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Effects of enzymatic hydrolysis and probiotic fermentation on anti-inflammatory ability of *Chlorella*

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The rigid cell wall of *Chlorella* cannot be easily digested and consequently lowered its nutritional value. Hydrolysis with cellulase and protease at 50oC promote the releasing of reducing sugar, lutein, chlorophyll, and peptides or free amino acid, suggesting the lysis of cell walls occurred. *Chlorella* hydrolysate was further fermented with *L. plantarum* subsp. BCRC 10069 at 37°C for 24 hr. The inhibition of LPS-induced nitric oxide (NO) and O^{2-} production in RAW264.7 cells were used to investigate the anti-inflammatory activity of the hydrolysates and their fermented samples. About 78.30% of NO and 76.72% of O^{2-} productions in LPS-RAW 264.7 cells were inhibited by *L. plantarum* subsp. BCRC 10069 fermented *Chlorella* hydrolysate. Probiotic fermented hydrolysates could inhibit 55.30% of interleukin 6 (IL-6) production and depress the tumor necrosis factor (TNF-α) from 364.80 ng/mL to 161.75 ng/mL, respectively. Further, the *Chlorella* hydrolysate and fermentation could increase interleukin 10 (IL-10) production. These phenomena suggested that hydrolysis and fermentation substantially facilitate the release of nutrients and decrease of ROS production. According to the data obtained, probiotic fermented *Chlorella* hydrolysates have higher potential to process into functional foods with anti-inflammatory ability.

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