Tolerase® P: The enzyme to enhance mineral absorption for optimal health

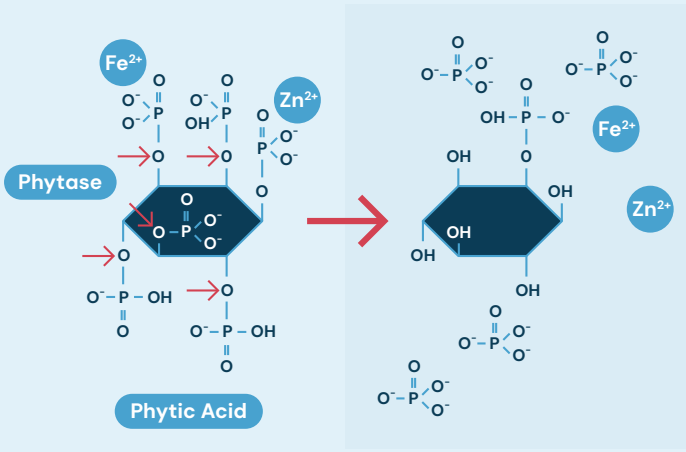
Tolerase® P is a phytase, which cleaves phosphate groups from phytic acid and therefore improves mineral bioavailability (iron and zinc) from cereals and legume-based foods.

More than a third of the world's population predominantly follows a plant-based diet, some by choice and others due to limited access to other types of nutrition. These diets typically include whole grains, pulses and beans, which can provide minerals but also contain phytic acid.

What is Phytic Acid?

Phytic acid is an antinutrient that binds minerals such as iron and zinc, hindering their absorption in the human intestine.

The high phytic acid content in cereal- and legume-based diets is a major cause of mineral deficiencies globally, including deficiencies of iron – the number one unsolved micronutrient deficiency in the world – as well as zinc.[1] Phytase can degrade phytic acid and prevent it from forming complexes with minerals, making them available for uptake by the human body. This applies to both food-intrinsic and added minerals.



Tolerase® P Benefits

Tolerase® P helps to increase the availability of minerals for uptake by the body. Phytase benefits consumers by supporting the health benefits offered by minerals:

Iron

- ✓ Energy (oxygen supply to tissues)
- ✓ Brain development in children

Zinc

- ✓ Immune function
- ✓ Skin, hair and nail health

In Short

- Tolerase® P is scientifically proven to support mineral absorption.
- International bodies, such as Codex and the Home Fortification Technical Advisory Group of the United Nations recognize the value of phytase in reducing levels of phytic acid.
- Tolerase® P is available in micro-granulated form with excellent handling properties for use in foods and supplement applications.
- Phytase is active across a broad pH range (2.5–5.5), including digestive conditions.
- Tolerase® P is manufactured in Europe.

Clinically Proven Efficacy

More than 20 clinical studies substantiate the benefits of phytase for mineral absorption.

These studies have demonstrated improved iron and zinc absorption in women and children when phytase was added to various food types (e.g., cereal or legume porridges, lipid-based supplements). Depending on the food matrix and the degree of dephytinization, iron absorption has been improved by 20% to >100%, and zinc absorption by 40% to 100%.[2]

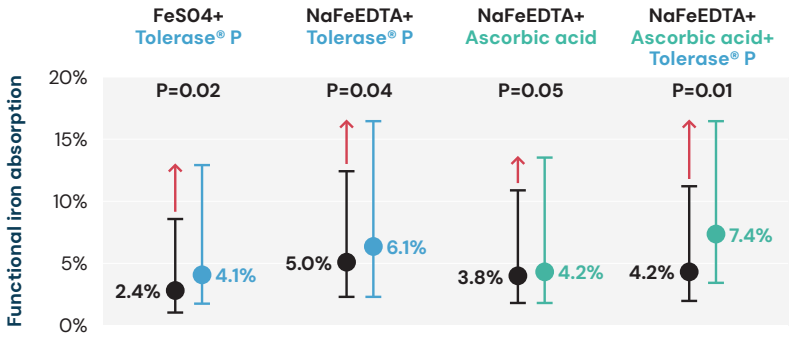
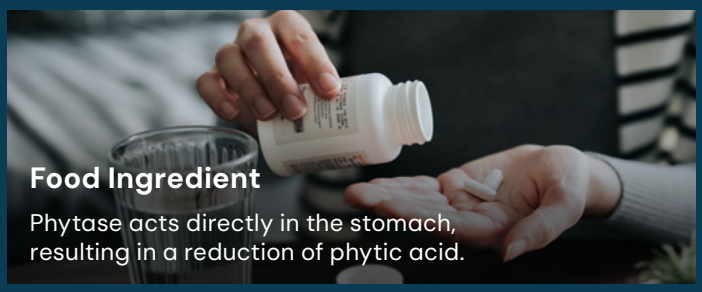


Figure 1. Tolerase® P significantly improved iron absorption from $FeSO_4$, NaFeEDTA or NaFeEDTA + ascorbic acid, given with whole grain maize porridge to women of reproductive age.[3]

Mode of Action

Phytase can work in two ways



Safety

- Tolerase® P is safe for the general population, as supported by safety and toxicity studies and as indicated in available clinical studies where Tolerase® P was administered to infants and children.[4,5]

Composition

Tolerase® P is phytase from the food-grade fungus *Aspergillus niger* with an activity of 20'000 FTU/g product. 1 unit of phytase activity (FTU) releases 1 micromole of phosphate from phytic acid at pH 5.5 and 37 °C.

Claims and labelling

Allowable claims need to be checked for each market. While dsm-firmenich has made efforts to evaluate and support ingredient claims, responsibility for review, validation and use of product claims lies with the customer supplying the product to consumers.

Possible claims can be:

- Phytase helps improve absorption of minerals (iron and/or zinc).
- Phytase releases minerals (iron and/or zinc) in a form easily digestible by the body.
- Phytase reduces phytic acid. Phytic acid is an anti-nutrient that binds minerals such as iron and zinc.
- Phytase results in reduced phytic acid in the product.

Applications and dosage

Tolerase® P

- Is a microgranulate with excellent flowability.
- Can be used for fortification of flour, micronutrient powders, lipid based supplements, spreads, table top condiments, tablets and for processing of cereals or legume-based foods.
- Has an off-white to creamish colour, high solubility and a bland taste.
- Has good stability at temperatures ≤ 30°C. Tolerase® P enjoys a shelf life of 24 months at ≤ 15 °C.
- Efficacious dose: as food ingredient 190 FTU/serving to digest 1g phytic acid in meal.

Together, we can deliver to the needs of consumers and patients.

We go beyond the essential, to co-develop desirable and sustainable science-backed products, powered by our expert services. A healthier world takes more than just ingredients. It takes an end-to-end purpose-led partner that brings progress to life.

For more information on Tolerase® P

Visit our website

We bring progress to life

References

1. https://www.who.int/health-topics/micronutrients#tab=tab_1 **2.** Troesch B et al. Food Nutr Bull. 2013 Jun;34(2 Suppl):S90-101. doi: 10.1177/15648265130342S111. PMID: 24050000. **3.** Troesch B et al. Am J Clin Nutr. 2009 Feb;89(2):539-44. doi: 10.3945/ajcn.2008.27026. Epub 2008 Dec 23. PMID: 19106242. **4.** Troesch B et al. J Nutr. 2011 Feb;141(2):237-42. doi: 10.3945/jn.110.129247. Epub 2010 Dec 22. Erratum in: J Nutr. 2011 Apr 1;141(4):718. van Stujivenberg, Martha E [corrected to van Stuijvenberg, Martha E]. Erratum in: J Nutr. 2011 Jul;141(7):1410. PMID: 21178093. **5.** Paganini D et al. Gut. 2017 Nov;66(11):1956-1967. doi: 10.1136/gutjnl-2017-314418. Epub 2017 Aug 3. PMID: 28774885.