

MANUAL FOR INSPECTION OF FORTIFIED FOODS AT IMPORTATION SITES

The purpose of this manual is to provide enforcement officers with a simple tool for assessing whether imported fortified foods comply with national standards for food fortification in the Pure Food (Food Control) Regulations.

It is important to ensure that imported foods are fortified appropriately, to protect the health of people in the Solomon Islands. The process focusses on reviewing documentation and declarations on food labels, particularly the Certificate of Conformity or Analysis (COA).

It is recommended that samples of mandated fortified foods - i.e. wheat flour, rice and salt – be collected once every five shipments into the Solomon Islands and tested qualitatively on site to confirm the presence of key micronutrient indicators. This allows testing of a range of food brands and food importers, with minimum additional resource requirements for government. It also makes it difficult for importers to predict whether their import will be tested, improving the rigour of the inspection system.

The procedures in this manual apply to:

- Wheat flour
- Rice
- Salt

The sections included in this manual are:

- A. Checking for the presence of key micronutrients for authorising entry p.2
- B. Qualitative tests p.4

Acknowledgement

This manual draws on the manual developed by the East, Central and Southern African Health Community Secretariat in 2007.

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

I. Objectives and Accountability

The purpose of assessing the minimum requirements prior to authorising entry is:

- To ensure that imported product is accompanied by adequate documentation to certify that national standards in the Pure Food (Food Control) Regulations are met.
- 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 Ministry of Health and Medical Services should perform the task of collecting samples, testing them qualitatively and reviewing documentation before the food can be allowed to enter the country.

II. Procedures

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

The *Customs agent* shall perform the following duties:

1. Flag the fortified food as a “food of regulatory interest” to the food inspector at port.

The *Food inspector* shall perform the following duties:

2. 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 fulfils the regulations established in the Solomon Islands.
3. Examine the packaging and the labelling to make sure that it indicates the brand name, batch number, country of origin and manufacturer. The food must comply with the Food Labelling Standards, as well as the labelling requirements established in the regulations for fortified foods such as micronutrient levels. Record data in the Inspection Form (**Table A-1**).

b. Confirming the presence of indicator micronutrients

The *Food inspector* shall perform the following duties:

1. Take samples from the fifth consecutive shipment (consignment) of that food. Do not take samples from four consecutive shipments (consignments) of a particular food (e.g. wheat flour).
2. Randomly collect 3 samples of this food from three different bags of that food in the consignment. Collect 500g per sample of rice or wheat flour, and 50g per sample of salt.
3. Perform the qualitative test appropriate to the food using methods described in **Section B**.
4. Record results in Inspection **Table A-1**.
5. All samples should test positive for the indicator micronutrient.
6. If the importer disagrees with the results, collect 3 new samples and perform the test again.

c. Taking decisions to authorise

7. If samples fail the qualitative test or fail to comply in terms of proper documentation or labelling requirements, the sampled product should not be allowed to enter the Solomon Islands.

8. If documentation is correct, authorise importation.

III. Records and Reporting

In all cases, the inspector shall duly complete inspection form (**Table B-1**) relating to import inspection. Results of qualitative analysis should be kept by *Environmental Health (MHMS)* at the importation sites. *Border inspectors* should submit a report to the central offices, as well as the Food Fortification National Committee, every six months indicating the dates of inspection, brands inspected and actions taken.

B. QUALITATIVE TESTS

I. Iodine in salt

1. Reagents and chemicals

Rapid Test kits (RTKs) for iodate and iodide in salt are commercially available from a variety of suppliers and can be 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 colour is developed where the solution is dropped. If a colour is not developed, add the confirming solution (re-test) over the wet spot (alkaline salts require of this reagent). If the blue/purple colour 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 colour 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.

II. Spot test for determining added iron in fortified wheat flour

AACC Method 40-40

IRON-QUALITATIVE METHOD

Scope

Applicable to iron fortified wheat flour.

Reagent

1. Thiocyanate reagent. Dissolve 10 g KSCN in 100 ml water. Mix with equal volume of 2N HCl just prior to use.
2. Hydrogen peroxide 3%.

Procedure

Make a flat surface of the enriched flour by pressing down with a flour slick, spoon, the bottom of a small beaker or any suitable smooth surface. Drop a few mls of the freshly mixed thiocyanate reagent onto the surface followed by a few mls of the hydrogen peroxide sufficient to wet an area approximately 1 inch in diameter. Let stand at least 10 minutes under observation.

If added iron compounds are present they will show up as red spots on the surface. Reduced iron shows up as small dots that take time to appear. Ferrous sulfate shows up as larger spots that

appear more quickly. The density of the spots provides an estimate of how much iron was added, which is best done by comparison to flours having known levels of added iron.

Reagent preparation and storage

The two solutions for the thiocyanate reagent can be prepared in advance and stored in separate bottles as stock solutions. These can be kept for a month.

The solutions should be freshly mixed each day to create the thiocyanate reagent. It can be stored for 24 hours.

Ideally all reagents should be kept in an air conditioned room.

Reference

Schlesinger, H. I., and Van Valkenburgh, H. B. 1931. The structure of ferric thiocyanate and the thiocyanate test for iron. J. Am. Chem. Soc. 53:1212.

III. Qualitative Spot Test for Iron in Fortified Rice

Scope:

The purpose of this test is to quickly and inexpensively assess the presence of fortified kernels (containing iron) in fortified rice. The dark brown-red pigment is generated by the reaction of the reagents with ferrous (iron) ions in the fortified kernels. Thus, this test will not work on fortified rice using fortified kernels that do not contain iron or iron in the non-ferric form. This is a qualitative test only (i.e. detects if iron is present/not present); quantitative details, including iron level and mixture homogeneity, are beyond the scope of this procedure.

Time required:

Less than five minutes

Equipment:

- Scale to weigh the potassium thiocyanate (KSCN)¹ (if Reagent 2 is not already prepared)
- Non-metal, non-porous container to hold fortified rice sample (for example, plastic cup or tray)
- Reagent 1: Hydrochloric acid (HCl), in dilute 2N form², in a non-metal, labeled bottle
- Reagent 2: Potassium thiocyanate (KSCN) 10% solution, in a non-metal, labeled bottle

Both HCl and KSCN 10% are clear, so labeling the solutions is necessary! Solutions will last for approximately 1 month. Store bottles in a cool and dark room or in a refrigerator used for non-food storage purposes.

To prepare the KSCN 10% solution:

1. Mix 10 grams of KSCN with 100 mL of water (distilled or bottled), by lightly swirling the water with the KSCN, or stirring to mix.

¹ KSCN is a dry, crystalline reagent.

² HCl can be purchased in the concentrated 37% solution but it is a dangerous reagent. If conducting this assay in a non-laboratory setting, it is recommended that the diluted 2N solution is purchased. N indicates the unit of normality, or concentration per liter of solution.

Procedure for testing fortified rice for the presence of iron:

The test is to be conducted in a well-ventilated area. Wearing of goggles and disposable gloves is recommended.

1. Place at least 50 grams of fortified rice sample in a plastic cup, tray, or similar container.
2. Pour Reagent 1 (2N HCl) on the rice sample until all of the rice is wet.
3. Pour a similar amount of Reagent 2 (10% KSCN) on the wet rice sample.
4. Immediately, fortified kernels will turn red to dark red (black upon drying) indicating the presence of iron fortified kernels (Figure 1).

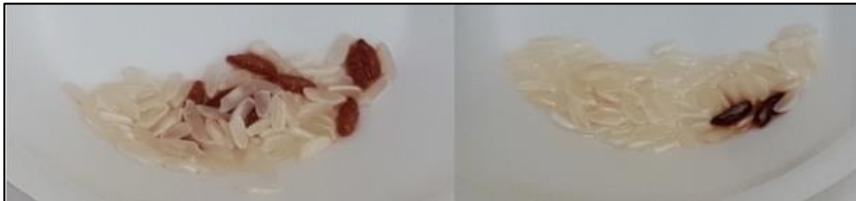


Figure 1: Fortified kernels in fortified rice will turn dark red/black, indicating the presence of iron.

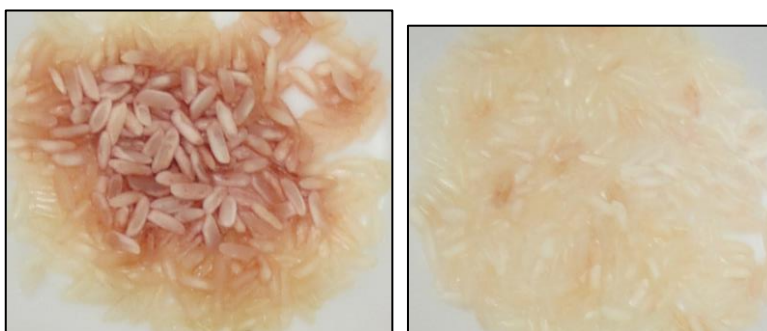
Log the results and dispose of sample:

Record the results (are there fortified kernels, Yes or No?) if necessary. Throw away the sample in the trash. If disposing of the reagents, HCl 2N needs to be neutralized with baking soda (sodium bicarbonate) by adding HCl to baking soda (do not add baking soda to HCl) until the bubbles stop rising. The HCl and baking soda mixture can be then poured down the sink with water running. Wash hands.

Notes:

Although the reagents are in diluted form, if any of the reagents come in contact with skin, wash the skin immediately.

Fortified rice using coated or extruded technology is usually fortified in a 0.5%-2% blending ratio, which will result in a discrete, iron-fortified kernel result as shown above. However, in the United States, dusting is the most commonly used fortification technology, and this is applied to all of the rice. However, dusting technology is not suitable for populations where the cooking practices include rinsing of the rice prior to cooking or disposing of excessive cooking water. For identification purposes, below is the iron spot test used on dusted rice and non-fortified rice:



Iron fortified rice using dusting technology Non-fortified rice

Reference:

AACC International Approved Methods, Inorganic Constituents. AACCI Method 40-40.01, Iron -- Qualitative Method (This method qualitatively determines iron added to flour and has been adapted for use with fortified rice.

Table A-1: Inspection at Importation Sites

Date: _____

Site: _____

Inspector name:		Supplier address:		Batch numbers and size:
Product:	Brand:			Variety of food:
Country of origin:				Certificate of conformity:
Shipping record ID:		Importer: Name and address:		
Product Examination				
	Adequate	Inadequate	Comments	
Brand name				
Manufacturer				
Nutrient claims			Specify nutrients:	
Expiry date				
Batch number				
Presence of nutrients (if tested qualitatively):				
Action:			Signature:	

