



Purple, blue, black and white wheat lines generated at NABI

Name of Technology: Nutraceutical colored wheat with high anthocyanin content

Technology description: Cereals take an important place among all the food items and play key role for a healthy life. Cereals are the basic requirement of almost every food item and among them; wheat is the leading one. Wheat is important as it can be used in multiple ways, for example bread, semolina, noodles, biscuits. Traditionally, we are accustomed to consuming white wheat flour prepared from the endosperm of amber (white) wheat. In recent years, consumers have accepted brown whole wheat bread and in fact has grown a liking to it. Thinking ahead of it, we at NABI have produced biofortified colored wheat-Black, Blue and Purple. One, usually see colored fruits and vegetables, but colored wheat is unique trait with potential health benefits. This color is due to anthocyanins present in the outer seed layers. Anthocyanins have evoked the interest of number of researchers. Plant anthocyanins and phytochemicals can act as antioxidants and help in prevention of cardiovascular diseases, diabetes, inflammation, cancer, obesity and aging. Developments in the food industry can lead to the innovation of new products from unconventional colored wheat, with better nutritional and functional properties.

Name of the Institute: National Agri-Food Biotechnology Institute, Mohali, Punjab

Stage of Development: Colored wheat lines are ready for use. Further enhancement in agronomical traits in under progress.

Patent/IPR status: The patent application has already been filed on process of product development

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Background: Biofortification of staple diets is a major challenge for agricultural biotechnologists. Colored wheat with anthocyanin biofortification can act as novel food for mass consumption. With continuous efforts, we have generated, colored wheat germplasm adapted to local climatic conditions and with the satisfactory yield potential. The Purple color is associated with mutation in the pericarp and blue color is a result of wide introgression. Black color combines both of them. Testing of stable lines indicated very good anti-oxidant potential of these lines. Anti-inflammatory effects of these lines were identified by animal cell culture based assays. Effectivity of black wheat line for prevention of fat deposition, improved glucose homeostasis, insulin tolerance and lowering the serum cholesterol and free fatty acid levels was found out from in vivo studies using high fat diet induced obesity mouse models. Selected lines showed significantly higher iron and zinc content, indicating double biofortification.

Benefits and Utility: There is great potential of future utilization of these advanced colored wheat lines for healthy product development and commercial utilization. It would be wonderful if our staple diet like wheat could give all the benefits of natural antioxidants with no change in taste. Products of colored wheat like bread, biscuits, porridge etc. would add a natural way of variety to our breakfast and rest of the day meals, snacks and mini-meals etc. The maize genotypes with colored grains are known to fetch premium prices. Nutrition parameters including major constituents, minor constituents and processing quality parameters of advanced colored lines were similar to high yielding white wheat cultivars indicating potential of these lines for product development and commercial utilization.

Country context: Multilocation on farmers field & evaluation of colored wheat lines is under progress.

Scalability: Colored wheat lines can be scaled to several hectares in the coming years.

Business and Commercial Potential: Due to huge demand for health promoting foods, there is huge potential for colored wheat lines for commercial products like bread, biscuits, buns, kulcha, pizza base etc.

Potential Investors to this technical innovation: Bakery industries involved in commercial product development.