Tropentag, September 14-16, 2022, hybrid conference

"Can agroecological farming feed the world?
Farmers' and academia's views"

Para-rubber seed kernel fermentation using *Aspergillus oryzae* and *Saccharomyces cerevisiae*: Targeting for aquafeed

Sudarat Chantakam[1], Chutima Tantikitti[1], Suppasil Maneerat[2]

[1]*Prince of Songkla University, Aquatic Science and Innovative Management Division, Thailand*
[2]*Prince of Songkla University, Dept. of Industrial Biotechnology, Thailand*

Abstract

Para-rubber is an important economic crop in Thailand, having cultivation area of up to 5.36 million acres and yielding a lot of rubber seeds. However, only a small portion of the para-rubber seed kernels (PRSK) is utilised and the remaining are left to spoil. The PRSK can be utilised as an animal feed ingredient if appropriate improvement processing methods are applied. Fermentation with eukaryotic microorganisms is a candidate method to enhance the nutritional value of the PRSK. This study therefore aimed at increasing nutritional value of PRSK by employing two-step fermentation with fungi, *Aspergillus oryzae* and yeast, *Saccharomyces cerevisiae*, respectively. The PRSK, original protein contents of 28.89 ± 0.03 % dry matter (DM) basis, was firstly boiled to remove cyanide which naturally contained in the seeds, then the oil was extracted using 95 % ethanol. The extracted samples were subsequently fermented with *A. oryzae* at concentrations of 0, 1, and 2 %, with distilled water added at 20, 40, 60, and 80 % (w/v), respectively for 192 h. The best combination of *A. oryzae* and distilled water levels was identified based on obtained proximate composition in the samples. The PRSK fermented with 1 % *A. oryzae* and 40 % distilled water (w/v) gave the best results which was then used for further fermentation. The second step was performed in a series of tests using *S. cerevisiae* yeast at 0, 2, 3, 4 and 5 %, sugar 0, 0.2, 0.3, 0.4 and 0.5 %, distilled water 0, 50, 66.67, 83.33 and 100 % (w/v) at 0, 24, 48, and 72 h, respectively, to obtain the suitable combinations of the factors. The results showed that 5 % *S. cerevisiae*, 0.5 % sugar, and 100 % distilled water (w/v) for 72 hours was a suitable factor combination for fermenting PRSK to enhance protein level at 45.71 ± 0.14 % DM basis. It can be concluded that this two-step processing method using *A. oryzae* and *S. cerevisiae* as reported above can be used to improve the nutritional value of PRSK that could be used as an aquatic feed ingredient to reduce feed cost for aquaculture production and ultimately benefit aqua-farmers.

Keywords: Aquafeed ingredient, Aspergillus oryzae, para-rubber seed, Saccharomyces cerevisiae, suitable fermentation conditions

Contact Address: Chutima Tantikitti, Prince of Songkla University, Aquatic Science and Innovative Management Division, 15 karnjanavanich rd., 90110 Hat Yai, Thailand, e-mail: chutima.t@psu.ac.th