

## FUNCTIONAL PROPERTIES OF FROZEN COWPEA PASTE: EFFECTS OF FREEZING RATE AND FROZEN STORAGE

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### ABSTRACT

The functional properties of cowpea paste at three different temperatures (-30°C, -40°C and -50°C) and stored for 28 days at -18°C were studied. The fastest rate of freezing was achieved at -50°C (60 minutes), while it took 90 and 100 minutes to achieve freezing at -40°C and -30°C, respectively. The freezing of cowpea paste led to decrease in functional properties. Foaming capacity, emulsion and gelation capacities were negatively affected by freezing. Foaming capacity decreased from 6.2 ml/g in the unfrozen paste to 4.2 ml/g in samples frozen at -30°C and -40°C, and 5.7 mg in sample frozen at -50°C. Least gelation capacity concentration increased from 6% in the unfrozen paste to 10% in sample frozen at -30°C and to 8% in sample frozen at -40°C. Increase in least gelation concentration is indicative of decreased gelation capacity. Hot paste viscosity (HTPV) and cooked paste viscosity (CKPV) were negatively affected by freezing, irrespective of the freezing temperature. The decreases were most drastic in paste frozen at -30°C, HTPV decreased from 490 BU in the control to 260 BU and CKPV decreased from 480 BU to 170 BU. However, the functional properties of paste frozen at -50°C were the closest to those of the unfrozen cowpea paste used as the control. The tendency of cowpea starch to retrograde, leading to increased paste viscosity on cooling, was completely absent in all frozen paste samples irrespective of freezing temperature. Results of the study indicate that, with a sufficiently fast freezing rate the functional properties of cowpea paste could be appreciably preserved by freezing.

**Keywords:** Functional properties, cowpea paste, frozen storage.