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Enhanced anti-inflammatory activity of brown seaweed *Laminaria japonica* by fermentation using *Bacillus subtilis*Wen-Jung Lu¹, Hong-Ting Victor Lin¹, Guo-Jane Tsai¹, Chien-Te Chou^{1,2}, Hsin-I Hsiao¹ and Pai-A Hwang¹¹National Taiwan Ocean University, Taiwan²Genomics Research Center - Academia Sinica, Taiwan

Most studies on the anti-inflammatory effects of *Laminaria japonica* have investigated bioactive ingredients that have been extracted from *Laminaria* using organic solvents. However, to avoid the toxicity and environmental issues caused by the solvent used for extraction, increasing attention has focused on fermentation using microorganisms as a green bioconversion process for producing bioactive compounds. In this study, fermentation with *Bacillus subtilis*, where the cultivation parameters and nutrient additives were optimized to achieve the greatest inhibition of lipopolysaccharide (LPS)-induced nitric oxide (NO) production was found to enhance the anti-inflammatory effects of *L. japonica*. Fermentation by *B. subtilis* using a 5% (w/v) *L. japonica* suspension as the sole carbon source, 2% additional nitrogen source, a starting pH of 6, and incubation at 150 rpm at 37°C for 72 h yielded the best anti-inflammatory effects, as LPS-induced NO production decreased to 27.6% ± 5.2%. The macrophages treated with the fermented *L. japonica* product inhibited the LPS-induced production of reactive oxygen species (ROS) and NF-κB (p65) phosphorylation in a concentration-dependent manner. Thus, our results show that *L. japonica* products generated by an optimized fermentation process designed to enhance anti-inflammatory effects by decreasing ROS production, NF-κB (p65) phosphorylation, prostaglandin E2, and NO production in macrophages.

Biography

Wen Jung Lu is a PhD student of National Taiwan Ocean University, Taiwan. Her topic is about the antibiotic resistance of microorganisms, and also doing the bioactive compounds in algae. She has obtained the scholarship from National Science Council, Taiwan; the topic is 'Bioactivity of beta-1, 3-xylan extracted from seaweed by using beta-1, 3-xylanase express from *E. coli*. Moreover, she is working on the phycobiliproteins and also obtained the scholarship from the Haiden Foundation, Taiwan. She is a competent researcher and she can work well with teams.

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