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Nutrient and Antinutrient Composition of Bouillon Cubes Developed from Fermented Condiments of *Ricinus communis* L. Seeds

Olaide R. Aderibigbe[1], Chizobam H. Igwe[1], Sunday F. Awe[1], Barbara Sturm[2]

[1] *National Horticultural Research Institute, Product Development Programme, Nigeria*
[2] *University of Kassel, Agricultural and Biosystems Engineering, Germany*

Abstract

Fermented condiments are part of the diets of many African nations and, they serve as a good source of protein and other nutrients for rural populations. They are used as alternatives for expensive protein sources such as meat and egg in poor households. In Nigeria, these condiments are presented in slurry, paste or loose solid form and are usually wrapped in leaves. *Ricinus communis*, an oil seed plant that grows both in the tropical and temperate climate is one of the seeds processed into a fermented condiment and is locally known as "*ogiri*". The development of fermented bouillon cubes offers an opportunity to enhance the safety and attract more consumers to the product. This study therefore developed three samples of bouillon cubes (A, B and C) containing fermented *R. communis* seeds and binder (cassava starch) at ratio 20:5, 20:10 and 20:20, respectively. The bouillon cubes were subjected to proximate, total carotene, vitamin C, minerals and antinutrient analysis. The results showed that the protein and fat content decreased while the carbohydrate content increased significantly ($p < 0.05$) with increasing binder proportion. The protein content was 9.93 %, 7.04 % and 3.49 %, fat content was 29.33 %, 28.00 % and 22.77 % and carbohydrate content was 48.99 %, 52.46 % and 60.09 % for samples A, B and C, respectively. The total carotene increased with increasing binder concentration while the vitamin C did not vary significantly. As for the minerals, Na, K, Zn and Fe increased with increasing binder concentration while Ca did not vary significantly. Phytate was significantly higher in sample C (0.45 mg g^{-1}) than samples A and B (0.35 and 0.32 mg g^{-1}, respectively). In conclusion, the addition of cassava binder in the production of fermented bouillon cubes of *R. communis* produced products with decreased protein content, increased phytate content and, increased mineral and total carotene content. The use of high protein binders or blend of binders should be considered for the development of this novel product as they are known to be rich sources of protein.

Keywords: Bouillon cubes, fermented condiments, protein, *Ricinus communis*

Contact Address: Olaide R. Aderibigbe, National Horticultural Research Institute, Product Development Programme, Jericho G.R.A., 200031 Ibadan, Nigeria, e-mail: connecttolaide@yahoo.com