Effect of Roasting Temperature on the Proximate, Mineral and Antinutrient Content of Pigeon Pea (Cajanus cajan) Ready-to-Eat Snack

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Abstract : Pigeon pea is one of the minor leguminous plants; though underutilised, it is used traditionally by farmers to alleviate hunger and malnutrition. Pigeon pea is cultivated in Nigeria by subsistence farmers. It is rich in protein and minerals, however, its utilisation as food is only common among the poor and rural populace who cannot afford expensive sources of protein. One of the factors contributing to its limited use is the high antinutrient content which makes it indigestible, especially when eaten by children. The development of value-added products that can reduce the antinutrient content and make the nutrients more bioavailable will increase the utilisation of the crop and contribute to reduction of malnutrition. This research, therefore, determined the effects of different roasting temperatures (130 0C, 140 0C, and 150 0C) on the proximate, mineral and antinutrient component of a pigeon pea snack. The brown variety of pigeon pea seeds were purchased from a local market-Otto in Lagos, Nigeria. The seeds were cleaned, washed, and soaked in 50 ml of water containing sugar and salt (4:1) for 15 minutes, and thereafter the seeds were roasted at 130 0C, 140 0C, and 150 0C in an electric oven for 10 minutes. Proximate, minerals, phytate, tannin and alkaloid content analyses were carried out in triplicates following standard procedures. The results of the three replicates were polled and expressed as mean±standard deviation; a one-way analysis of variance (ANOVA) and the Least Significance Difference (LSD) were carried out. The roasting temperatures significantly ($P<0.05$) affected the protein, ash, fibre and carbohydrate content of the snack. Ready-to-eat snack prepared by roasting at 150 0C significantly had the highest protein (23.42±0.47%) compared the ones roasted at 130 0C and 140 0C (18.38±1.25% and 20.63±0.45%, respectively). The same trend was observed for the ash content (3.91±0.11 for 150 0C, 2.36±0.15 for 140 0C and 2.26±0.25 for 130 0C), while the fibre and carbohydrate contents were highest at roasting temperature of 130 0C. Iron, zinc, and calcium were not significantly ($P<0.5$) affected by the different roasting temperatures. Antinutrients decreased with increasing temperature. Phytate levels recorded were 0.02±0.00, 0.06±0.00, and 0.07±0.00 mg/g; tannin levels were 0.50±0.00, 0.57±0.00, and 0.68±0.00 mg/g, while alkaloids levels were 0.51±0.01, 0.78±0.01, and 0.82±0.01 mg/g for 150 0C, 140 0C, and 130 0C, respectively. These results show that roasting at high temperature (150 0C) can be utilised as a processing technique for increasing protein and decreasing antinutrient content of pigeon pea.

Keywords : antinutrients, pigeon pea, protein, roasting, underutilised species
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