

# Study on the Variations in Characteristics of Cassava Starch During the Chemical and Physical Modification Process Within Selected Locally Grown Varieties

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## **Abstract**

The study was carried out to improve functional properties of native starch by hydrothermal modification and cross-linking modifications. The starch was extracted from different varieties of cassava (Swarna, Kirikawadi, MU51, Shani, JS1, 565) and extracted cassava was dried at 55°C. The physical characteristics were analyzed of both native starch and modified starch. The highest starch yield was observed in MU51 variety (15.25%) and had more export potential. The hydrothermal modification was carried out for MU51 and Shani varieties. The modified starch had a significant reduction in solubility with native starch ( $0.22\pm 0.65\%$ ,  $0.83\pm 0.08\%$ ) ( $p < 0.05$ ). The swelling power ( $253.83\pm 0.014\%$ ,  $214.08\pm 0.26\%$ ) and water absorption capacity ( $113.77\pm 0.67\%$ ,  $100.09\pm 0.75\%$ ) of the modified starch was significantly higher than the native starch. The dual-modified starches had the highest Gelatinization Temperature ( $68.00\pm 0.00^\circ\text{C}$ ,  $70.00\pm 0.00^\circ\text{C}$ ) than native starches ( $P < 0.05$ ). The hydrothermal modified starches had a significant reduction in viscosity with native starch. The crosslinking modification was carried out for the MU51 variety with different concentrations of cross-linking agents (STMP/STPP) (0%, 6%, and 12%). The solubility of cross-linked cassava starch with 12% concentration ( $4.37\pm 0.28\%$ ) was higher than native starch ( $p < 0.05$ ). The swelling power of cross-linked cassava starch with 12% concentration ( $222.94\pm 0.54\%$ ) was higher than other samples ( $p < 0.05$ ). The native starch had the lowest GT value ( $67.00\pm 0.00^\circ\text{C}$ ) than cross-linked cassava starch ( $p < 0.05$ ). The cross-linked starch with 12% concentration had the highest FC value (1.96%) ( $p < 0.05$ ) and a notable decrease in viscosity when compared to native starch. The hydrothermal and cross-linked modified starch suitable for the harsh conditions in food processing technology than native starch.

**Keywords:** *Cassava starch, Cross-linking modification, Hydrothermal modification*

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