

## Assist in the proper digestion of food by providing supplemental digestive enzymes

RxBalance™ Enzy Factors is a blend of highly concentrated, active plant enzymes. These enzymes break down all major dietary components including proteins, carbohydrates and fats across a broad pH range in the gastrointestinal tract.

This broad spectrum effect at a wide pH range ensures the best possible results in the most varied of conditions.

### Ingredients: Medicinal

Each capsule contains:	
Enzyme Blend	500 mg
Protease ( <i>Aspergillus oryzae</i> , <i>Bacillus</i> spp.)	41,000 HUT <sup>1</sup>
Amylase ( <i>Aspergillus oryzae</i> )	11,900 DU <sup>2</sup>
Cellulase ( <i>Aspergillus niger</i> )	175 CU <sup>3</sup>
Lipase ( <i>Rhizopus oryzae</i> )	1,050 FIP <sup>4</sup>
Phytase ( <i>Aspergillus niger</i> , <i>Trichoderma longibrachiatum</i> )	0.85 FTU <sup>5</sup>
Lactase ( <i>Aspergillus oryzae</i> )	800 ALU <sup>6</sup>
Invertase ( <i>Saccharomyces cerevisiae</i> )	150 INVU <sup>7</sup>
Maltase ( <i>Aspergillus niger</i> )	160.5 DP <sup>8</sup>

<sup>1</sup>Hemoglobin Unit Tyrosine base; <sup>2</sup>Dextrinizing Units;  
<sup>3</sup>Cellulase Units; <sup>4</sup>International Pharmaceutical Federation  
Units; <sup>5</sup>Phytase Units; <sup>6</sup>Acid Lactase Units; <sup>7</sup>Invertase Units;  
<sup>8</sup>Diastatic Powder Units.

### Ingredients: Non-medicinal

Cellulose, maltodextrin, ascorbyl palmitate, dicalcium phosphate.

### Recommended Use

Assists in the proper digestion of food by providing supplemental digestive enzyme. The inclusion of cellulase and phytase increases the bioavailability of plant-based nutrients for mixed as well as vegetarian diets.

### Recommended Dose

*Adults:* Take two capsules with each meal or as recommended by a health care practitioner.

### Risk Information

Patients with a gastro-duodenal ulcer and pregnant or breastfeeding women should consult a health care practitioner before use.

### Interaction with Drugs/Supplements

None known.

### Dosage Form Description

A vegetarian capsule with a tan powder fill.

### Packaging

Available in bottles of 90 capsules.

### Stability

Shelf-life of two years if stored in a cool, dry place.

### Ingredient Description

**Protease** - Proteases, or proteolytic enzymes, are a class of enzymes that break down the peptide bonds joining amino acids in a protein. *Activity is measured in: HUT - Hemoglobin Unit Tyrosine base.*

**Amylase** - Amylases are enzymes that catalyze the hydrolysis of alpha-1, 4-glycosidic linkages of polysaccharides to yield dextrans, oligosaccharides, maltose and D-glucose. *Activity is measured in: DU - Dextrinizing Unit.*

**Cellulase** - Cellulase hydrolyzes the indigestible plant polysaccharide cellulose. It hydrolyzes the beta-D-1,4-glycosidic bonds of cellulose to beta-dextrans and ultimately to glucose. *Activity is measured in: CU - Cellulase Unit.*

**Lipase** - Dietary lipids are attacked by lipases to yield simple fatty acids and glycerol. *Activity is measured in: FIP units - Fédération Internationale Pharmaceutique (one FIP unit = ten LU units).*

**Phytase** - An enzyme that catalyzes the breakdown of phytic acid which is responsible for significantly hindering the bioavailability of nutrients by forming non-digestible complexes. *Activity is measured in: PU - Phytase Unit.*

**Lactase** - Lactase is a sugar-splitting enzyme that hydrolyses lactose, a milk sugar yielding galactose and glucose. Lactase is helpful in reducing GI symptoms in those with lactose intolerance. *Activity is measured in: ALU - Acid Lactase Unit.*

**Sucrase (Invertase)** - An enzyme that catalyzes the hydrolysis of sucrose into glucose and fructose. *Activity is measured in: INVU - Invertase Unit.*

**Malt Diastase** - Maltase hydrolyses maltose, malt sugar into two separate glucose molecules. *Activity is measured in: DP - degrees of Diastatic power.*



## Reason For Combination

Review of evidence, biochemical, laboratory and clinical, highlights a significant measure of efficacy can be expected from this enzyme blend in aiding the digestive process.

The synergistic action of the constituents can be expected to deliver the desired action.

The warnings, cautions, and contra-indications are mostly on a theoretical basis. Standard precautions to avoid use in pregnancy and during breastfeeding are included due to lack of evidence clearly demonstrating safety in these populations.

Furthermore, digestive enzymes may aggravate certain gastrointestinal diseases. Logically, the concept of an orally-administered digestive enzyme formulation appears incredibly sound. Decades of biochemistry has been compiled to elucidate exactly which reactions each enzyme will catalyze. The clinical data reviewed clearly demonstrates that such preparations can be expected to positively impact the in vivo processes of digestion.

This product provides direct support to the processes associated with nutrient macromolecule breakdown. Furthermore, in order to increase the bioavailability and absorption of nutrients in a mixed diet as well as a vegetarian diet, phytase and cellulase have been added to the formula.

In the context of human and animal nutrition, the following two aspects of phytate are critically important: monogastric animals (one stomach – like humans) have only low levels of phytate-degrading enzymes in their digestive tracts; phytic acid is considered to be an anti-nutrient factor as it forms complexes with proteins and a variety of metal ions and thereby decreases the dietary availability of these nutrients. Because of these problems, there is considerable interest in phytate-degrading enzymes.

For example, the main limitation in the biological utilization of cereals and legumes or their blends is the presence of high amounts of anti-nutrients such as phytic acid, polyphenols and trypsin inhibitors. The latter inhibit the proteolytic enzyme trypsin that is secreted by the pancreas and thus affect the digestibility and bioavailability of protein. Similarly, phytic acid and polyphenols are also known to inhibit amylolysis and proteolysis (breakdown of proteins).

Thus, if this enzyme product was taken with a cereal/legume-based meal, it may not only improve the nutrient profile but may also exert beneficial health effects. Consumption of such a food mixture would prove beneficial to all age groups, including children and adults, especially those from vegetarian populations of developing countries which would have a larger intake of these anti-nutrients.

So the next question should be: "Does breaking down or reducing these antinutrients have any effect on nutrient availability and absorption, other than on a theoretical basis?" The short answer is "yes". There have been many studies that have shown this. For example, Egli et al. (2004) clearly demonstrated the beneficial effects of dephytinization on absorption of zinc. Valencia et al. (1999) showed an increase in iron bioavailability and absorption. Lopez et al. (2001) showed an increase in phosphorus and magnesium absorption and utilization, And the list goes on, but by now it should be quite evident that there are real and tangible benefits to breaking down these anti-nutrients.

## Research Synopsis

1. An experiment was designed to study the effect of dietary phytase on iron absorption. A test meal was administered, with or without added phytase. Radio-labeled iron was also added to the meal. The investigation sought to determine if adding phytase to the meal would enhance iron absorption since phytate is an inhibitor of iron absorption.

Ten subjects received both the active treatment and control in crossover fashion with washout. Results suggested that the addition of phytase to the meal increased the absorption of iron from 14% in the control phase to 26% in the active treatment Phase.

2. Lactose-intolerant subjects (n = 24) were studied for the effects of a single dose of oral lactase on their subjective symptoms, breath hydrogen concentration and glucose absorption following a lactose challenge.

In a randomized, double-blind, crossover study, subjects were given either lactase tablets (total lactase dose = 9900 FCC units) or placebo tablets. They consumed 8 oz. of whole milk in which 37.5 g of lactose powder had been dissolved (total lactose content = 50 g). Subjects completed symptom-evaluation questionnaires every 8 hours for four days. Results showed no significant differences in plasma glucose levels.

Maximum mean breath hydrogen was significantly lower after lactase treatment than after placebo treatment. Subjective reporting of abdominal cramping, belching, flatulence and diarrhea were significantly improved with lactase use.

## References

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