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Editorial

Nutritional Plant Breeding for Food and Health Sciences Research - ②

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By training I am a plant breeder/geneticist as I have nearly 12 years of research experience in both conventional and molecular plant breeding and genetics that includes over 9 years on wheat breeding and 2 years on vegetable breeding, and more specifically I was working on breeding for traits associated with cereal grain quality and chemistry (nutrition), and end-product (food) processing and quality. While I studied Horticulture, Plant Science, Plant Breeding and Genetics in my graduate studies (Masters and Ph.D.), nonetheless, I was always thinking how to combine Plant, Health, Nutritional and Food Sciences research in my future research endeavor to contribute in such a multi-disciplinary area of study.

Since I was invited to write an editorial article for SRL Nutrition and Food Science, I took the opportunity to write about some future studies on nutritional plant breeding for food and health sciences research. Like other food products in the market, such as, products with “0 trans-fat”, “omega-3”, “gluten-free”, “high oleic” etc., we need to create some value-added bread products for the niche food market. For example, bread with high vitamin ‘X’, bread with high mineral, bread with high soluble proteins, high lutein and zeaxanthin bread (important nutrients that reduce the risk of chronic eye disease), low glycemic index bread (the lower the glycemic index, the less it affects blood sugar and insulin levels), etc. would be the ideal for nutritional food market. Since wheat flour has all those nutritional components built-in, so we do not need to add or enrich with external substances in the bread products. There are not too many studies conducted on water soluble proteins, albumin and globulin in wheat flour, which occupy 20% of total protein content in flour and have very high nutritious value.

The major groups of endosperm proteins in wheat are gluten proteins which are composed of two main groups of proteins, gliadin (about 33% of the total protein) and glutenin (about 16% of

the total protein). Furthermore, gliadin and glutenin proteins are separated into different high molecular weight and low molecular weight subunits, and each subunit or combination of subunits are responsible for different rheological and functional properties of wheat flour in dough formation. Therefore, it is essential to design experiments to study the role and functional properties of different subunits of gliadin and glutenin proteins in single and in different combinations in end-use products of wheat. Since some genes are coded and chromosomes loci are known for these gluten subunits, as a plant breeder I would develop some chromosome substitution or deletion stocks of wheat using gene gun transformation technology to study the gluten subunits in isolation and in combination. I would also collaborate with cereal chemist or food quality scientist to see the rheological and functional properties in end-use products using those wheat stocks for different subunits and subunit combinations. Detailed designs for these experiments could be drawn from this idea when needed.

Therefore, in my future studies I would screen wheat lines collected from various sources for desirable nutritional traits. Then few lines would be selected for improvement of nutritional traits while maintaining all other good rheological and functional properties of flour. Collaboration with other wheat breeders would be needed to improve those nutritional traits in new wheat cultivars or in existing cultivars with all other good quality traits. New wheat cultivars with specific nutritional traits would be designated for special value-added bread products for the niche food market.

At last but not least, I would like to thank you for the opportunity to serve in the Editorial Board of SRL Nutrition and Food Science. It has been a great pleasure to have been part of such an international, peer reviewed, open access, scholarly journal that brings about latest research in all related aspects of Nutrition & Food Science.