FUNCTIONAL PROPERTIES OF RICE, COMPLEMENTED WITH PIGEON PEA PROTEIN CONCENTRATE AND CARROT FLOUR

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BACKGROUND AND OBJECTIVES:

The functional properties of complementary foods are the fundamental physico-chemical properties that reflect the complex interaction between the structure, molecular components, and composition of such food (1). The knowledge of the functional properties is very useful in new product development and its application in the preparation of complementary foods. Therefore, the study examined the functional properties of rice, complemented with pigeon pea protein concentrate and carrot flour.

MATERIALS AND METHOD:

Local rice, pigeon pea, carrots and commercial product were procured from Kure Ultra-Modern Market, Minna, Niger State. The pigeon pea seeds were cleaned and then soaked in distilled water for 6hrs, at ambient temperature. The water was changed every 2hrs to avert fermentation. The soaked pigeon pea were distributed on jute bags and allowed to germinate for 48hrs with sprinkling of water at intervals. The germinated pigeon peas were dried using solar drier for 48h and then milled. The protein extraction was carried out as described by Chandi and Sogi (2007), with minor alterations. Functional properties were determined according to (Onwuka, 2018). 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 bulk density of the formulated blend varied from 0.26 to 0.73%. Blend A had the least bulk density. Diet of lower density is required for infants to allow them swallow it with ease without choking or suffocation (4). The water absorption capacity was significantly higher ($P<0.05$) in blend D followed closely by blend C. Blend A with the highest rice content of 70% had the least WAC which could be attributed to the higher ratio of rice in the blend in comparison to other blend samples. Oil absorption capacity is an indication of the rate at which the protein binds to fat in food formulations. High OAC of flours suggests the presence of polar amino acids. The control had the best solubility index (74.05%) followed by blend C

(7.02%) which was significantly higher (P<0.05) than other blends. The higher the ratio of the carrot flour in the blend, the higher the solubility index. However, there was reduction in foaming capacity as the carrot content increased from 20 to 30% with blend A having the value of 8.92% which was significantly higher (P<0.05) compared to other blends. Gelation capacity of the blends varied from 2.00 to 8.00g/cm^3 with blend C significantly higher in value than other blends.

CONCLUSION AND RECOMMENDATİON(S):

Blend C (60% rice flour, 10% pigeon pea protein concentrate and 30% carrot flour) has the fit functional properties for the formulated blends. There is a need to determine the blends storage stability (Shelf life).

Table 1. Functional properties of the formulated blends

Parameter	A	B	C	D
Bulk Density (g/ml)	0.68^{b}±0.01	0.71^{ab}±0.07	0.73^{a}±0.07	0.26^{c}±0.02
WAC	3.59^{d}±0.01	3.69^{c}±0.01	4.52^{b}±0.02	5.82^{a}±0.03
OAC	2.51^{a}±0.02	1.82^{c}±0.02	2.10^{b}±0.14	2.52^{a}±0.03
GC (%)	2.00^{c}±0.01	2.00^{c}±0.03	8.00^{a}±0.01	6.00^{b}±0.02
FC (%)	8.92^{a}±0.01	3.42^{b}±0.03	1.50^{c}±0.02	0.63^{d}±0.02
Solubility index (%)	5.02^{d}±0.03	6.02^{c}±0.03	7.02^{b}±0.02	74.07^{a}±0.03
Swelling Power	7.56^{b}±0.01	7.67^{a}±0.03	7.12^{c}±0.02	6.43^{d}±0.04

Values are means ± standard deviation of triplicate determination. Values in the same row with different superscripts are significantly different (p≤0.05).

KEYS

A= 70% rice flour, 10% pigeon pea protein concentrate and 20% carrot flour,
B= 65% rice flour, 10% pigeon pea protein concentrate and 25% carrot flour,
C= 60% rice flour, 10% pigeon pea protein concentrate and 30% carrot flour,
D= Control (Commercial Product).

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