- a) Shall not divide the sample into portions or parts .
- b) Where the sample consists of more than one sealed package of the type normally sold in the retail trade , the person shall submit for analysis samples in their market package unopened and intact .

The number of units and the minimum size of each sample unit to be taken or obtained for subsequent analysis shall be as shown in the following Table 1 .

In Column 2 of Table 1. is the number of samples to be taken of the described foodstuff and Column 3. indicates the minimum size or weight applicable to such sample unit .

(a) ALL SAMPLES SHOULD BE OBTAINED IN THE MARKETPLACE .

SAMPLES DIRECT FROM MANUFACTURER SHOULD NOT BE TAKEN AS THEY
HAVE NOT RECEIVED DISTRIBUTION TIME AND HANDLING .

(The purpose of the quantity is to ensure that a representative sample was obtained for the analysis and therefore can be upheld in a court , should such action be necessary . For that reason the person obtaining the sample should always try and obtain the sample from at least 10 or more units at random) . *

Such samples are to be delivered to the authorised laboratory as soon as possible . Where the product requires to be kept at a certain temperature for retail sale purposes , such storage shall, wherever possible, be maintained until actual delivery to the authorised laboratory .

(It should be remembered that under ideal conditions the bacterial load can double every twenty minutes . Ideal conditions mean temperatures of 35 degree C. which often Exists in a motor vehicle.)

TABLE 1.

Column 1.	Column 2.	Column 3.
Food	Number of sample units	Minimum size or weight of sample unit.
Cheeses	5	100 g
Chopped or minced meat, uncooked	5	100 g
Cooked, corned, pickled or salted meat	5	100 g
Creams, light cream, reduced cream		
pasteurised creams	5	100 g
Frozen pre-cooked food	5	100 g

Column 1.	Column 2.	Column 3.
Goat milk, pasteurised goat milk	5	100 g
liquid egg, liquid yolk,		
liquid white & mixtures of		
liquid yolk and liquid white	5	100 g
Manufactured meat		
uncooked fermented	5	100 g
Meat paste or spread including pate	5	100 g
Milk, pasteurised, modified		
Milk, pasteurised skim milk		
pasteurised flavoured liquid milk	5	100 g
Oysters, fresh or frozen	5	10 oysters
Pasta, uncooked wet or dry	5	100 g
Prawns, cooked	5	100 g
Yoghurt, reduced fat yoghurt		
skim milk yoghurt and other		
yoghurt products	5	100 g
desiccated coconut	10	100 g
dried milk, dried skim milk		
skim milk powder malted milk		
Powder	10	100 g

Column 1	Column 2	Column 3
Ultra heat treated creams, Ultra heat treated milks or sterilized milk	10	unopened PACKAGES any size
Infant food in tinplate for lead analysis	20	unopened containers any size

-
- * IT SHOULD BE REMEMBERED THAT THE SAMPLES MUST CONFORM WITH
- a) FOOD REGULATIONS/STANDARDS
 - b) MICROBIOLOGICAL STANDARDS
- and c) WEIGHTS & MEASURES REGULATIONS .

Annex 6.

Initial Work Plan for Dr. W.E.FISHER

currently based at the Ministry of Industry & Trade
- Directorate of Standardization and Quality Control.

1.

Factory Visit to Arabian American Food Manufacturing Co.
(Mr F. Gheith - General Manager.)

1b.

Select approx five other food firms to visit. These firms
should be producing a cross section of the markets products
together with a variety of packaging forms.

2.

Visit Dr Bani- Hani - National CoOrdinator DP/JOR/87/009.
contact through Aduan Naghaway- Programme Officer U.N.D.P.

3a

Visit Dr Arafat Altameni
Vice President for Industrial Affairs
Royal Scientific Society.

3b.

After this visit finalize the list of laboratory equipment
as currently under consideration.

4.

Visit the selected food factories (Refer 1b.)

5.

Visit Munir Zaghloul - Assistant Director
Jordan Institute of Management.

In discussion Hassan Saudi - Director of Standardization and
Quality Control agreed that the Jordan Institute of Management.
was the best site for Quality Control Seminars but has no figure
on costings.

Annex 7.

Arabian American Food Manufacturing Co. - Mafraq, JORDAN.

This was considered an "essential" visit as it was a potential short term consultancy project.

Visited May 1st. by car with Director of Aram. Ghassan Batayneh.*

The plant was situated approx one hours drive from Amman and some distance from any citrus plantation. While there the raw material was coming by truck from TURKEY.!

This MUST be a costly procedure.

The plant itself appeared quite good, in some instances the equipment almost too sophisticated for the siting. One immediate thought was who was going to carry out the necessary maintenance on some of the essential equipment should it become necessary. (The Finnish Densitometer for example.)

There were a number of aspects that I considered unsatisfactory with the plant, the most important was the non use of the oil/water from the "abraser" and the Italian Juice extractor incorporating too much oil into the juice.

Apart from the "errors" in the set up of the plant (it would appear that the designers had not actually worked in a juice concentrating plant) the major items that will require attention when the plant resumes operation towards the end of the current year is the necessary training of the senior staff in the many facets of juice and concentrate production. This is essential if this project is to become viable. From a time aspect I cannot see satisfactory training being achieved in less than three months of REGULAR supply of oranges. During this time it should also be feasible to train the laboratory staff in basics. At present this area is very rudimentary.

The "Combibloc" section seemed satisfactory although I did not see it in operation.

From a Quality Control aspect there was NO attempt to conduct tests on raw material, due to extreme paucity. This led to only essential testing being carried out. In many instances the laboratory personnel were not trained to carry out tests which are FUNDAMENTAL to a citrus plant.

The result from a Q.C. aspect is relatively poor.

At present any suggestion that this plant diversifies into tomato paste and ketch-up, or milk products should unless supply of raw material becomes securely available be definitely postponed. The prime importance is to get this plant operational with adequate raw material and with proper training..

* The Director of ARAM - Ghassan Batayneh made it very plain that he was very disappointed that I or someone else had not arrived one to two months earlier as the citrus season was now finishing. He firmly believed that I should have spent my entire time at the ARAM plant. The orange season will recommence November/December.