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Optimization of medium composition for enhanced chitin extraction from *Parapenaeus longirostris* by *Lactobacillus helveticus* using response surface methodology

(2013) Food Hydrocolloids 31 (2) PP. 392 - 403 Cited 3 times.

doi: [10.1016/j.foodhyd.2012.10.025](https://doi.org/10.1016/j.foodhyd.2012.10.025)

ABSTRACT:

Chitin extraction by biological way, using the lactobacilli *Lactobacillus helveticus*, is a non-polluting method and offers the opportunity to preserve the exceptional qualities of chitin and its derivatives. However, the major disadvantage of the fermentative way is the low efficiency of demineralization and deproteinization. The aim of our study is to improve the yield of extraction. Many factors, such as the initial concentration of carbon source, fermentation time, incubation temperature, inoculum size, shell size, volume and medium composition have been reported to influence the fermentation process and consequently demineralization and deproteinization efficiency. Based on the use of central composite design and response surface methodology ten factors with three levels each were examined to determine the optimal operational conditions of demineralization and deproteinization. The analysis of the obtained results showed that the optimal conditions of 98% of demineralization and 78% of deproteinisation are 171.4 g L⁻¹ of reducing sugars, 2.03 g of nitrogen source [(NH₄)₂Fe(SO₄)₂] and 1.29 g of calcium source (CaCl₂), used to ferment 4.84 g of shells, of 1.053 mm size heat treated at 120 °C, with 10 mL of inoculum (*L. helveticus*) incubated at 32.1 °C in 100 mL of juice date for 254.38 h (15 days)