Article on Approach Having for Bio Fortification in Staple Cereal Crop of Content Zinc & Iron

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Abstract— The Food and Agricultural Organization of the United Nations (FAO) and the World Health Organization (WHO) aimed to reduce the numbers of the hungry and chronically undernourished to 832 million by 2018, but this did not happen. There are still 806 million hungry people and half the world population is either undernourished or malnourished. The poor and the underdeveloped countries have not made any appreciable progress in improving food and nutritional security bio fortification enriching the nutrition contribution of staple crops through plant breeding is one option. Scientific evidence shows this is technically feasible without compromising productivity. The challenge is to get producers and consumers to accept bio fortified crops and increase their intake of the target nutrients. A crop is a plant that can be grown and harvested for food or profit grains, such as corn, wheat, and rice, are the world's most popular food crops. In fact, these crops are often the basis for food staples. A food staple is a food that makes up the dominant part of a population's diet. Deficiencies of vitamin A, iron, and zinc affect over one-half of the world's population. Progress has been made to control micronutrient deficiencies through supplementation and food fortification, but new approaches are needed, especially to reach the rural poor.

Key words: Bio Fortification, Staple Cereal Crop, Content Zinc, Iron

I. INTRODUCTION

The staple cereal crop in most of the development low income countries of India and Africa, where they may contributes as much more 55% of the dietary energy (Prasad et al., 2014). The essential micronutrient such as zinc and iron affected more than three million people worldwide (White and Broadly, 2009). Iron (Fe) deficiency alone affects 50 % of all pre-school aged children globally. Bio fortification is of great importance in enriching seeds with Zn and Fe. Soil application are reported to have in general, small increases in grain zinc concentration, while foliar application results in remarkable increases in grain zinc concentration in wheat (Cakmak et al., 2010). Foliar application of $FeSO_4$ (1%) level at different growth stage of rice crop significantly increased grains yield and iron concentration in rice grains (Singh et al., 2013). Zinc and iron deficiency in human nutrition are widespread in developing India and African countries where cereal grain are the staple crop.

Bio fortification approaches for zinc and iron - There are three types' bio fortification approaches for zinc and iron.

- Fertilizer management
- Genotype Improvement
- Genotype Selection

A. Fertilizer Management

Proper fertilization is important for crop yield and quality. For the greatest fertilizer nutrient use efficiency, it is important to select the right source, the right method, the right timing, and the right rate of application frame work. In this factsheet, fertilizer sources, application methods, and timing are discussed.

B. Soil Application

The application of composted organic wastes to soil can be used for conserving soil organic matter, reclaiming degraded soils and supplying plants with nutrients. Two greenhouse experiments were carried out to evaluate the addition of compost on chemical and physical properties of soils. Four different texture soils were used: Sandy soil, Silt loam soil, Clay loam soil (33.2 O.C. g/ kg) and Clay loam soil. The applied dose (40 Mg/ ha) modified the chemical composition of the plants: those grown in soil with added compost showed higher concentrations of nutrients than those grown in control soils.

C. Foliar Application

Plants absorb nutrients through the roots and through the foliage. Many plant nutrients are needed in such great quantities that it is impractical to supply them through the foliage. However, when soil conditions are unfavorable, when micronutrients are needed, or when spraying for insects and disease, it may be desirable to make foliar applications of the plant nutrients.

D. Seed Priming

The vegetable industry have developed a method called seed priming to deal with slow to germination crops and weak seedlings. Seed priming or osmoconditioning is a seed pretreatment where moisture is controlled, allowing the seed to be brought through the germination process, just before root and shoot emergence. Nothing breaks the seed coat. Seed priming become common treatments to reduce the time between sowing and seedling emergence. This technique leads vegetables plants, flower plants, and some field crops to be able to get more soil moisture, nutrition, sun radiation, and early maturity to reach to maximum yield, and best quality.

Zinc and Iron seed for sowing: The germination of wheat seeds produced by plants whose seeds had been treated with zinc, iron is positively influenced by treatments with the fungicide alone, or with the combination of zinc, iron in fungicide. The yield per plant increases when wheat seeds are treated with zinc before sowing.

E. Bio Fertilizers

The natural products laying around farms can be turned into bio fertilizers and used to make healthy and abundant crops.

Teaching farmers how to use biofertilizer will in still self-reliance into their daily lives. Biofertilizer are defined as preparations containing living cells or latent cells of efficient strains of microorganisms that help crop plants uptake of nutrients by their interactions in the rhizosphere when applied through seed or soil.

II. GENOTYPE IMPROVEMENT

Crops are susceptible to pests and disease, and with greater volumes being produced the requirement for water and fertilizers increases. Our modern crops have been selectively bred for many centuries and so are not very diverse, genetically. To accommodate increasing environmental pressure, our current crops will need to be adapted to give higher yields to feed a growing population.

A. Conservation Breeding

Conventional plant breeding has been going on for hundreds of years, and is still commonly used today. Early farmers discovered that some crop plants could be artificially mated or cross pollinated to increase yields. Conventional Plant Breeding. A hybrid rice field. Plant breeding is the process of selecting plants with the most desirable qualities to produce of spring that inherit these desired traits.

B. Genetic Engineering

Genetic engineering refers to the direct manipulation of DNA to alter an organism's characteristics in a particular way. Genetic engineering is not just an extension of conventional breeding. In fact, it differs profoundly. As a general rule conventional breeding develops new plant varieties by the process of selection and seeks to achieve expression of genetic material which is already present within a species. Genetic engineering, also called genetic modification or genetic manipulation, is the direct manipulation of an organism genes using biotechnology.

III. GENOTYPE SELECTION

Genetic selection strategies, there are several levels of change that must be considered because they are integral to successfully molding domestic animals to forms desirable by humans. Biological evolution or natural selection is a relatively slow process in which fitness of animals in a specific environment is the selection criterion. Artificial selection programs attempt to direct and accelerate biological changes in animals using selection criteria that will tailor those animals for human needs and desires. These traits seen in an organism are due to the gene found on their chromosomes.

REFERENCES

[1] Prasad R., Shivay Y. S. and Kumar D. (2014) "Agronomic biofortification of cereal grains with iron and zinc". Advances in Agronomy.125: 55-91.
[2] Cakmak, I., Pfeiffer, W. H. and McClafferty, B. (2010) Biofortification of durum wheat with zinc: agronomic or genetic biofortification. Cereal Chem. 87: 1-17.
[3] White, P. J. and Broadley, M. R. (2009) Biofortification of crop with seven mineral elements often laking in human diets-iron, zinc, copper, calcium, magnesium, selenium and iodine. New Phytol. 182: 49-84.
[4] Singh, P., Dhaliwal, S. S. and Sadana, U. S. (2013) Iron enrichment of paddy grains through feri-fortification. J. Res. Panjab Agric. Univ. 50: 32-38.

