

## Functional Properties of Germinated Brown Finger Millet Complemented with Bambara-nut Protein Concentrate and Carrot Flour

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### BACKGROUND AND OBJECTIVES:

The functional properties of germinated brown finger millet are the fundamental physico-chemical properties that reflect the complex interaction between the structure, molecular components, and composition and physico-chemical properties of food components (1). The knowledge of the functional properties will be useful in new product development and its application in the preparation of complementary foods, composite flour and baked products. Therefore, the study examined the functional properties of germinated brown finger millet complemented with bambara-nut protein concentrate and carrot flour.

### MATERIALS AND METHOD:

Brown finger millet, bambara-nut and carrot roots were purchased from Kure Ultra-market in Minna, Niger State. The brown finger millet were sorted, washed and then soaked in distilled water for 12hrs, at ambient temperature. The water was changed every 4hrs to avert fermentation. The soaked brown finger millet were distributed on jute bags and allowed to germinate for 24hrs while water was sprinkled on it every 3hrs. After germination, it was oven dried for 12hrs, then milled. Method by (2) with minor alterations was used in the production of bambara-nut protein concentrate. Functional properties was determined according to (3). The analyses were conducted in triplicates and data were subjected to one-way analysis of variance.

### RESULTS AND DISCUSSION:

From the results obtained in table 1, the water absorption capacity of the blends varied from 2.15 to 3.55 g/cm<sup>3</sup>, though there was no significant different ( $p > 0.05$ ) between blend A and B. However, control was significantly different ( $p < 0.05$ ) from the blends. Oil absorption capacity of the blended samples ranged from 1.52 to 3.87 g/cm<sup>3</sup>, no significant different ( $p > 0.05$ ) across the blends except for control. The gelation capacity varied from 6.00 to 8.00 g/cm<sup>3</sup> with blend B having the utmost gelation capacity. The foaming capacity varied from 5.95 to 11.95 g/cm<sup>3</sup> with blend C having the highest foaming capacity of 11.95 g/cm<sup>3</sup> and blend A having the lowest value. However, there was significant different ( $p < 0.05$ ) across the blends. The bulk density varied from 0.26 to 0.60 g/cm<sup>3</sup>, there was no significant different ( $p > 0.05$ ) across the blends except for control with the least value.

### CONCLUSION:

Sample B (65% germinated brown finger millet flour, 10% bambara nut protein concentrate, 25% carrot flour) was the best in respect to functional properties of the formulated blends.

**Table 1: Functional properties of the blends and control (commercial product)**

Parameter	A	B	C	D
WAC ( $\text{g}/\text{cm}^3$ )	$2.15^c \pm 0.05$	$2.15^c \pm 0.05$	$2.55^b \pm 0.05$	$3.55^a \pm 0.05$
OAC ( $\text{g}/\text{cm}^3$ )	$1.71^b \pm 0.05$	$1.68^b \pm 0.05$	$1.52^b \pm 0.08$	$3.87^a \pm 0.05$
Gelation (w/v)	$5.95^b \pm 0.05$	$7.95^a \pm 0.05$	$5.95^b \pm 0.05$	$5.95^b \pm 0.05$
FC (%)	$5.95^d \pm 0.05$	$9.95^b \pm 0.05$	$11.95^a \pm 0.05$	$7.95^c \pm 0.05$
Bulk density ( $\text{g}/\text{cm}^3$ )	$0.60^a \pm 0.05$	$0.60^a \pm 0.05$	$0.56^a \pm 0.05$	$0.26^b \pm 0.05$

**KEYS**

**A:** 60% germinated brown finger millet flour, 10% of bambara nut protein concentrate, 30% carrot flour.

**B:** 65% germinated brown finger millet flour, 10% bambara nut protein concentrate, 25% carrot flour.

**C:** 70% germinated brown finger millet, 10% bambara nut protein concentrate, 20% carrot flour.

**D:** Control (Commercial product).

**WAC**= water absorption capacity; **OAC**= oil absorption capacity; **FC**= foam capacity.

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