

Effect of 1-butanol-Hydrochloric acid Hydrolysis on Rheological Properties of Glutinous Rice Starch

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Objective- The change of rheological properties of the glutinous rice starch due to the acid-alcohol chemical modification.

Methodology- The starch was modified in the presence of 1-butanol and concentrated HCl acid hydrolysis at room temperature (30°C) and low temperature (5 °C) for 0.5 -1.5 h. Rheological properties of these modified rice starches were studied and compared with the native rice starch. The dynamic rheological properties of native and modified starch such as complex modulus (G^*) and complex viscosity (η^*) as a function of angular frequency were measured.

Results–The glutinous rice starch contents very high amylopectin which confer stickiness in cooked rice. From rheological properties of native and modified starch, it was observed that there was a significant variation in complex modulus and complex viscosity of the modified starch. The room temperature modified starch showed higher viscosity change with the change of angular frequency than native starch and low temperature modified starch. The order of effect on the complex modulus was $M7 > M5 > M6 > M4 > M1 > M3 > M2$.

Conclusion- The results of the study indicate that the change in time and temperature during modification drastically effect the molecular structure of the native starch.

Keywords: 1-butanol-HCl Hydrolysis, Complex modulus, Complex viscosity, glutinous rice starch