



East, Central and Southern African
Health Community



MANUAL FOR INSPECTION OF FORTIFIED FOODS AT IMPORTATION SITES

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Foreword

Over the last five years, the East, Central and Southern African Health Community (ECSA-HC) has continued to undertake advocacy and technical assistance to assist member countries to embrace and scale up food fortification initiatives as a key strategy to reduce micronutrient malnutrition in the region.

ECSA has been working with partners in direct response to resolutions of the Conference of Health Ministers to scale up food fortification initiatives as a critical strategy in fighting the devastating effects of micronutrient malnutrition among populations of member states. ECSA partners in the Regional Food Fortification Initiative include the A2Z Project, USAID, UNICEF, Micronutrient Initiative (MI), and ICCIDD, among others.

Part of the outcome of the intensified collaborative initiative, is a series of fortification guidelines developed to guide the industry during the fortification process of staple foods and provide government food inspectors a reference point in enforcing the standards.

Similarly, food control manuals have been developed for the industry and government to provide technical reference resources that cover the entire fortification process to ensure that the fortified foods are safe and adequately fortified with the required fortificants.

This manual is part of a series of manuals on food fortification and is meant to directly contribute to the overall effort to strengthen food fortification in the region.

It is our hope that the use of this manual will help strengthen food control activities in our countries in order to deliver safe and quality fortified foods to the ECSA population.

Steven Shongwe
Executive Secretary
ECSA Health Community

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The manual is as a result of joint work by distinguished food fortification experts in developing countries. During the drafting of this manual, consultations with senior officers from food control departments of the ECSA member states were made and input incorporated.

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ECSA is deeply thankful to the above authors for preparing this manual.

Disclaimer

The content of this manual can be adapted to suit country specific contexts. In such a case, the content of the resulting document will be the sole responsibility of the organization adapting the manual and will not represent the views of the authors and that of the ECSA-HC. The Use of the content of this manual should be duly acknowledged.

MANUAL FOR INSPECTION OF FORTIFIED FOODS AT IMPORTATION SITES

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MANUAL FOR INSPECTION OF FORTIFIED FOODS AT IMPORTATION SITES

Despite that specific norms for inspection of imported foods have been proposed by the Codex Alimentarius, those are very laborious and rarely implemented, and they are more applicable to check for safety rather than for quality of the nutritional composition. Thus, the purpose of this manual is to provide enforcement officers with a simple tool for assessing the extent to which importers of fortified foods comply with local regulations related to food fortification. This is to make sure that specified foods are not imported and distributed to consumers if they are not fortified appropriately. The process mainly involves collecting food samples and reviewing documentation and declarations on food labels. This is achieved by reviewing the Certificate of Conformity or Analysis (COA) accompanying imported food batches as well as collecting samples at ports of entry and testing them qualitatively on site.

Composite samples of each brand are prepared monthly and sent out for quantitative tests at reliable laboratories to confirm information of the COA. The purpose of the quantitative tests is to review and validate the decision taken at the importation site based on qualitative tests. If anomalies are identified through the quantitative testing, the results provide a basis for alerting border officials on which failing brands need more scrutiny.

The procedures described in this manual are applicable for the following foods

- Oil
- Sugar
- Salt
- Wheat flour
- Maize flour

These procedures are divided in two categories namely;

- Checking for the presence of key micronutrients for authorizing entry
- Documenting compliance in terms of micronutrient content through laboratory testing

A. CHECKING FOR THE PRESENCE OF KEY MICRONUTRIENTS FOR AUTHORIZING ENTRY

I. Objectives and Accountability

The purpose for assessing the minimum requirements prior to authorizing entry is:

- To ensure that the imported products are accompanied by adequate documentation to certify that national standards and regulations are being fulfilled.
- To confirm that the food complies with fortification conditions based on the presence of one or more key micronutrients in the imported fortified food.

Officials from the customs office in conjunction with the responsible government institution in charge of certifying the quality of foods (e.g. Ministry of Commerce, Ministry of Agriculture, Ministry of Health or the Bureau of Standards, depending on the country) should perform the task of collecting samples, testing them qualitatively and reviewing documentation before the food can be allowed enter the country.

II. Procedures

a. Reviewing the Certificate of Conformity or Certificate of Analysis and Labeling

The food inspector and customs official shall perform the following duties

1. Review the documents that usually certify the safety (and sometimes quality) of the imported product. Examine the Certificate of Conformity or Analysis, issued by a government authority or an officially recognized body from the country of origin, which would declare –supported by laboratory analysis- that the food fulfills the regulations established in the importer country.
2. Examine the packaging and the labeling to make sure that it indicates the brand name, batch number, country of original and manufacturer. The food must comply with the Food Labeling Standards, as well as the labeling requirements established in the regulations for fortified foods such as micronutrient levels. Inspectors should also look out for false health claims that may be contrary to set guidelines in the country. They should record data in the Inspection Form (**TableA-1**).

b. Confirming the presence of indicator micronutrients

3. From each batch or truck, randomly, collect 3 samples (500 grams or 100 milliliters per sample) of imported fortified food. Collect samples based on brand names and perform appropriate qualitative tests corresponding to the food using methods described in **Section C**. Record results in Inspection **Table A-1**.
4. All samples should test positive for the indicator micronutrient.
5. If importer disagrees with the results, collect 3 new samples and perform the test again.

c. Taking decisions to authorize

6. If samples fail the qualitative test or fail to comply in terms of proper documentation, labeling requirements, the affected brand should not be allowed to enter the country.
7. If documentation is correct, and samples show the presence of the key micronutrient, authorize importation and proceed with the preparation of a composite sample as describe below.

d. Preparation of monthly composite samples for quantitative testing

9. Take three samples of 500 g (or 100 mL) each from each brand and truck (or consignment) that has been accepted and place in a 5,000 g (or 1,000 mL) containers labeled with the name of the brand imported into the country. Write the date of sampling on the container. Keep well closed, in a dark, dry and cool place.
10. Positive samples of the same brand that arrive in subsequent consignments are to be combined by adding them to the appropriate container for that brand. Do not forget to write the corresponding date of each and every consignment added to the composite sample. Once the container is full (3 consignments), close and store it. Use new containers for additional samples and always keep samples in a dark, dry and cool place.
11. Once a month, send the composite samples collected to a reliable laboratory protecting the samples from exposure to heat, humidity and light. Send all the samples that have been collected during the period, regardless of the containers being full or not. Package them well and check that they are well labeled.

e. Actions for brands whose composite samples fail quantitative tests

- 12.** In the case where the laboratory reports of brands containing below minimum levels of the indicator micronutrient, inspectors at the border will be notified immediately and the brand name put on its Black List for closer scrutiny of subsequent consignments. A letter shall be sent by the Office of Importation to importer(s) advising them of the new status of their brand. This warning letter will state that any shipments arriving after the issuing of the letter will be sampled for immediate quantitative analysis, over and above normal sampling for qualitative tests and document review, and the importer will cover the cost of this quantitative analysis.
- 13.** In the next shipment of a brand in the Black List, the inspector at the border proceeds as specified in steps (1) to (6) above. However, despite that it passes the examination, authorization for entering the country depends on results of the following steps.
- 14.** The Inspector shall randomly collect nine 500-g (or 100-mL) single samples per truck, and prepare 3 composite samples, mixing 3 of the single samples for each one of them, and send them to the laboratory with the instruction that the analysis should be done urgently and report submitted to the Office of importation. Importer should cover the cost of shipment and analysis.
- 15.** If a brand on the Black List passes the quantitative test, it shall be allowed entry and removed from the Black List at the border.

III. Records and Reporting

In all cases, the inspector shall duly complete inspection form (Inspection **Table B-1**) relating to import inspection and forward samples for testing at the Food Control Laboratory or any reliable laboratory. Results of qualitative analysis should be kept by the food control institution at the importation sites. Border inspectors should submit a report to the central offices, as well as the food fortification committee, every 6 months indicating the dates, brands, amounts, and actions taken.

B. DOCUMENTING COMPLIANCE WITH THE MICRONUTRIENT CONTENT THROUGH LABORATORY TESTING

I. Objectives and Accountability

The purpose of documenting compliance in terms of micronutrient content is:

- To provide documented evidence that imported brands comply with national regulations and standards based on laboratory reports of quantitative tests performed on samples of imported foods.
- To provide a basis for issuing specific quality improvement recommendations to importers.
- To warn the officials at importation sites of failing brands that deserve more stringent examination.

This task is a combined responsibility of the food laboratory, the Head of the Food Control Division and Importation Office, and the supervisors of inspectors at the importation sites.

II. Procedures

a. Receipt of Composite Samples

1. The food control laboratory must record the receipt of the composite samples sent by the official at the importation points, number them and record the date.
2. Store samples in cool, dry and dark places.

b. Quantitative Determination of Micronutrients

3. Mix each sample very well, and then determine the content of key micronutrients depending on the type of sample (e.g. iodine in salt; vitamin A for oil and sugar; vitamin A and iron for wheat and maize flour), using quantitative tests provided in the Manual for Laboratory Methods.

III. Records and Reporting

- 4.** The Head of the Food Laboratory shall submit a report to the Office of Importation and the supervisor of inspectors at the corresponding importation site.
- 5.** Whenever a sample fails the quantitative test, the Office of Importation should immediately send to the importer a warning letter for attention and immediate action. The letter should state that new consignments arriving after the date of the warning letter will be subjected to immediate quantitative testing even if it passes the qualitative test before the consignment can be released.
- 6.** When the brand fails the quantitative test described in step 5, a letter shall be sent to all importation sites advising them to quarantine all new consignments until the laboratory results confirm that technical requirements are complied. This special treatment shall end on instruction from the laboratory confirming compliance.
- 7.** The Head of the Food Control Unit in charge of inspection of the imported foods shall prepare a consolidated report every 6 months with all the results based on the type of food, and indicating brands, country of origin, amount imported, micronutrient tested and the corresponding analytical results, and actions taken.

C. QUALITATIVE TESTS

I. Vitamin A in Oil

This method for testing vitamin A uses corrosive reagents and so tests need to be conducted in protected areas and with proper handling. The test must only be performed by adequately trained personnel.

1. Reagents and chemicals

Reagents described in these methods are of analytical grade unless otherwise specified.

- i. **Chromogenic solutions Trifluoroacetic acid (TFA) Solution:** It is prepared by dissolving 15 mL of TFA in 120 mL of dichloromethane. Store in a brown bottle in a cool environment. When properly stored, the solution has been found to be stable for up to 4 months.

2. Equipment

Pasteur pipettes and pipette bulbs

Test tubes

Pipette 5 mL

Vortex Mixer

3. Procedure and interpretation

In a test tube, place 0.5 mL oil (10 drops of oil), then add 3 mL of the chromogenic reagent (TFA). Mix as quickly as possible and observe the formation of a blue color. The blue color shows the presence of vitamin A.

4. Handling of remnant reagents

Discard residual chromogenic reagent, including that mixed with the oil, into a labeled glass bottle containing dissolved sodium bicarbonate, slowly adding the reagent to the bottle. Clearly mark the bottle "Organic Waste" and indicate the date. After the bottle is filled, send it to the laboratory to be discarded appropriately as other organic waste material.

II. Vitamin A in Sugar

This method for testing vitamin A uses corrosive reagents and so tests need to be conducted in protected areas and with proper handling. The test must only be performed by adequately trained personnel.

1. Reagents and chemicals

Reagents described in these methods are of analytical grade unless otherwise specified.

i. Chromogenic solutions

Trifluoroacetic acid (TFA) Solution: It is prepared by dissolving 15 mL of TFA in 120 mL of dichloromethane. Store in a brown bottle in a cool environment. When properly stored, the solution is stable for up to 4 months. Alternatively, the following solution could be used:

Trichloroacetic acid/Dichloromethane/acetic anhydride: Dissolve 30.0 g trichloroacetic acid in 60 mL dichloromethane. To dissolve completely, warm up the mixture in a water bath at 50°C stirring constantly. Add 2 mL of acetic anhydride and store in a dark bottle with glass stopper.

2. Equipment

Pasteur pipettes and pipette bulbs

Test tubes

Pipette 1 mL

Vortex Mixer

3. Procedure and interpretation

In a test tube, place 1 gram of sugar measured by volume using a calibrated spoon. Add 2 mL of hot distilled water and dissolve the sugar. Then add 1 mL of the chromogenic reagent. Mix as quickly as in the vortex mixer and observe the formation of a blue color. The blue color shows the presence of vitamin A.

4. Handling of remnant reagents

Discard residual chromogenic reagent, including that mixed with the sugar, into a labeled glass bottle containing dissolved sodium bicarbonate, slowly adding the reagent to the bottle. Clearly mark the bottle "Organic Waste" and indicate the date. After the bottle is filled, send it to the laboratory to be discarded appropriately as other organic waste material.

III. Iodine in Salt

1. Reagents and chemicals

Rapid Test kits (RTKs) for iodate and iodide in salt are commercially available from MBI Chemicals in India and are procured through UNICEF, or any other supplier. Use the appropriate one (there is a kit for salt fortified with iodate, and another for iodide).

The test kits have a life span of 18 months but when opened, the solutions are effective for a maximum of 6 months. It is important when using iodine test kits to take into account the type of iodine compound (iodate or iodide) that was added to the salt in order to use the correct kit. The use of potassium iodide is discouraged but there could be manufacturers who use it especially for refined salts, and inspectors need to be aware of this possibility.

2. Procedure and interpretation

Place the salt on a clean dry test plate or surface and moisten the salt by dropping the test solution onto the salt. If iodine is present in the salt, a blue color is developed where the solution is dropped. If a color is not developed, add the confirming solution (re-test) over the wet spot (alkaline salts require of this reagent). If the blue/purple color does not appear, it means that the salt lacks iodine from iodate.

It should be noted that the test kit for iodate will give a negative answer if the salt was iodized with iodide.

Note: Although some kits include a scale of color to approximate the content of iodine in the salt, do not use it for reporting levels. The kit is unreliable for giving quantitative results; it is only useful for detecting the presence of iodine in salt.

IV. Iron in Fortified Wheat and Fortified Maize Flours

1. Reagents and chemicals

Solution A (2 N-HCl): To a 500 ml beaker, add 100 ml distilled water. Then pour slowly 17 ml of concentrated HCl, and finally 83 mL more of water.

Solution B (10% Potassium Thiocyanate): Dissolve 10 g of KSCN in 100 ml distilled water.

Working Solution (1:1 Solution A: Solution B): Prior to testing, mix 10 mL Solution A and 10 mL Solution B

H₂O₂-3% (required only when iron is as elemental iron or as a ferrous salt). Add 5 ml concentrated H₂O₂ (30%) to 45 ml distilled water. Prepare daily and discard after finishing the analysis.

2. Material

- Magnet
- Filter paper Whatman # 1
- Manual sieve.
- Watch glass.
- Pasteur pipettes and pipette bulbs

3. Procedure for determining elemental iron (e.g. electrolytic, reduced iron and others)

- i. Take a clean magnet and insert it into a 1-kg sample of flour.
- ii. Move it thoroughly inside the sample and then take it out.
- iii. The presence of electrolytic or reduced iron is shown by the presence of small iron metal particles on the magnet.

4. Procedure for determining the presence of iron from NaFeEDTA (mostly used for maize flour fortification)

- i. Place a filter paper over a watch glass.
- ii. Wet the surface of the filter paper with the working solution prepared as described above. Let the liquid penetrate the paper.
- iii. Using a hand sieve, sift portion of the flour sample in order to load a thin layer over the entire wet area. Scrape off any excess flour.
- iv. Add a little more of the acidic solution of potassium thiocyanate over the flour. Let it stand for a few minutes for the reaction to occur.
- v. Red color spots indicate the presence of a ferric salt, such as the one present in NaFeEDTA.

5. Procedure for determining fortified iron from other sources

- i. Place the filter paper over the watch glass

- ii. Wet the surface of the filter paper with the working solution prepared as described above. Let the liquid penetrate the paper.
- iii. Using a hand sieve, sift portion of the flour sample in order to load a thin layer over the entire wet area. Scrape off any excess flour.
- iv. Add a little more of the acidic solution of potassium thiocyanate over the flour.
- v. Add small amounts of the H₂O₂-solution to wet the whole surface. Let it stand for a few minutes for the reaction to occur.
- vi. Red color spots indicate the presence of added iron from any source. (Note: If the result for electrolytic or reduced iron was negative with the magnet test, then it is likely that iron comes from an iron salt).

6. Interpretation

Number and distribution of spots are coarse indicative of the iron level of the sample. Use samples with known amounts of the same type of iron that is expected to make a comparative assessment. [Note: Unfortified flours may develop a red color due to inherent iron but this will appear on a diffuse red/pink patch and not in the form dots or spots].

The appropriate type of iron will depend on the local standard for fortification. However, current ECSA recommendations promote the use of iron EDTA for maize flour fortification and ferrous fumarate for wheat flour fortification. A number of countries use electrolytic iron for wheat flour. The inspectors need to be aware of what type of iron to expect as per standard of the country.

V. Vitamin A in Wheat and Maize Flours

PENDING

INSPECTION AT IMPORTATION SITES - TABLE A-1
IMPORT INSPECTION / SAMPLING FORM

DATE: _____ BORDER PO ST: _____

DISTRICT: _____

Inspector Name:		Supplier Address:	Batch Numbers and Size (MT):	
Product:	Brand:		Variety of Food (refined, whole, others):	
Country of Origin:			Certificate of Conformity:	
Shipping Record ID:		Importer : Name and Address:		
<i>Product Examination</i> LABELING INFORMATION¹				
	Adequate	Inadequate	Comments	
Brand Name				
Manufacturer				
Nutrient Claims			SPECIFY NUTRIENTS :	
Expiry Date				
Batch Number				
Presence of nutrient			Based on qualitative test on three samples per brand and per truck (consignment)	
Action:			Signature:	

¹ Mark with a tick (✓) in the *adequate* or *inadequate* boxes where appropriate.

REPORT OF INSPECTION AT IMPORTATION SITES- TABLE B-1

REPORT OF IMPORT INSPECTION

Date	Product (Food Type)	Brand	Country of Origin	Amount (MT)	Tested Micronutrient	Qualitative Test (+ or -)	Action Taken



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