

## UNMET NEED & OPPORTUNITY

In modern day lifestyle, over-consumption of processed foods has led to various metabolic diseases like obesity, diabetes and cardiovascular diseases. Therefore, new or natural sources of natural compositions are required for better health. Wheat is the most utilized staple food in India and is also important for India's economy. Therefore, efforts are being consistently made to improve wheat varieties such that it is beneficial for health and is preventive against high fat induced metabolic diseases. Starch consists of Amylose and Amylopectin. Amylose Content (AC) is preferred in higher amount to make Resistant starch (RS) for better digestibility of starch-based food products. It is slowly digested and thus provides low or medium GI to diabetic and obese people.

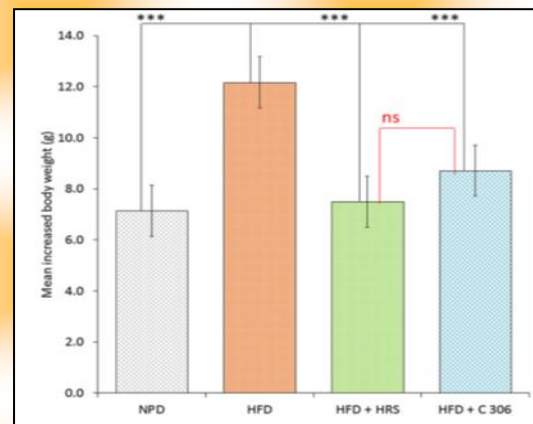


Low GI | High Resistant Starch | High Amylose

## TECHNOLOGY

The wheat lines mutated through EMS were tested by Iodine dilution method to select the lines with high AC. Two varieties "TAC 28" and "TAC 35" with high AC, RS and reduced GI ~25% were selected. These mutated wheat varieties demonstrated improved blood glucose levels, lowered blood pressure, improved lipid profiles, increased immunity and weight loss contributing to improved health. These wheat varieties offer good potential for food industries due to high nutritional value i.e. high Amylose content, high Resistant Starch and low glycemic index (GI)".

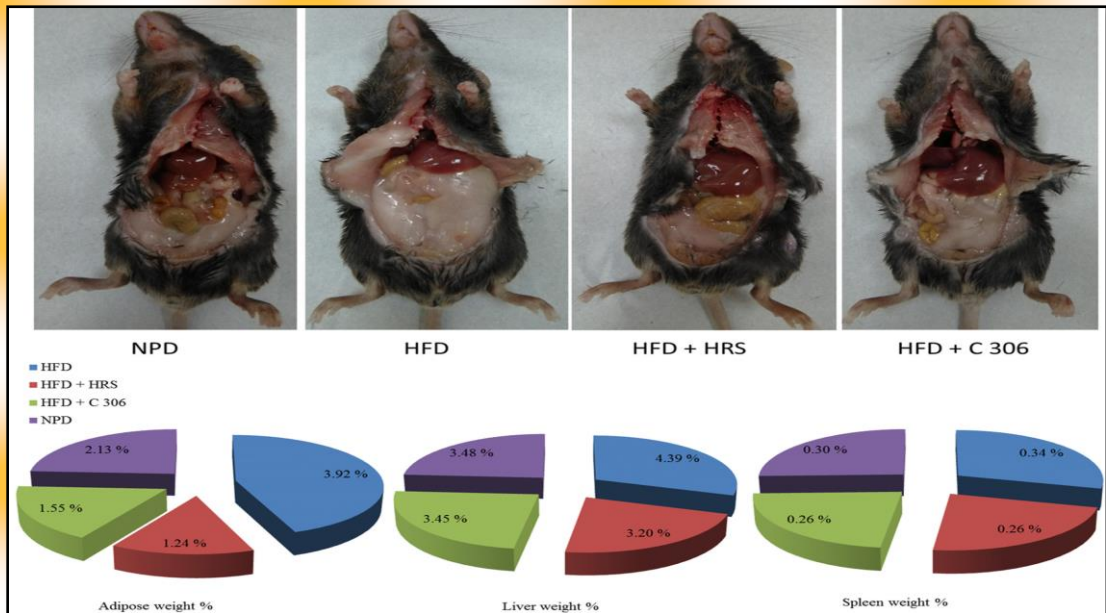
### Health benefits of mutant wheat variety in mice



**Figure 1:** Mice Body Weight reduced in HRS diet fed mice  
\*NPD-Normal pellet diet; HFD- High fat diet; HRS- High resistant starch wheat; 'C 306'- a good chapatti Indian wheat variety

Wheat lines	Mean In-vitro glycemic index (3 replicates)	Mean In-vitro glycemic index (2 round with 2 replicates)	In-vivo glycemic index (n = 5 mice) first round	In-vivo glycemic index (n = 5 mice) 2 <sup>nd</sup> round
'C 306' (P)	47 ± 1	51.7 ± 1.3	74.2 ± 0.25	75.7 ± 1.8
'TAC 28'	36 ± 1	35.8 ± 0.9	60.8 ± 1.03	59.8 ± 2.0
'TAC 35'	38 ± 1	38.4 ± 0.3	56.5 ± 0.75	57.4 ± 1.0
'TAC 74'	34 ± 1	41.3 ± 0.1	67.5 ± 0.87	68.7 ± 2.3
'TAC 75'	41 ± 2	46.5 ± 0.6	72.0 ± 0.63	-
'TAC 399'	47 ± 1	49.3 ± 0.6	73.9 ± 0.39	72.1 ± 0.9

**Figure 2:** In-vitro and In-vivo Glycemic index comparison in wheat varieties TAC 28 and TAC 35 having low GI.



**Figure 3:** Mice has less body weight, liver, spleen and gonadal fat deposition with HFD+HRS variety consisting of TAC 28 & TAC 35.

## UNIQUE SELLING PROPOSITION

- Proven nutritional and health benefits.
- High amylose content of ~75% and Resistant starch (RS-II) ~30% compared to ~2% in conventional varieties.
- Promotes healthy gut bacteria and increased and aids in production of small chain fatty acids (SCFA).
- High physiological benefits due to low GI.
- Prolonged shelf life ~2 years compared to ~1 year in conventional varieties.
- Numerous applications in food Industry.

## INTELLECTUAL PROPERTY

Application has been applied for the mutant wheat lines for protection under Protection of Plant Varieties and Farmer's Rights Act, 2001 (PPV & FR Act).

## LICENSING OPPORTUNITY

BCIL is looking for a suitable industrial partner for licensing of the technology.

## CONTACT:

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