BCIL

Biotech Consortium India Limited

IMPROVED WHEAT LINES- HIGH AMYLOSE, RESISTANT STARCH & LOW GI

TECHNOLOGY AVAILABLE FOR TRANSFER

UNMET NEED AND OPPORTUNITY

Wheat is the cornerstone of the Indian diet and plays a vital role in the nation's economic well-being. However, there's a potential drawback: food products made from wheat, rice, and maize tend to have a high glycemic index (GI). This means they cause rapid spikes in blood sugar levels after a meal (postprandial response). Conventional wheat, due to its high content of easily digestible starch, falls squarely into the high GI category (around 74). The consumption of such high GI foods is linked to an increased prevalence of various diet-related metabolic diseases. Researchers are actively developing improved wheat varieties with a focus to increase the levels of amylose or resistant starch within the wheat grains. High amylose starch functions similarly to dietary fiber, breaking down at a slower pace compared to regular starch. This translates to a significant reduction in the glycemic index of wheat products made with such high amylose varieties. Consequently, the potential benefits extend to a lowered risk of developing chronic diseases like diabetes, coronary heart disease, obesity, and even colon cancer.

UNIQUE SELLING PROPOSITION

- Proven nutritional and health benefits.
- High amylose content of ~75% and Resistant starch ~30% compared to ~7.5% in conventional varieties.
- Promotes healthy gut bacteria and increased and aids in production of small chain fatty acids (SCFA).
- High amylose and resistant starch is indicative of soluble dietary fibres and hold a good commercialization potential.
- High physiological benefits due to 25% low GI compared to conventional wheat line 'C306.
- Prolonged shelf life ~2 years of the grains and the grain flour was found to perform equal or better compared to the marketed flour.

TECHNOLOGY

A set of mutant lines showing variation in amylose and resistant starch were developed in Indian bread wheat (Triticum aestivum) variety, 'C 306' through ethylmethyl sulfonate (EMS) treatment of seed Two varieties "TAC 28" and "TAC 35" with high AC, RS and reduced GI ~25% were selected. The glycemic response of high resistant starch wheat was measured by both in vitro and in vivo experiments. Food product (Chapatti) quality made from high resistant starch wheat was examined based on the dough, baking, sensory, texture and physicochemical characteristics using different specified methods. These mutated wheat varieties demonstrated improved blood glucose levels, lowered blood pressure, improved lipid profiles, increased immunity and weight loss contributing to improved health.

Low GI| High Starch| High Amylose

Wheat sample	Amylose (%)	Resistant Starch (%)
'C 306' (P)	$26.2^{d} \pm 0.2$	$00.5^{e} \pm 0.2$
'TAC 28'	$73.4^{a} \pm 0.1$	$43.2^{a} \pm 1.9$
'TAC 35'	$68.6^{b} \pm 0.1$	$29.6^{d} \pm 0.9$

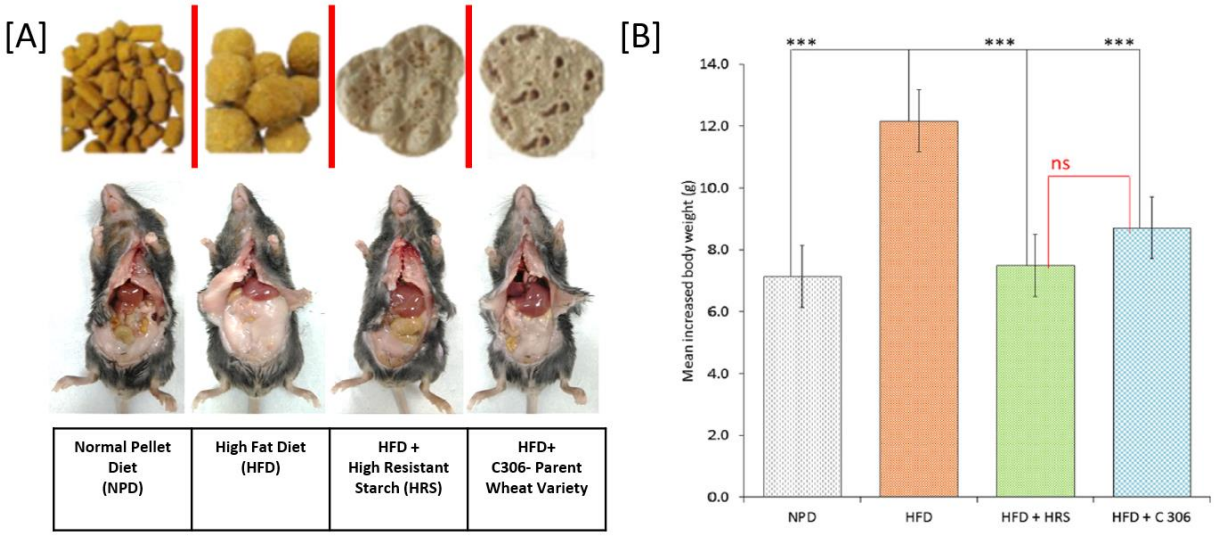

Figure 1: Body weight gain induced by high fat diet was prevented when the HRS-low GI wheat (TAC 35) was added to the high fat diet. [A] Fat deposition in mice intervened by various diets. [B] Difference increased body weight at 10 week

LICENSING OPPORTUNITY

BCIL is looking for suitable companies for licensing this technology.

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