Standard Operating Procedure:
Qualitative Spot Test for Iron in Fortified Rice

Purpose:

The purpose of this test is to quickly and inexpensively assess the presence of fortified kernels (containing iron) in fortified rice.

In this test, reagents react with ferric (iron) ions to generate a dark brown-red pigment. Thus, this test will not work on fortified rice using fortified kernels that do not contain iron. 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 KSCN reagent
- Non-metal container to hold fortified rice sample (for example, plastic cup or tray)
- HCl, 2N Solution[1], in a non-metal, labeled bottle
- KSCN, 10% Solution, in a non-metal, labeled bottle
    - To create solution, mix 10 grams of KSCN[2] with 100 mL of water (distilled or bottled)

Reagents will last for approximately 1 month. Store bottles in a cool and dark room (air conditioned, preferably).

Step 1: Procedure for testing fortified rice for the presence of iron:

Conduct the test in a well-ventilated area. Wearing goggles and disposable gloves is recommended.

1. Place at least 50 grams of fortified rice in a plastic cup, tray, or similar container.

2. Pour the 2N HCL solution on the rice sample until all of the rice is wet.

3. Pour a similar amount of the 10% KSCN solution onto the rice sample.

4. Immediately, fortified kernels will turn red to dark red (black upon drying) indicating the presence of iron fortification (Figure 1).

5. Repeat the test with the remaining samples.

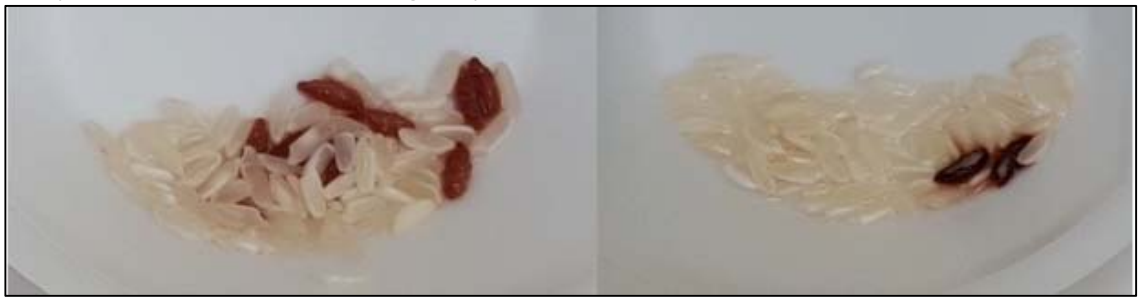

Figure 1: Fortified kernels in fortified rice will turn dark red/black, indicating the presence of iron.

[1] 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.

[2] KSCN is a dry, crystalline reagent

Step 4: Log the results and dispose of sample

Record the results as appropriate.

Notes:

Although the reagents are in diluted form, if any of the reagents come in contact with skin, wash 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. For identification purposes, below is the iron spot test used on dusted rice and non-fortified rice:

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)

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