

The commercial tempura flours' properties , gelatinization temperature range were 64.13-69.00°C, amylose content range were 19.08-20.91%, viscosity range at 95°C and 50°C were 130-175 and 203-275 B.U. respectively, and total setback viscosity were 40-145 B.U.

In modifying 50% starch slurry of rice flour by cross-linking with sodium trimetaphosphate ($\text{Na}_3\text{P}_3\text{O}_9$) at pH 11.0±0.1, it was found that the speed of stirrer affected the reaction, resulting the properties of modified rice flour differed from native flour. The stirrer's speed at 110 rpm was used for studying the effect of sodium trimetaphosphate's concentration at 1.4, 1.7 and 2.0% (dry basis) of flour, temperature at 50°C and 55°C and time at 1.5, 3.0 and 4.5 hrs. on cross-linking reaction. It was found that higher level of each factor increased the reaction accordingly and the interaction between 3 factors was synergistic and increased gelatinization temperature and stability during heating cycle but decreased viscosity at 95°C and 50°C and setback viscosity. Phosphorus (X) and amylose content (Y) were found to increase with cross-linking reaction and the relationship was $Y = 20.94 + 0.58X + 0.015X^2$ ($R^2=0.976$). The relationship between phosphorus (X) and gelatinization temperature (Y) was $Y = 71.99 - 0.61X + 0.15X^2$ ($R^2=0.974$) but between amylose content (X) and total setback (Y) was $Y = 2.80 \times 10^{12} e^{-0.0005X}$ ($R^2=0.947$). The modified rice flour with 2.0 % $\text{Na}_3\text{P}_3\text{O}_9$ at 50°C for 4.5 hrs. and 1.7% at 55°C for 4.5 hrs. were selected for the utilization in tempura flour. It was found that the product using only modified rice flour had gelatinization temperature and amylose content higher than the commercial tempura flour and viscosity properties were at the same levels. However, the protein content and the sensory qualities with the exception of fat absorption were lower than the commercial flour. The product using modified rice flour, wheat flour and corn flour at the ratio of 40:55:5 had gelatinization temperature and amylose content higher than the commercial flour, viscosity properties, protein content and sensory qualities at the same levels with the commercial flour but fat absorption was lower while overall acceptance was higher.

ภาควิชา เทคโนโลยีทางอาหาร
สาขาวิชา เทคโนโลยีการอาหาร
ปีการศึกษา 2533

ลายมือชื่อนิสิต
ลายมือชื่ออาจารย์ที่ปรึกษา
ลายมือชื่ออาจารย์ที่ปรึกษาช่วย