

Nutritional analysis and sensory evaluation of crab shell fortified bread

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Bread is a baked staple food made from wheat flour, fat and sugar but low in micronutrients especially when produced from refined flour⁽¹⁾. Crab shell is an animal waste product thrown away in many countries despite its high mineral content. It has potential for food fortification because of its nutritive component like essential vitamins and dietary minerals and therefore will reduce unnecessary use of landfills⁽²⁾. Bread was produced from the three flour blends and the 100% by substituting clean dry crab shell powder with wheat flour in the following ratios: 10%:90%, 20%:80%, crab 30%:70% ;100% wheat flour as control and coded CAN, BAN, CAD and DAN respectively. The blends were baked using the straight dough method⁽³⁾ Proximate (Moisture content, protein, fat, carbohydrate) and mineral (calcium, magnesium, potassium, analyses were carried out using standard procedure (AOAC 2005)⁽⁴⁾. Mineral analysis was carried out with Atomic Absorption Spectrometer Agilent 240 AA model. All analyses were done in triplicates and mean, and standard deviation were determined.

Proximate analysis result was within this range - moisture content, ash, protein, fat, crude fibre, total carbohydrate, and energy value range were found as follows respectively- 1.12 -1.16 %; 47.23–47.41 %; 0.62- 0.66 %; 2.96–3.15 %; 1.84–1.88 %; 45.93–46.04 % and 197.1–197.18 kcal respectively.

Mineral analysis shows that BAN contains the highest calcium with 317.48–319.56 mg/L; CAD is lowest with 53.57 mg/L; Magnesium is highest in CAN 51.05–51.10 mg/L lowest in CAD 13.69–13.68 mg/L; potassium is highest in CAN 50.23 -57.23 mg/L; lowest in DAN 32.22 -33.15 mg/L; sodium is highest in CAN 110.53 -112.05 mg/L and lowest in DAN 51.86–52.87 mg/L. Sensory evaluation indicated significant difference between the control sample BAN and CAD but not CAN. BAN and CAD were not significantly different from each other for all the parameters. Most of the sensory properties for the experimental samples were significantly different from the control. Result showed that CAN is the most acceptable in terms of aroma with a mean score of 6.7, while BAN is the least preferred in terms of Aroma with mean score of 5.2. CAN is the most preferred taste and colour with a mean score of 6.9 and 8.0 respectively. Increase in wheat flour in the blend, increased calcium, potassium and sodium contents. On contrary, magnesium content reduced with increased wheat flour and reduced crab shell po. However, DAN did not follow any trend. This may be due to mineral interaction. This study indicates that better nutritional quality and acceptable bread can be produced from wheat-crab shell blends with higher nutritional value. Blend CAN-Crab shell bread can be recommended for prevention of Osteoporosis and Arthritis in elderly due to the high content of calcium.

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