Partial substitution of rice flour with root and tuber flours and its effect on pasting behavior and quality of rice noodle

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Abstract

The effect of substituting rice flour with root and tuber flours on pasting behavior and quality of rice noodle was investigated. Partial substitution of rice flour with cassava flour, East Indian arrowroot flour and potato starch was done at rice flour-to-substituting flour ratios of 90:10, 80:20, 70:30 and 60:40 by weight. Pasting behavior, as monitored using a Rapid Visco Analyzer, revealed that among the flours studied, rice flour exhibited the highest pasting temperature, final viscosity and setback viscosity. The lowest peak viscosity was evidenced in rice flour paste while the highest peak viscosity belonged to that of potato starch. The root and tuber flours possessed lower pasting temperature, holding strength, final viscosity and setback viscosity, as compared to rice flour. Upon replacing rice flour with root and tuber flours, a decrease in pasting temperature was observed with increasing substitution level. Increased peak viscosity was demonstrated in the blended flour samples, especially those containing potato starch. An increased setback viscosity was shown in the samples with lower levels of potato starch substitution (90:10 and 80:20). Blending root and tuber flours to rice flour also posed a significant effect on textural properties of rice noodle ($p \leq 0.05$). As monitored using Texture Profile Analysis method, noodle made from rice flour only (control) had a hardness of 32706.3 gf. Upon adding root and tuber flours, noodle hardness tended to decrease with increasing substitution level. Only slight decrease in cohesiveness was demonstrated in those samples containing potato starch while cohesiveness of those samples substituted with cassava flour or East Indian arrowroot flour remained unaffected. Adhesiveness and springiness of the noodles made from blended flour were similar to those of the control.