



Phytic Acid: Boon or Curse

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Abstract

Phytic acid in its phytate form has been shadowed over the years as being advantageous or vice-versa. At one hand, where it is extremely helpful in several ways, its major drawback of being a chelating agent cannot be overlooked. Quantity of nutrients delivered by any eatable is what defines its beneficial quality. The pro-and-cons of phytic acid are essential to understand in order to develop the quality of a grain, food and vegetable.

Keywords: Phytate; Hemochromatosis; Cancer; Nutrition; Minerals; Anti-nutrients; Chelating agent

Introduction

The Quality of a food, vegetable or grain depends upon the nutrients made available while human intake. There are several food varieties which are highly nutritious when tested for the quality checkup during its production but a serious question arises that does the nutrition present in the food reaches and is absorbed by the human body upon its intake. There are several barriers existing which inhibit this highly important process. One among the barrier is Phytate, which influences the nutritional quality of the food.

Phytate, an “anti-nutrient”, is a form of phytic acid when it bounds with the nutrients in the seed. Seeds like those of grains, varieties of nuts, and edible seeds stores phosphorus as Phytic acid. The reason why phytate is considered as anti-nutrient is since it is binded with the minerals, it inhibits minerals availability to human body while it's intake. However, the content of Phytic acid varies among plants depending upon the regional differences due to environmental conditions, quality of soil, climate and various other factors. In some sources of phytic acid, most of it is concentrated and isolated in the aleurone layer of the seed and hence in the bran while in others, it is present in the cotyledon layer of the seed [1].

Phosphorus storage (in seed) = Phytic acid

Phytic Acid + Minerals = Phytate (In seed)

Phytic Acid: A Boon

As a general fact, Phytic acid is the principal form of Storage of Phosphorus when in seed stage. Other than being a storage for phosphorus, its also proven that certain amount of phytic acid is essential for the developmental stages of the seeds, including the seedling.

By chelating iron, during seed stage, it suppresses iron-catalyzed oxidative reactions and hence it works as a possible antioxidative agent in the preservation of seeds. It is therefore also being used as a food preservative during current time. As per the simmlar mechanism dietary phytic acid has also been considerate to lower the incidence of colonic cancer along with few other kind of cancerous activities (although the data still lacks from human studies), helps in preventing the hardening of arteries and platelet formation and providing protection against other inflammatory bowel diseases too. Phytic acids antioxidant function has also provided up its industrial applications [2,3].

Hemochromatosis is a condition occurring due to high iron intake, can also be reduced due to phytic acid intake as it keeps iron binding with it and not making it available.

Phytic Acid: A Curse

Phytic Acid has the vigorous potential to chelate multivalent metal ions, predominantly iron, calcium, magnesium and Zinc. Consequence to the binding, there are terribly insoluble salts which are poorly absorbed from the gastrointestinal tract and hence results in loss of bioavailability of minerals. This is a major issue in regions where the staple diet contains grains i.e. most of the developing countries and among vegetarians.

This is one of the major reason why we need to research about various methods and techniques to discover how we can make the availablilty of theses minerals upon consumption but reduce the levels of phytic acid only upto certain limit so that it do not hinders it's helpful qualities, such as during time of developmental stage of the seed and plant.

The major drawback of phytic acid acting as a chelating agent can be reduced to a certain level by various techniques and methods where we can activate the Phytase, a phosphatase enzyme, which catalyses the Phytic acid Hydrolysis and releases inorganic phosphorus and other binded minerals. Although Ruminant animals have certain bacteria in their gut wall which naturally produces few types of phytases making the minerals and phosphorus available for them upon intake.

Few techniques that can be followed in order to activate the phytase is soaking, fermentation, heating, milling process and sprouting. However, It should also be mentioned that although these methods activates the phytase enzyme and hence makes the minerals bioavailable but sometimes they can distrust the vitamins present (except sprouting) [1].

Conclusion

Quality of a grain, food and vegetable is an important factor to consider. Not only the laboratory quality should be determined for an eatable but also its human consumption and availability must be a key factor to determine its quality. The modernized world is getting more conscious about what they intake in their diet, what are the minerals, vitamins and proteins available in their diet. Human beings continues

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to increase their knowledge and understanding about the food and their role in maintaining and optimizing health, as the generation is getting more involved with their healthy diet it becomes the responsibility of the researcher and the health organizations to deliver what they seek for [4].

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