

Development of resistant starch rich gluten free bars as functional food for celiac disease patients

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Project Objectives

- To extract the foxtail millet starch and prepare resistant starches from isolated starch.
- To characterize the chemical, functional and structural properties of resistant starches (RS).
- To develop gluten-free bars with different types of RS and analyze its quality characteristics.

Description

Foxtail millet starch was modified by physical treatments (annealing, ultra-sonication), chemical treatments (Ultra-sonication, heat-moisture treatment (HMT) and acid hydrolysis) and Lipid complexation (Pullulanase, β -amylase + vegetable oils) to prepare resistant starch 3, 4 & 5 respectively and they were characterized. Compared to the native starch (NS), modified starches particularly UAS contained the highest amylose (27.96%). Ultra-sonication prior to annealing had a predominant effect on resistant starch 3 (RS3) level (UAS-45.59%). Among the modified starches UAS with 45% of RS3 exhibited superior resistance to acidic (0.94), shear (0.68) stability. Later, influence of different chemical treatments on RS4 formation was investigated. Treatment of succinylated starch by citric acid (ASFS) had markedly increased the resistant starch 4 content. In vitro studies have confirmed that USFS exhibited the highest cholesterol binding capacity at both pH 2.0 (1.86 mg/g) and pH 7.0 (3.12 mg/g) owing to the chemical bonding and entrapment of cholesterol molecules in the starch matrix. Further, RS 5 content was increase to 21 % after enzymatic treatments followed by complexation with coconut oil. Gluten free cereal bars were prepared using 5 and 10 % of RS3, RS4 & RS5. Cereal bars with 5% RS content was well accepted by the sensory panel and is rich in protein, calcium, iron and resistant starch content.