PAS 233:2021

Zinc enriched wheat, maize and rice grain – Specification

HarvestPlus

gain
Global Alliance for Improved Nutrition

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Foreword

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The provisions of this PAS are presented in roman (i.e. upright type). Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. "organization" rather than "organisation").

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0 Introduction

0.1 General

HarvestPlus leads and coordinates a global effort within the Consultative Group on International Agricultural Research (CGIAR) network to improve nutrition by promoting biofortified staple crops. This effort focuses on catalyzing the development, production, delivery and consumption of foods that are rich in essential micronutrients, including vitamin A, iron and zinc. In May 2018, HarvestPlus and GAIN launched a landmark partnership to accelerate progress towards improving access to biofortified seed, grain and foods via commercial channels with the Commercialisation of Biofortified Crops (CBC) programme.

0.2 Zinc

This PAS will focus on crops enriched with zinc through biofortification (breeding or agronomic) technology. Billions of people around the world are at risk of zinc deficiency. Zinc is an essential micronutrient that is important for several functions in the body, including:

a) growth and development;
b) immune system function;
c) reproductive health; and
d) healthy body tissues.

When consumed daily, zinc enriched maize, rice and wheat could contribute 35% to 80% of daily zinc needs for women and young children.

NOTE 1 *See HarvestPlus publication,* Estimated Average Requirements Provided by Biofortification *[1].*

Several factors determine the amount of zinc absorbed by the body from zinc enriched crops, such as average daily consumption, degree of processing and form of final food product and bioavailability of the zinc. Research has shown that zinc absorption from zinc enriched foods is higher than that from conventional crops.

NOTE 2 *See* Bioavailability of iron, zinc, and provitamin A carotenoids in biofortified staple crops *[2] and* Food Biofortification – Reaping the Benefits of Science to Overcome Hidden Hunger – A paper in the series on The Need for Agricultural Innovation to Sustainably Feed the World by 2050 *[3].*

Furthermore, regular consumption of zinc enriched crops has been shown to improve health, e.g. by reducing illness among children, with additional research ongoing.

NOTE 3 Food Biofortification – Reaping the Benefits of Science to Overcome Hidden Hunger – A paper in the series on The Need for Agricultural Innovation to Sustainably Feed the World by 2050 *[3]* and Efficacy of high zinc biofortified wheat in improvement of micronutrient status, and prevention of morbidity among preschool children and women – a double masked, randomized, controlled trial *[4].*

0.3 Rationale

Zinc enriched grains are visually indistinguishable from standard commercial grains. To facilitate domestic, regional, and international procurement and trade of zinc enriched maize, rice and wheat, individuals and entities along the value chain need to have specific guidance in order to differentiate the zinc content of zinc enriched grains. The requirements outlined in this PAS identify global standards for zinc enriched crops and aid in widespread adoption and scale-up of these commodities in local and global food systems.

The methods and definitions of the biofortification technology used to create more nutritious crops are set out in several other regulatory and academic publications. Zinc enriched maize, rice and wheat are the terms used throughout this PAS to define the final grain product. All terms associated with biofortification (i.e. biofortified, biofortify) are not used within this PAS but are accepted terms for identifying nutrient enriched grains. These terms might be used by various entities, including, but not limited to, international nutrition and agriculture agencies, governments, researchers, and private and public enterprises. It is important to note that consumer understanding and acceptance of the term "biofortification" might vary country to country.

PAS 233 is not intended to be a position statement on the different types of breeding technologies available to produce zinc enriched maize, rice or wheat. This PAS focuses on the zinc concentration in the final grain product and its impact on human nutrition, not on the technology used. The PAS sponsor and steering committee members acknowledge the ongoing international conversation concerning the use and acceptance of conventional and transgenic crops among global stakeholders and consumers. It is the responsibility of the user of this PAS to abide by current regulations within countries and to properly communicate to consumers, as applicable, the source of the grain and the breeding technology used.

At the time of publication, conventional plant breeding was the most widely available and adopted form of zinc enriched maize, rice and wheat, and there is a robust collection of scientific literature on the subject published in peer-reviewed journals. Other technologies to enhance zinc concentration or bioavailability in crops for human health are currently in development and will be tested and evaluated as these crops become available.

1 Scope

This PAS specifies requirements for zinc enriched maize (*Zea mays),* rice *(Oryza sativa)* and wheat *(Triticum aestivum)* intended as food for human consumption. It includes requirements for:

a) class levels of zinc concentration;

b) sampling guidance;

c) packaging; and

d) labelling.

This PAS is applicable only to zinc enriched grain produced from seed developed using breeding technologies or agronomic practices such as fertilization.

NOTE 1 *The breeding methods permitted by a country for local production and/or import or export markets are regulated by national and international legislation and are outside the scope of this PAS.*

This PAS is not applicable to grain that has undergone post-harvest fortification.

This PAS is intended for all entities, regardless of size, that are producing, procuring, and selling zinc enriched maize, rice and wheat grain for human consumption.

This PAS is intended to be used by private and public enterprises in sectors of the food supply chain that procure and sell grain, governments, and associated quality and compliance agencies.

NOTE 2 *Examples of users of this PAS include, but are not limited to, food aid organizations, aggregators, traders, millers, primary food processors, seed producers, food manufacturers, national agriculture agencies and food standards agencies.*

This PAS does not cover standards for all quality characteristics, contaminants (e.g. heavy metals, pesticide residues, mycotoxins and noxious seeds) or nutrient claims for food labelling.

NOTE 3 *Standards and regulations for these components are described elsewhere in Codex Alimentarius [5] and by regional or national authorities.*