High-Protein Crispy Snack from freshwater Algae : A New Plant-Based Protein Alternative

Saritwat Jiarapong[1], Theewara Talernglap[1] and Watcharaporn Saenna[1]*

[1]*Princess Chulabhorn Science High School Buriram, Satuek, Buriram 31150, Thailand*

**E-mail: saritwatjiarapong@pcshsbr.ac.th*

Abstract

This research project aimed to develop a baked crispy snack using Spirogyra, a freshwater algae with high protein content, as the main ingredient. The objective was to create a healthier snack with higher nutritional value than conventional snacks, which are generally high in fat, low in protein, and contain many food additives. Spirogyra provides protein comparable to soybeans and some animal-based sources while also supplying vitamins, minerals, and dietary fiber. It is easy to cultivate, grows rapidly, and has minimal environmental impact, making it a promising resource for sustainable health food development. The product was formulated with Spirogyra as the primary ingredient and topped with roasted sesame seeds to enhance nutritional value while using health-conscious seasonings. The production process included raw material preparation, seasoning, baking, and packaging, followed by quality evaluation. Quality assessment focused on protein, fat, moisture, and ash content. The product contained 22.00±0.53 g of protein per 100 g, exceeding the target of at least 15.00 g per 100 g. The fat content was 2.70±0.28 g per 100 g, meeting the criterion of not exceeding 8.00 g per 100 g. The average moisture content after storage was 6.42±1.63 %, remaining below the 10% limit, while the average ash content was 16.91±0.35 %, indicating the total mineral content after ashing. The results demonstrate that the developed Spirogyra-based baked crispy snack successfully achieved the project objectives and hypotheses. The project also supports the Sustainable Development Goals (SDGs), particularly Goal 9, promoting innovation and sustainable industrialization, and Goal 12, encouraging sustainable consumption and production.

Keywords: Plant-based protein, Spirogyra