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09339

DP/ID/SER.A/218  
15 October 1979  
English

ASSISTANCE TO THE MAURITIUS STANDARDS BUREAU

DP/MAR/75/008

MAURITIUS

Technical report: Standardization and testing of  
industrially produced consumables and food  
products\*

Prepared for the Government of Mauritius  
by the United Nations Industrial Development Organization,  
executing agency for the United Nations Development Programme

Based on the work of Mac Treboux, food and analytical  
chemist

United Nations Industrial Development Organization  
Vienna

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id.79-7573

Explanatory notes

MSB is the Mauritius Standards Bureau.

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Mention of firm names and commercial products does not imply the endorsement of the United Nations Industrial Development Organization (UNIDO).

ABSTRACT

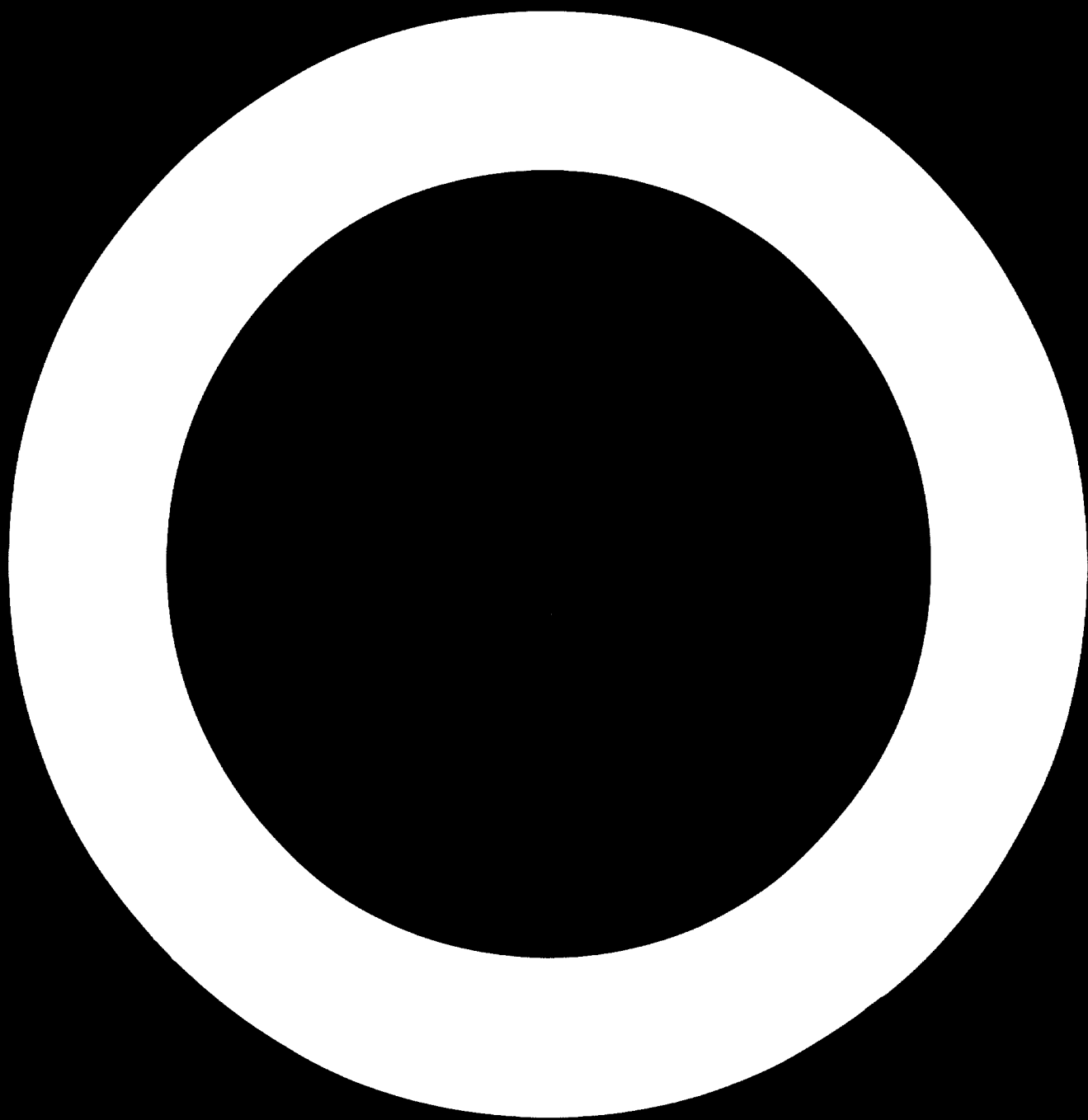
The expert was assigned for one year (19 July 78 - 18 July 79) as the expert in food and analytical chemistry to the Mauritius Standards Bureau (MSB). The expert's mission formed part of the project "Assistance to the Mauritius Standards Bureau" (DP/MAR/75/008).

The expert organized the activities of the chemical section of the MSB. The equipment was installed and checked. Additional testing equipment (instruments, glassware and reagents) was ordered during the mission.

Counterpart staff was trained in chemical testing of foods and chemical products. About 50 test methods were adapted for use in quality control of soaps, detergents, oils and fats, salt, cereal products, fruit and vegetable products.

Standardization activities were increased during the expert's mission. 5 draft standards were prepared, discussed and finalized. 3 draft standards prepared before July 78 were reviewed. 7 draft standards are under preparation at the end of the mission.

The report recommend to increase urgently the staff of the chemical section by recruiting one chemist and two technicians. Specific recommendations are made in relation with the organization of the section, the testing and standardization activities, the additional equipment needed and the training of the staff.



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## INTRODUCTION

This is a report of a mission forming part of the project "Assistance to the Mauritius Standards Bureau" (DP/MAR/75/008) which was approved by the United Nations Development Programme (UNDP) on 8 December 1976. The executing agency is the United Nations Industrial Development Organization.

The expert was sent on a mission of 12 months from 19 July 1978 to 18 July 1979 as an adviser to the Mauritius Standards Bureau (MSB). According to his job description, he was expected to assist the Mauritius Standards Bureau in developing and strengthening the activities of standardization and testing of industrially produced consumables and food products. Specifically, the expert was expected to:-

- assist in drafting local standards concerning industrially produced food products
- organise and operate the analytical chemistry laboratories for testing industrially produced consumables and food products
- advise generally on chemical analytical methods as required for testing of products subject to application of local or foreign standards
- train local counterparts in analytical chemistry.

The MSB was established in April 1975 by governmental decree (The Standard Act). It is divided into 6 technical sections with their own laboratories and 1 administrative section. The technical sections are: textile, electricity metrology, mechanic, paint and chemistry.

The chemical section started its activities in February 77 with the nomination of Mr. R. Gopaul scientific officer as head of the section.

## II ORGANIZATION OF THE CHEMICAL SECTION

### II.1 Main lines of activity

Up to date the chemical section has been involved in standardization and testing of products such as soaps and detergents, oils and fatty foods, canned vegetables and fruits, safety matches, toothpastes, edible salt, wheat flour and bread, etc. The section is responsible for standardization and tests on all consumables and food products. This field of activity has such a large width that it needs to be clearly delimited and to determine priorities.

This section should restrain its field to products where quality is mainly characterized by chemical tests. This means that standardization of commodities such as safety matches for example should be done by an other section. On the other hand the chemical tests required by other section of MSB should be more strictly under the control of the chemical section in order to improve the quality of results and to impede errors and misuse of the instruments and methods. Keeping in mind the limited number of staff trained in chemical works, they should be used with a maximum of efficiency.

Within the field so defined, the section can not be involved in standardization and testing of drugs which would require specialized staff and laboratory facilities. The same limitations exist regarding microbiological tests on products.



Once settled the field of activities, the order of priorities can be fixed taking in mind the following points:

- economical importance of the product
- situation of monopoly of the manufacturer
- governmental facilities given to the manufacturer
- wishes of the National Consumer Council
- testing facilities of the MSB laboratories
- possibility of cooperation with other local laboratory.

## II.2 Installation and equipment

### II.2.1 General installation

The chemical laboratories consist of two rooms on the first floor of the MSB building. Room 26 is a general analytical laboratory equipped with the instruments and furniture listed in Appendix Ia. Room 28 is a smaller laboratory for instrumental analytical chemistry equipped with the instruments and furniture listed in Appendix Ib. Both rooms have climatisation and provided with tap water, gas and electrical energy. The pressure of tap water is very low and does not allow the use of water filter pump. The electrical energy provided is sufficient up to date, but supplementary lines would be required when some new equipment is installed. Some important voltage variation occur during the day and this has to be kept in mind when ordering instruments with low voltage variation tolerance. In some cases voltage stabilizers will have to be ordered. A third room on the ground floor was installed as store room for reagents and glassware.

## II.2.2

### Reagents and glassware

The expert found necessary to increase considerably the stock of reagents and glassware. This was necessary to allow to perform routine work, simultaneous analysis and new methods. Reagents listed in Appendix 2a and glassware listed in Appendix 2n were ordered through government funds in October 78 and are expected to be delivered at mid 79. Usually great delay occur between order and delivery it is therefore necessary to stock materials for two years work. In addition practically no materials being available locally, a great care should be given in the preparation of orders to include materials needed for planned new analytical works. No glass blower is available in the country and we think that it would be useful to coordinate with other governmental institutional and private laboratories for the training of such a technician to perform reparations and other related works.

## II.2.3

### Instruments

Previous to the mission of the expert all the instruments of room 26 were installed and used. The instruments in room 28 were not or partially installed and had never been used. The expert installed and checked all the instruments. Except the gas chromatograph, all is now working well. The expert found that the gas chromatograph delivered just before his mission was not equipped for working with 220V/50 Hz power supply. After investigations it was found that a mistake occurred in shipment by the manufacturer and as the adaption was not possible, the instrument was returned to Perkin Elmer in January 79.

The right instrument was delivered on the last week of May 75. The expert made the installation but for lack of time he was not able to put it into operation.

After reviewing the existing instruments and determining the analytical chemical methods to be used and adapted by the section at short and middle term, the expert advised to order some new instruments and accessories. The instruments ordered through UNIDO project fund are listed in Appendix 3a. The instruments ordered through government fund are listed in Appendix 3b.

Once all instruments received, the section will be very well equipped to perform on routine basis most of the chemical tests required to check quality of consumables and food products. However in the view of a considerable increase of mineral analysis especially mineral contaminants as lead, mercury, tin, iron, copper and arsenic the acquisition of an atomic absorption spectrophotometer should be envisaged. Classical methods to analyse these minerals are time consuming and sometimes very difficult to perform. Atomic absorption spectrophotometry allow to perform analysis of more than 60 elements in various products with great accuracy and low detection limits. However such an instrument would be efficient provided that a full time technician can be recruited and trained to operate it. Meanwhile mineral analysis have to be performed by classical methods or sent to another laboratory. The expert investigated the kind of instrument needed and advised to order one instrument as described in Appendix 4 as soon as the availability of a technician can be secured.

II.2.4 Books, Standards and Bibliographical references

Bibliographic materials on analytical chemistry and foreign and international standards on consumables and food products being insufficient, the expert advised to order the materials listed in Appendix 5. Most of these publications have been received. Particular attention were given to avoid duplication with the University Library. The latter situated next to the MSB building hold numerous books, reviews, abstracts and periodical journals on matters of interest for the chemical section. The expert recommend the senior staff to make intensive use of the facilities offered by the University **Library**.

II.3 Staff

From the beginning of the activities of the section, the staff was formed of one chemist (scientific officer, head of section) Mr. R. Gopaul, one assistant technician Mr. V. Gunesh and one laboratory attendant. They have little professional experience and no postgraduate qualification in analytical chemistry, quality control and standardization. However they do their best in order to satisfy all the work required to fulfil the responsibilities of the chemical section in all aspects.

In the view of the quantity of work to be performed in a very wide field, the expert advised at the beginning of his mission to increase the staff by recruiting urgently one analytical chemist and two technicians. These recruitments could not be done up to date for governmental budget reasons but it is expected that they will be possible during the second half of 1979. In the long run, the staff of the chemical section will

have to be increased in order to have the capacity to perform routine tests on products granted with the certification mark.

A number of three technicians and one laboratory attendant for each chemist should be reached within a 3 years period.

Highly qualified staff is difficult to recruit in Mauritian conditions, however the section needs senior staff with wider experience in analytical chemistry. Considerable attention should be given to previous professional experience, ability to manage technicians, experience in planification and adaptation of analytical work and capacity of initiative, in the choice of a second chemist.

A wide cooperation between both chemists is a must. However, in order to avoid problems a clear demarkation of the responsibilities should be set from the beginning. It is not possible to fix the details of the responsibilities before knowing the candidate to be recruited as it depends on his experience, training and wishes. However we think it would be convenient to separate the duties in the following manner. One chemist should be responsible for instrumental analytical methods (spectrophotometry, chromatography, polarography, etc). The other one should be responsible for general analytical methods (proximal analysis, titrimetric methods, extraction methods, etc). The repartition of the instruments between both rooms allows to separate easily the responsibilities in this way.

A separation of the responsibilities in the standardization activities (secretariat of technical committee, drafting of standards, visits to manufacturers, sampling, etc) may be easily done. One chemist may be responsible for food products

and the other one for other consumables and chemical products. Further training for both chemists should be organized - Mr. R. Gopaul was sent last year for a 3 months training in Australia. For this course on standardization and quality control he got a fellowship from the Australian Government. It would be very useful if Mr. Gopaul can be sent for a 3 months training period during the year 1980 to be trained more specifically on laboratory techniques. Depending on the qualifications and the professional experience of the new chemist, a fellowship for a 3 months training period may be granted to him during the year 1981.

The locations for these trainings can not be determined before knowing exactly the specific specializations required. These depend on the qualifications of the second chemist to be recruited.

Particular guidance has to be given to the work of technicians. As they have no professional experience their work has to be very strictly organized and checked. The senior staff should try to train them in order to avoid any misunderstanding of the chemical methods, which lead to errors.

### III Testing activities

During the mission of the expert a great importance was given to the adaption of test methods and to the training of the staff in this field. The methods listed in Appendix 6a were carefully checked and the technician is now able to use them on routine basis.

The test methods have usually to be adapted to the conditions of the laboratory (reagents and material facilities). They have to be checked carefully in order to know their accuracy and repeatability. Such checkings have to be repeated periodically. Where possible samples should be sent to other local or foreign laboratories to avoid the occurrence of a systematic error. Standard reference materials can be used for this purpose when available.

The responsible chemist should control very strictly the work of the technicians and when necessary undertake personally the adaptation of methods. In ~~future~~ the use of more sophisticated instruments will render even more necessary for the chemist to perform himself the tests in numerous cases.

For lack of more numerous staff and delay in delivering reagents, it was not possible during the mission of the expert to adapt some test methods urgently required. These methods listed in Appendix 6b should have priority in the future work of the section as soon as reagents, materials and staff are available.

Up to date the main part of testing activities consists in adaptation of methods and this will remain so for still a few years. Consequently the chemical section should not engage itself in numerous testing activities on routine basis unless strongly required and staff substantially increased. Therefore the publicity for adoption by manufacturers of the certification mark should be intelligently tackled.

In some cases, the despatch of samples for testing in other laboratories can help to solve some problems (overcharge of work, lack of time). Local laboratories are very few and usually not having time and better facilities than the MSB. In addition, the MSB should secure that they are competent to give accurate results. Tests made by well recognized foreign laboratories are very expensive and the systematic use of such facilities can not be reasonably made for other than exceptional cases. To the knowledge of the expert it should be possible to use the facilities of other local laboratories for the following analysis:

dairy product, pesticide residues, microbiological tests, sugars.

If the number of such tests become important some difficulties could appear and the MSB should find suitable solutions.



IV STANDARDIZATION ACTIVITIES

IV.1 General

The chemical section has the responsibility for the standardization of two groups of products: food products and chemical products. Within the food products the section should establish priorities. Standardization of fresh products such as fresh fruits and vegetables, fresh milk and meat ~~cannot~~ be undertaken for the time being. Standardization of products whose quality depends essentially on bacteriological tests should not be undertaken until the MSB has the required facilities or an agreement can be made with an other local laboratory. Animal feedstuff do not need urgent standardization, however contact have to be established with those responsible in this field in the Ministry of Agriculture. Industrially produced food products to be standardized are mainly the following:

- edible oils and fats
- canned foods
- frozen foods
- beverages
- dairy products
- bread, biscuits and confectioneries
- salt and spices
- cereal products
- tea, coffee

In addition, general standards covering all prepackaged foods have to be priority drafted for labelling and sampling.

In order to avoid confusion and duplication with the works of the Ministry of Health, the fixation of tolerances and allowances for food additives should not be made by the MSB. The standards on food products shall mention that the use of food additives shall be in accordance with the Regulations made under the Food and Drug Ordinance. The expert hopes that such Regulations will be updated and completed as soon as possible by the responsible authority.

Within the chemical products, the priority should be given to the following products:

- cleaning products
- cosmetics
- pesticides

Other products should be standardized if required and when new chemical industries are installed in the country.

#### IV.2

##### Past and Future activities

The chemical section started standardization activities with the help of the UNIDO paint expert in February 78. Three draft standards were prepared, reviewed by the Technical Committee and approved by the Standards Council before the mission of the expert. These standards are the following:

- DMS 11 Synthetic Laundry Detergent for Household Use
- DMS 12 Toilet Soap
- DMS 14 Hard Laundry Soap (built type)

They were published in the Government Gazette on 4th October 78 and also sent to foreign Standards Institution for public comments. After expiration of the 6 months delay, the Technical Committee analysed the comments and made some modifications in the redaction of all three drafts. It appeared that DMS 11 had to be modify in order to restrain its application to synthetic anionic laundry detergent for non automatic washing machine and hand laundering. In fact it was found impossible to apply this standard to products used for automatic washing machine and a specific standard has to be prepared for that latter kind of product.

At the beginning of the mission, the expert established a work plan for the section and several draft standards on food products were prepared, and discussed by the Technical Committee. Other draft standards are still under preparation or discussion. The following draft standards were approved by the Standards Council on 21 May 79:

- DMS 26 Margarine
- DMS 27 Edible oils and fats
- DMS 28 Edible Sunflowerseed Oil
- DMS 29 Edible Olive Oils

The following draft standard are under preparation:

- DMS 30 General Standard for the labelling of prepackaged foods
- DMS Edible salt
- DMS Wheat flour
- DMS Bread

DMS Canned processed peas  
DMS Canned Tomato Puree  
DMS Canned Tomato Sauce (Ketchup)  
DMS Canned Pineapple Jam

The expert advised to prepare standard in the future on the following products:

General sampling plans for prepackaged food

Frozen Vegetables

Frozen Fish

Frozen Meat

Soft drinks

Cleaning products

#### IV.3 Drafting standards

In order to avoid problems and to draft standard which do not need important modifications after publication or cannot be used in local conditions, the expert advised the head of section how to prepare standards step by step.

The following steps should be followed chronologically in the preparation of most draft standards:

##### a. Preliminar studies

- Literature review (order of books and standards when necessary)
- Visits to factories

- Selection and adaptation of test methods.
- Quick market survey to determine the relative economical importance of the product and the ratio between importation and local production.

b. Draft preparation

- Tests on imported and/or locally manufactured products to determine the quality
- Select bibliographical references for the members of the technical committee.
- Write the first draft standard as a basic working document for the technical committee.

c. Draft discussion

- Elaboration by the technical committee of a draft standard approved by all the members.
- Presentation of the latter document to manufacturers and/or importers for comments. If necessary they should be invited to present their objections during a meeting of the technical committee.
- Finalization of the draft standard by the technical committee after study of the comments.
- Approval of the draft standard by the Standards Council.

d. Standard Approval

- Publication of the draft standard in the Government Gazette for public comments and also despatch to foreign standards Institution and local people or institution concerned with the products.

- After six months, study of the comments by the Technical Committee and modification of the draft standard if necessary.
- Approval of the standard by the Standards Council.

The expert recommends that particular attention be given to the preliminar studies and to discussions with the manufacturer in order to obtain his approval of the draft standard when possible before its finalization. Particular emphasis has to be given on the selection and the adaption of test methods during the first stage of the draft standard preparation.

#### IV.4 Technical Committee

The technical committee on chemicals and related products held 11 meetings from February 78 to May 79. It consists of members of the following institutions:

- The University of Mauritius
- The Mauritius Chamber of Commerce and Industry
- The Mauritius Sugar Industry Research Institute
- The Ministry of Health
- The National Consumer's Council
- La Societe de technologie agricole et sucriere.

The Government Chemist, delegate of the Ministry of Health, does not assist to the meetings where standardization of food products are planned. Discrepancy between Ministry of Health and the Ministry of Commerce and Industry exists since a long time about the competency of the MSB to have standardization activities on food products.

This matter has to be taken in Cabinet for final decision but a considerable delay is occurring. The point of view of the MSB to maintain food standardization activities was presented to the Ministry by the Standards Council.

It was found impossible by the members of the Technical Committee to hold more than one 2 hours meeting monthly. During the mission of the expert it appeared that this did not give sufficient time to proceed without delay with all matters. With the increase of staff in the chemical section, this problem will be worse. The formation of sub-committee or a second technical committee should be envisaged. We suggest that one committee may be set up exclusively for food products standardization and a second committee will then be responsible for chemicals. It may be perhaps difficult to find sufficient people to set up two committees, but it seems the best way to avoid delays in approval and revision of standards.

V. RECOMMENDATIONS

1. The staff of the chemical section should be urgently increased. A second chemist with professional experience in analytical chemistry should be appointed. Two laboratory technicians should be also recruited without delay. In the long run supplementary technicians should be appointed in order to have three technicians and one laboratory attendant for each chemist.
2. The equipment of the chemical section should be completed as recommended in this report. Accessories for gas chromatography and atomic absorption spectrophotometer should be ordered as soon as supplementary staff is available.

3. Further acquisitions of books and foreign standards should be made keeping in mind the University library facilities.
4. An effort should be made to recover at least one part of the third floor in the MSB building in order to install one supplementary laboratory room for instruments.
5. In order to increase the efficiency of the Technical Committee on chemicals and related products, one second committee should be set up as recommended in this report.
6. Fellowships should be given to both chemists for three months training in different fields of analytical chemistry.
7. A two years work stock of reagents and glassware should be permanently kept in order to avoid shortage due to delays in ordering and delivering.
8. The job performed by technicians should be well planned and closely checked by the senior staff.
9. Routine analysis in the framework of the certification scheme should be undertaken when sufficient staff and material available.
10. A collaboration with the Ministry of Health should be set up for standardization of food products and cosmetics as soon as the responsibilities of each institution will be clearly defined by the Government.
11. Testing and standardization priorities should be established as recommended in this report. A work plan should be established each six months.



12. Considerable attention should be given to the suggestions and comments of the National Consumer's Council, the related manufacturers and the foreign standards institutions when drafting a standard.
13. Test methods should be carefully adapted and checked before their adoption in a standard.

Appendix 1a

Equipment - Room 26

Article

1 Large central laboratory desk	2 Vacuum rotary pump
2 Laboratory benches	1 Emulsifier
2 Laboratory tables	1 Flask shakes
2 Laboratory chairs	2 pH Meter Corning various electrodes
1 Filing cabinet	1 Engler viscometer
1 Double fume cupboard	1 Centrifuge
2 Glazed cupboard	1 Muffle furnace
1 Refrigerator	1 Top loading balance
1 pH Meter Model EIL	1 Analytical balance
1 Westphal density balance	1 Air pump
2 Crucible nickel	6 Contact thermometers
1 Water still (plant)	2 Hot plate magnetic stirrers
4 Dessicators	1 Incubator
12 Tripod	2 Heating and drying oven
1 Rotary evaporator Buchi	2 Handilab stirrers
1 Pensky-Martens Flash Point tester	Various Glassware
2 Water bath	Various Reagents
1 Protective relay	
1 Universal oven	
12 Heating mantles	
2 Magnetic stirrers	
2 Energy regulators	

Appendix 1b

Equipment - Room 28

- 3 Laboratory benches
- 4 Laboratory tables
- 1 Laboratory chair
- 1 Glazed cupboard
- 1 Refractometer
- 1 UV-Visible spectrophotometer with accessories
- 1 Colorimeter
- 1 Binocular microscope
- 1 Polarograph with accessories
- 1 Automatic titrimeter with accessories
- 1 Gas chromatograph with accessories
- 2 Viscometers
- 1 Hotbench
- 4 Gas cylinders

Appendix 2a

Reagents ordered in October 78

100 various items ordered from BDH Chemicals Ltd.

Proforma invoice no. TM 1385 10534 Value: British £ 3156.25

Appendix 2b

Glassware ordered in October 78

118 various items ordered from Gallenkamp & Co. Ltd

Proforma invoices: 15x 12536 Value: British £ 3620.76

Appendix 3a

Equipment ordered through MSB funds

Various accessories, spare parts and reagents for gas chromatography

- from Perkin-Elmer Proforma invoice: 72-3029

Value: British £ 884.20

- from Supelco Proforma invoice: 90221

Value: US \$ 4100.-

Appendix 3b

Equipment ordered through UNIDO Funds

- 2 Motorized piston burets Metrohm E 574 with accessories  
Purchase order 17/78 page 1 of 6  
Received: May 79  
Value : Us dollars 4000.-
- 1 Nitrogen analyser Buchs 425/320 with accessories  
Purchase order : 17/78 page 2 of 6  
Value : US dollars 3800.-
- 1 Electrodeposition analyser Gallenkamp ENE 300 with electrodes  
and accessories  
Purchase order: 17/78 page 3 of 6  
Value : US dollars 1400.-
- 1 Thin layer chromatographic kit Camag with accessories  
Purchase order : 17/78 page 4 of 6  
Value : US dollars 1500.-
- 1 General Purpose Box Furnace Gallenkamp FSL 320 110 N  
with accessories  
Purchase order : 17/78 page 5 of 6  
Value : US dollars 1600.-
- 1 Apparatus for fiber extraction with accessories  
Purchase order : 17/78 page 6 of 6  
Value : US dollars 500.-

Appendix 4

Atomic Absorption Spectrophotometer

**Specifications:** double beam  
range 185 - 900 nm  
four lamps turret  
background corrector  
digital read out: emission, absorption, concentration, peak height, and area  
calibration up to three standards  
automatic gas control

**Accessories :** Vapour generator kit for Hg, As, Se, Sb analysis  
Recorder  
Burner head for nitrous oxide/acetylene  
Hollow cathode lamps for the following elements:  
Ca, Cr, Cu, Fe, Mg, Mn, Hg, Ni, K, Na, Zn  
Electrode discharge lamps with suitable power supply for the following elements:  
As, Pb, P, Se and Sn

**Estimated price :** US dollars 30,000.-

**Suitable instruments :** Model AA-575 ABQ from Varian  
Model 560 from Perkin-Elmer

Appendix 5

Books and Standards Ordered

- Books: Methods of Analysis of the International Fruit Juice Union
- Handbook of Physics and Chemistry 54th Ed CRC
- Official Methods of Analysis of the AOAC Ed 1976
- Official and Tentative Methods of Analysis of the AOCS Ed 1977
- Standard Methods for Analysis of Oils, Fats and Soaps of the  
IUPAC
- Amino Acid Content of Foods and Biological Data on Protein  
FAO Nutritional Studies No.24 1970 285p. 1976 3rd printing.
- Food additive control in the USSR by A.J.Stenberg and all.  
FAO Food Additive Control Series No.8 1969 45p.
- List of additives evaluated for their safety-in-use in food  
First series Food Additives CAC/FAL 1. 1973, 88p.
- First supplement to the list of additives evaluated for their  
safety-in-use in food. First series. Food Additives CAC/FAL 1  
1973. 1974. 27p.
- List of maximum level recommended for contaminants of the Joint  
FAO/WHO Codex Alimentarius Commission. First series. Food  
Additives CAC/FAL 2. 1974. 14p.
- Subscription to Food and Agricultural Legislation.
- Chemistry and Testing of Dairy Products 4th Ed AVI 1977
- Food Analysis Theory and Practice BK 2 (revised) AVI 1978
- Food Products Formulary (Vol I) AVI 1974
- " " " ( Vol II) AVI 1975
- " " " (Vol III) AVI 1977
- Source book for Food Scientists AVI 1978
- BMFIRA Scientific and Technical Surveys No. 69 Composition of  
meat and fish
- BMFIRA Scientific and Technical Surveys No. 82 Detection of  
**Thickeners**
- BMFIRA Scientific and Technical Surveys No. 90 Determination of  
Preservatives
- BMFIRA Scientific and Technical Surveys No. 91 Detection of  
Food Antioxidants

Appendix 5 (contd)

- Books : BMFIRA Scientific and Technical Surveys No.103 Determination of sulphur dioxide
- BMFIRA Symposium Proceedings No. 2 Legislation
- BMFIRA " " No. 28 Characterisation of Oils and Fats
- BMFIRA Food Legislation Surveys No. 1 Artificial Sweeteners
- BMFIRA Food Legislation Surveys No. 2 An index to Food Additives ....
- BMFIRA Food Legislation Surveys No. 3 Guide to FDA of USA
- BMFIRA A Guide to Food Regulations in the UK including 1st and 2nd supplement
- BMFIRA A Guide to Food Regulations in the UK 3rd supplement
- BMFIRA Food Additives - Description, Functions and UK Legislation.

Standards: Full set of AFNOR Standards on food and agricultural products and on oils, soaps and detergents (French Standards)

Various SABS Standards on food and chemical products (240 South African Standards)

Various ONGL Standards on food and chemical products (110 Canadian Standards)

15 Standards from Sri-Lanka

10 Standards from Israel

8 Standards from Singapore

8 Standards from Japan

8 Standards from Egypt.

In addition the Australian Standards Institute and the Bureau de Normalisation du Quebec sent free complete sets of their Standards.



Appendix 6a

Test methods adapted

Phosphate content of detergents  
Sodium silicate content of detergents  
Water insoluble matter content of detergents  
Water content of detergents  
Total fatty matter content of soaps  
Rosin acids content of soaps  
Free caustic alkali content of soaps  
Total free alkali content of soaps  
Chloride content of soaps  
Unaponified saponifiable fatty matter content of soaps  
Ethanol insoluble matter content of soaps  
Moisture and volatile matter content of soaps  
Determination of water in fats and fatty oils  
Determination of impurities in fats and fatty oils  
Determination of acidity and acid value in fats and fatty oils  
Determination of peroxide value in oils and fats  
Determination of water and volatile matter in oils and fats  
Determination of soap in oils and fats  
Determination of relative density of oils  
Determination of refractive index of oils  
Determination of saponification value of oils  
Determination of iodine value of oils  
Determination of unsaponifiable matter in oils  
Determination of Bellier Index in Olive oils  
Determination of semi siccative oils in olive oils  
Determination of olive-residue oil in olive oils  
Determination of cottonseed oil in olive oils  
Determination of teaseed oil in olive oil  
Determination of sesameseed oil in olive oil  
Determination of specific extinction in UV of olive oil  
Determination of water capacity of container for canned products  
Determination of fill of container for canned products  
Determination of drained weight for solid products canned in  
liquid medium

Appendix 6a (contd)

Determination of pH of canned products

Determination of salt content of canned products

Determination of soluble solids content of canned products

Determination of titrable acidity of canned products

Determination of protein content of bread and wheat flour

Determination of moisture content of bread and wheat flour

Determination of ash content of bread and wheat flour

Determination of acid insoluble ash of bread and wheat flour

Determination of moisture content of salt

Determination of water insoluble matter content of salt

Determination of chloride content of salt

Determination of alkalinity of salt

Determination of sulphate content of salt

Determination of Ca and Mg content of salt

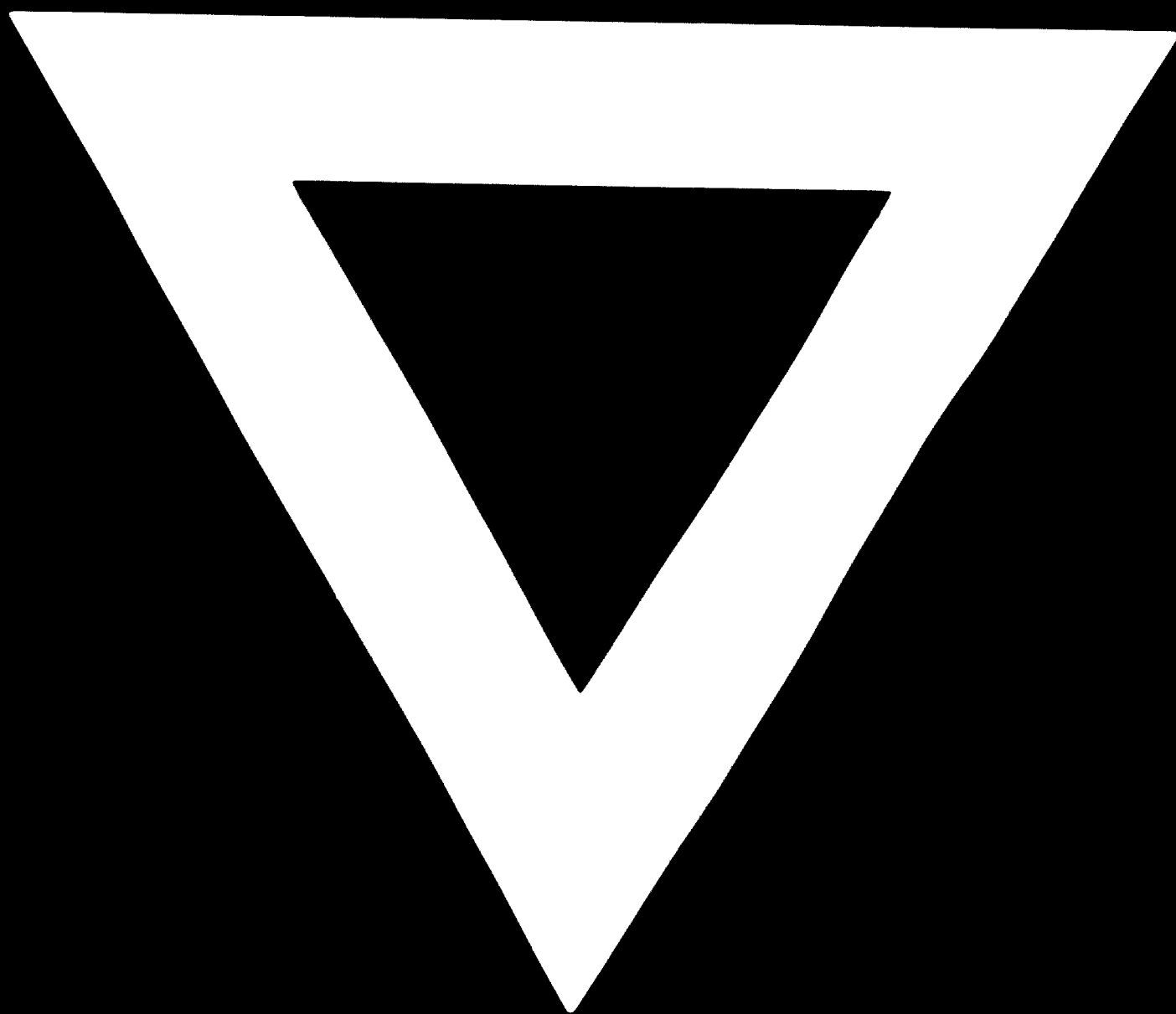
Appendix 6b

Tests methods to be adapted

- Determination of sodium carboxy methyl cellulose content of detergents
- Determination of anionic surface active agent content of detergents
- Determination of Pb in fats, oils and canned products
- Determination of Fe in fats, oils and canned products
- Determination of Cu in fats, oils and canned products
- Determination of As in fats, oils and canned products
- Determination of Sn in canned products
- Determination of Zn in canned products
- Determination of fatty acids in oils and fats by GLC
- Determination of F in toothpastes by GLC
- Determination of crude fiber content in cereal products
- Determination of ethanol content of fruit and vegetable products
- Determination of essential oil content in products from citrus fruits
- Determination of total sulphur dioxide content of food products
- Determination of mineral impurities of fruit and vegetable products
- Determination of ash insoluble in HCL of fruits and vegetable product
- Test methods for testing formulations of pesticide products



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**80.12.08**