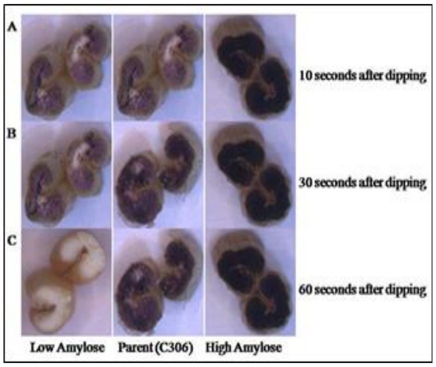

Different blue color intensity observed in half-seeds of the low amylose mutant line (Amylose content, AC, – 6 %), the parent variety (AC – 26 %), and the high amylose mutant line (AC – 64 %)

Name of Technology: Bread wheat (*Triticum aestivum*) lines with high amylose or resistant starch in seed

Technology description: A strategy was adopted to generate a mutant population for identification of wheat lines showing variation in amylose content and resistant starch. For this, the Indian bread wheat (*Triticum aestivum*) variety, 'C 306', a good chapatti making variety, was treated with EMS (ethylmethyl sulfonate) and about 1,000 M5 mutant lines were developed. A sub set of 101 M4 EMS-treated mutant lines showing variation between ~3% to 76% in amylose content in grain starch was identified. Their grain starch showed variation in resistant starch from 0 to 41%. Twenty-one lines showed resistant starch (RS) content at least 10% in comparison to their parent variety with <1%. Statistical correlation analysis showed a poor negative correlation between thousand kernel weight (TKW) and amylose content ($r = -0.131$, $p < 0.05$). However, 18 out of 21 high resistant starch (at least 10% RS) lines showed better performance in TKW (range: 41 to 49 g/TKW) over the parent variety (40g/TKW).

Name of the Institute:
National Agri-Food Biotechnology Institute (NABI), Mohali

Stage of Development: High amylose/resistant starch lines are ready to extract the modified starch as product *per se* or transfer the trait to other wheat varieties.

Scientific Experts: Dr. Joy K Roy

Contact person: Dr. Joy K Roy
Address: National Agri-Food Biotechnology Institute (NABI) Mohali, Punjab (INDIA)
Phone: 0172-4990106
Email: joykroy@nabi.res.in

Background: A few years back a research programs was identified in the area of 'Gene discovery for improvement of processing and nutrition quality'. Wheat flour is processed into a wide range of end-use food products, whose complex quality mainly depends on biochemical composition of grains. Starch affects the processing, cooking, and organoleptic qualities, and digestibility of starch-based food products. The wheat grains contain about 70% starch which requires to be improved into nutritive starch, for example, high amylose-starch or resistant starch for healthy wheat diets. Initial screening of about 50 Indian bread wheat varieties showed narrow variation in amylose content (22-30%) in grain starch. A set of germplasm showing variation in amylose content is pre-requisite for genetics and molecular knowledge of genes and their regulators underlying amylose variation and their interaction among with environment. To achieve this, a set of mutant lines showing variation in amylose and resistant starch were developed in Indian bread wheat (*Triticum aestivum*) variety through ethylmethyl sulfonate (EMS) treatment of seed.

Benefits and Utility: An EMS-induced mutation population was developed in bread wheat (*Triticum aestivum*) for amylose (~3 to 76%) and resistant starch (~ 1 to 41%) variation. These lines are important genetic resources for the study of genetics and molecular basis for variation of amylose and resistant starch, improvement of the adopted wheat varieties of different wheat growing regions of India or worldwide for resistant starch, and development of resistant starch as product per se. The efforts are being made to increase potential for commercialization.

Country context: The improvement of wheat varieties of India or worldwide for resistant starch.

Scalability: The material is ready for scale up through multiplication.

Business and Commercial Potential: It holds potential for commercialization for nutrition quality as resistant starch or healthy starch is consider under soluble dietary fibers.

Potential Investors to this technical innovation: Food industries working on the development of resistant starch for good health