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Development of Method to Enhance Resistant Starch Content in Rice Flour

Prajongwate Satmalee
UNU-Kirin Fellow from Thailand
Carbohydrate Laboratory

Rice is the main crop of Thailand, but the utilization and the value of the rice flour is limited. The digestibility of rice flour is high due to its low resistant starch (RS) content. The functions of the RS are similar to the dietary fibers. Many public health authorities and food organizations recognize RS as a beneficial carbohydrate. High and low amylose Thai rice flours (KC and ML, respectively) were used in this work, to increase the RS content in the flour. Pullulanase debranching followed by heat-moisture treatment (HMT) altered the pasting properties, which increased the shear stability to the flours. The gelatinization temperature determined by DSC was increased and the more retrogradation occurred in treated flour compared to the native flour. The SEM observation showed that the treatment did not change the morphology of the granules in both flours. The RS content of the treated KC flour was not significantly changed from 10.86% in native to 10.20 and 10.81% in both treatments, but the slowly digestible starch (SDS) content was significantly increased (from 1.07% to 3.27 and 3.25%). The treatment worked well with ML rice. The RS content in the treated ML flour was increased to 18.31% from 11.59% in native flour. This concluded that the treatment can increase the RS, while maintaining the granular structure and improve the pasting properties of the flour. Moreover the debranching and HMT process has different effect on the RS content, depends on the cultivar and the milling method of the rice flour. This can be used to improve functional properties of rice flour and also increase the value of rice flour.