



Full Paper

Determination of Optimum Process Schedule and Nutritional Content of Vacuum-fried Asiatic Clam

Nora Tumaneng Garcia*¹, Mark Keneth C. Sumbillo¹, Arthur G. Ibañez², Denis V. Policar²

¹Department of Science and Technology Region II, Tuguegarao City, Cagayan

²Cagayan State University - Carig Campus, Tuguegarao City, Cagayan

Fresh Asiatic clams (*Corbicula manilensis*) from Region 2, Philippines, were processed using vacuum frying to develop a nutrient-dense and shelf-stable product. Process optimization at 100 °C, 700 mmHg, and a 6 kg batch load yielded the most favorable sensory attributes and the highest product recovery. The optimized treatment (T6) contained 28.66 g protein, 35.25 g carbohydrates, 25.72 g fat, 7.49 g ash, and 2.88 g moisture per 100 g sample. Shelf-life evaluation showed stability for up to four months under ambient conditions, with quality deterioration observed beginning at the fifth month. The product exhibited a low microbial load ($<1 \times 10^1$ CFU/g) and notable mineral content, particularly zinc and iron. These results demonstrate that vacuum frying effectively produces a nutrient-rich, safe, and shelf-stable clam-based product, with potential for extended shelf life through improved packaging.

Keywords: Vacuum frying, Asiatic clam, Process optimization, Nutritional composition, Shelf-life stability

Introduction

Vacuum frying is an emerging food processing technology that offers a promising alternative to conventional deep-frying methods. It operates under reduced pressure, typically ranging from 100 to 700 mmHg, and at lower temperatures, usually below 100 °C. This controlled environment allows the frying of food at temperatures well below those required under atmospheric conditions, resulting in improved retention of color, flavor, and nutrients

while minimizing oil absorption and oxidative degradation. Conventional frying methods, generally carried out at temperatures between 175 °C and 190 °C, tend to cause significant deterioration in the sensory and nutritional properties of food due to the breakdown of thermolabile compounds such as vitamins, pigments, and antioxidants. Under vacuum conditions, the boiling point of water decreases, permitting moisture removal at lower temperatures and thereby reducing the extent of thermal damage.

* Corresponding author.

E-mail addresses: nonggarcia@yahoo.com (N. T. Garcia, M. K. C. Sumbillo, A. G. Ibañez, D. V. Policar).

<https://doi.org/10.63225/nrcp.rj.2026.0053>

Received 17 February 2025; Received in revised form 27 May 2025; Accepted 24 November 2025

Available online 30 March 2026

2980-4728/ © 2026 NRCP Research Journal. All rights reserved.

