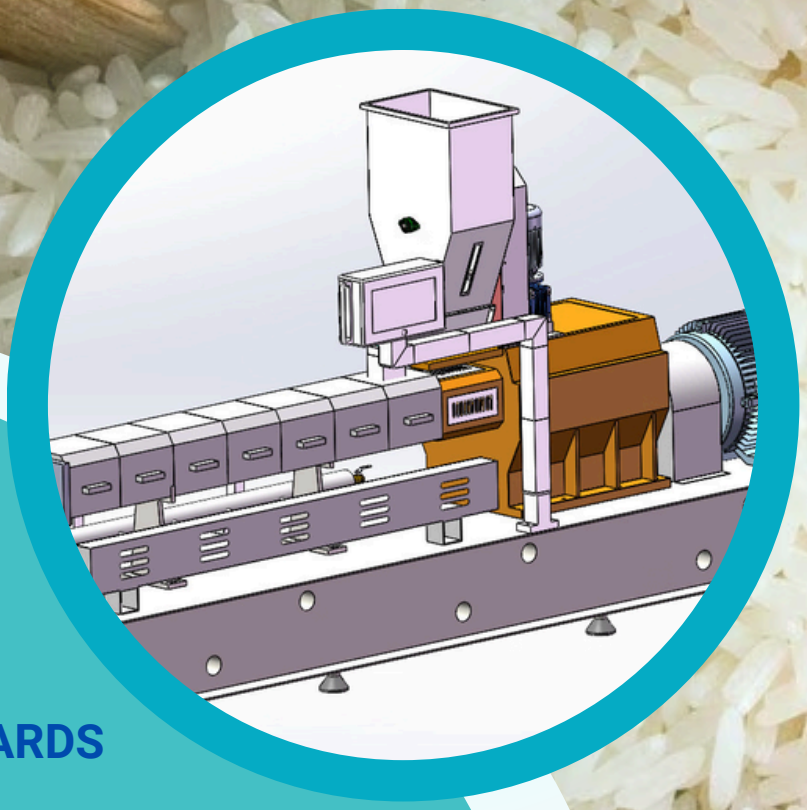
मानकः पथप्रदर्शकः

COMPENDIUM OF INDIAN STANDARDS ON RICE FORTIFICATION



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INTRODUCTION

India continues to face the challenge of widespread micronutrient deficiencies, particularly among vulnerable populations such as children, women, and the economically disadvantaged. Deficiencies in iron, folic acid, and vitamin B12 contribute significantly to anaemia, poor growth, and reduced cognitive performance. In response, the Government of India has adopted rice fortification as a strategic public health intervention, leveraging the fact that rice is the staple food for a majority of the Indian population.

To ensure the success and safety of rice fortification efforts, the BIS has developed a series of comprehensive standards that cover the entire rice fortification ecosystem — from raw material and premix quality to processing equipment and the final fortified product. This compendium brings together five key standards: IS 17780 (Fortified Rice), IS 17781 (Vitamin and Mineral Premix), IS 17782 (Fortified Rice Kernels), IS 17853 (Equipment for FRK Manufacture), IS 17854 (Blending Equipment).

These standards aim to create a consistent framework for manufacturers, regulators, and public agencies to produce and distribute fortified rice that is safe, nutritionally effective, and aligned with national health objectives. This compendium serves as a reference guide to support implementation and compliance across the fortified rice value chain.

I. Indian Standards on VMP, FRK and Fortified Rice

1. IS 17781:2021 – Vitamin and Mineral Premix for manufacturing FRK – Specification

Scope: This standard outlines the requirements and the methods of sampling and test for vitamin and mineral premix (VMP) for manufacturing fortified rice kernels.

Key provisions:

i) The standard lays down the physical characteristics such as particle size and moisture content of VMP for manufacturing FRK.

ii) It establishes the suitable chemical forms of constituent micronutrients in VMP.

iii) It specifies the packing and storage guidelines for VMP.

iv) It also prescribes the marking requirements of VMP, along with the requirement of CoA of VMP with the product package.

2. IS 17782:2021 – Fortified Rice Kernels – Specification

Scope: This standard defines quality requirements for Fortified Rice Kernels (FRK) used in the production of fortified rice along with their test methods.

Key provisions:

i) The standard specifies physico-chemical requirements such as moisture limit and defected grains in FRK.

ii) It provides the limits of both mandatory (Iron, folic acid and vitamin B_{12}) and optional (Zinc, vitamin A, vitamin B1, vitamin B2, vitamin B3, vitamin B6) fortificants with two different blending ratio i.e., 1:100 and 1:200. Test methods for quantification of levels of fortificant have also been prescribed in the standard.

iii) It specifies microbiological limits for Total plate count, Yeasts and moulds, Coliform count along with their test methods.

iv) It also lays down requirement for cooking quality of FRK i.e., percent solid loss, cooking time, etc, along with their test methods.

v) It covers proper packing, storage and marking requirements of FRK.

vi) The standard also details the Good Manufacturing Practices (GMP)/Good Hygienic Practices (GHP) to be followed by the manufacturer at each step of the manufacture of fortified rice kernels.

3. IS 17780:2021 – Fortified Rice - Specification

Scope: This standard specifies requirements for fortified rice, which is a blend of Fortified Rice Kernels (FRK) and polished raw/parboiled rice in ratios 1:100 or 2:100.

Key provisions:

i) The standard specifies physico-chemical requirements such as moisture limit and defected grains in fortified rice.

ii) It specifies the levels of the mandatory fortificants (Iron, folic acid and vitamin B12) and optional fortificants (Zinc, vitamin A, vitamin B1, vitamin B2, vitamin B3, vitamin B6) along with their test methods.

iii) It specifies the limit of contaminants like uric acid and aflatoxin B1 in fortified rice, and also prescribes the methods for analysing the same.

iv) It prescribes appropriate, storage and marking requirements of fortified rice.

v) The Standard also covers Good Manufacturing Practices (GMP)/Good Hygienic Practices (GHP) for blending of fortified rice kernels with fortified rice.

II. Indian Standards on Equipment used in Rice fortification

1. IS 17853:2022 – Equipment for Manufacture of Fortified Rice Kernel - Specification

Scope: This standard specifies construction and performance standards for equipment used to produce FRK via extrusion.

Key provisions:

i) the requirements for micro-pulverizer such as constructional & material requirements of components e.g. hopper, grinding chamber, screen, hammer, cyclone etc.

ii) the requirements of mixer such as constructional & material requirements of components e.g. mixing chamber, paddles, cover/lid and water dosing unit etc.

iii) the requirements of extruder such as constructional & material requirements of components e.g. barrel, screw, feeder, die head, die & cutter etc.

iv) the requirements of dryer such as material requirement of belt etc.

v) Performance requirements for all its components (micro-pulverizer, mixer, extruder, and dryer).

vi) marking requirements and provides a detailed process flow chart for FRK production, emphasizing quality control and safety measures throughout the manufacturing process.

2. IS 17854: 2022 Equipment for Manufacture of Fortified Rice - Specification

Scope: This standard prescribes the requirements of blending unit and its types used for manufacture of fortified rice.

Key provisions:

i) This standard covered either one of the following types or the combination thereof offering flexibility in blending methods:

a) Continuous screw/ribbon blender;
b) Drum blender;
c) Continuous drum blender;
d) Paddle blender; and
e) Octagonal blender.

ii) It provides constructional & material requirements for all of its components such as hopper, lid, screw/ribbon, paddle, containers, agitator etc.

iii) It also prescribes the performance requirements in terms of precision in desired blending ratio and the quality of the output.

III. Important Standards for Quantification of Micronutrients

i) Iron Content - AOAC 944.02 or AACC 40-70.01 which require Atomic Absorption Spectroscopy (AAS).

ii) Iron Content - AOAC 984.27 employs Inductively Coupled Plasma (ICP) Emission Spectroscopy for iron estimation.

iii) Vitamin B12 (Cyanocobalamin) - IS 16640 utilizes Reversed Phase High Performance

iv) Zinc - AOAC 984.27 using ICP emission spectroscopy or AACC 40-70.01 using atomic absorption.

v) Vitamin A - IS 16639 utilizes Normal Phase High Performance Liquid Chromatography

Disclaimer — For accessing/purchasing above mentioned Indian Standards, please visit https://standardsbis.bsbedge.com/