

## Abstract

Physico-chemical properties of starches from *Colocasia esculenta* var. *antiquorum* better known as Paanch Mukhi Kosu locally were studied in comparison with the starch from Corn (*Zea mays*), which are then incorporated in food products viz. Tomato Ketchup at 0% (S1), 1% (S2), 2% (S3), 3% (S4) of Colocasia starch and 2% of corn starch (S5). The starch content of Colocasia starch ( $93 \pm 0.52\%$  d.b) and corn starch ( $95.3 \pm 0.956\%$  d.b) were found to be almost same. Moisture content of the extracted starch samples were  $9.22 \pm 0.1\%$  d.b (Colocasia) and  $11.93 \pm 0.233\%$  d.b (Corn). Ash, protein and lipid content were found to be low in both the samples. Amylose content was comparatively lower in Colocasia ( $20.14 \pm 1.23\%$  d.b) than Corn ( $34.2 \pm 1.21\%$  d.b). Pasting properties showed pasting temperatures of  $84.1^\circ\text{C}$  and  $77.7^\circ\text{C}$  and peak viscosities to be 4007cP and 4083cP for Colocasia and Corn respectively. The granule size for Colocasia ( $2.25\text{-}3\mu\text{m}$ ) was smaller than Corn ( $10.98\text{-}15.85\mu\text{m}$ ). Crystallographic properties by XRD showed that both the starches were of A type. Thermal properties by DSC showed that the temperatures onset ( $T_o$ ), peak ( $T_p$ ) and conclusion ( $T_c$ ) were found to be  $27.46^\circ\text{C}$ ,  $52.51^\circ\text{C}$ ,  $111.33^\circ\text{C}$  for Colocasia and  $28.5^\circ\text{C}$ ,  $85.215^\circ\text{C}$  and  $122^\circ\text{C}$  for Corn starch. Solubility was higher in Colocasia ( $0.396 \pm 0.007\text{g}/100\text{ml}$ ) than Corn ( $0.055 \pm 0.0042\text{g}/100\text{ml}$ ); however swelling power was less,  $4.97 \pm 0.61\text{v/w}$  (Colocasia) and  $12.46 \pm 0.791\text{v/w}$  (Corn). The corn starch was purer than Colocasia starch with lower absorbance ( $0.058 \pm 0.0063$ ) at 630nm. Tomato ketchup had a lower preparation time and high product yield with the addition of starches. Colour values (L,  $a^*$ ,  $b^*$ ) increased with starch addition. The pH (S1-3.66, S4-3.89) and moisture (S1-47.52%, S4-62.76% w.b) seemed to increase with starch addition while acidity decreased (S1-1.55%, S4-0.49%). Fat content was a low in all the samples and ranged from  $0.56 \pm 0.02\%$  to  $1.043 \pm 0.008\%$ . Ash ranging from S5-  $3.13 \pm 0.8\%$  to S4-  $1.15 \pm 0.04\%$  decreased while carbohydrate and starch content seemed to increase ranging from  $8.6 \pm 0.36\%$  (S1) to  $15.17 \pm 0.47\%$  (S5) and  $1.08 \pm 0.023\%$  (S1) to  $3.6 \pm 0.26\%$  (S4) respectively. Storage study done on 0, 5, 15 and 25 days showed very little changes in pH, acidity and moisture. Texture characteristics showed that S5 had the highest firmness, consistency while S3 showed high cohesiveness and viscosity. Sensory evaluation showed S2 to be the most acceptable product with a score of  $7.35 \pm 0.04$  in a 9 point scale. Colocasia starch (1%) as such was found to be the most suitable. Microbial analysis showed negligible values. Colocasia starch being cheap and easily available, can easily be used as a thickener replacing other general starches in food products.