

ORIGINAL RESEARCH

Physico-Chemical, Sensory and Microbial Qualities of Yacon (*Smallanthus Sonchifolius*)-Based Oatmeal Energy Bar

Grace Ng'endo Miringa¹, Monica Mburu¹, Amos Kipkemoi Ronoh¹

¹ Institute of Food Bioresources Technology, Dedan Kimathi University of Technology, Nyeri, Kenya
<https://orcid.org/0009-0003-1639-8324>; monica.mburu@dkut.ac.ke; <http://orcid.org/0000-0002-5751-8949>; ronoh.kipkemoi@dkut.ac.ke, <https://orcid.org/0000-0002-6664-6037>

Corresponding Author's Email: grace.miringa23@students.dkut.ac.ke

Abstract

Due to the increase in the rate of non-communicable diseases, consumers are becoming more health-conscious, and there is an increased demand for highly nutritious diets. Yacon is a sweet-tasting Andean tuber considered a functional food due to its bioactive compounds, such as fructooligosaccharides. Yacon has been used to formulate many products, including yacon sweets, cupcakes with yacon flour and snacks made with yacon and banana flours, among others. There is limited research on the use of yacon to formulate energy bars. The aim of this study was to evaluate the physico-chemical, sensory and microbial qualities of yacon-based oatmeal energy bars. Energy bars were made using four oats-to-yacon powder mixtures in the following proportions: 100:00 (control), 95:5, 85:15, 75:25 and 60:40; a completely randomised design was used. Substituting oats with yacon powder led to a significant increase in ash, fibre and carbohydrate content and a decrease in moisture, protein, fat and total energy. The decrease in fat was desirable. The addition of 40% yacon powder led to a 67% decrease in fat content compared to the 100% oats energy bar. Yacon powder also led to a significant increase in polyphenol content, antioxidant activity, calcium and potassium. Polyphenol content increased by 33%, as compared to a 100% oats energy bar, with the addition of 40% yacon powder. There was a significant decrease in flavonoid content with increased yacon powder. This could be attributed to the processing conditions. On physical properties, pH and texture decreased while water activity and bulk density increased; low pH guarantees a long shelf-life. Consumer acceptability tests showed significant differences for all attributes except aroma, highlighting the treatment with 60:40 oats:yacon flour as having the highest scores for all attributes and intent to purchase. The energy bars were microbiologically safe, with yeast and moulds detected after 30 days. The yeast and moulds detected were below the standard limit (<100CFU/g), thus safe. Based on the results, making the energy bars with oats and yacon powder can be a great alternative use of the Andean tuber. It not only offers nutritional benefits but also microbial safety and satisfactory sensory characteristics.

Key words: Yacon, Energy bar, fructooligosaccharides, Physico-chemical, Oats