

## Abstract

Soy sauce is a liquid condiment that is made from fermented soybeans with mold, wheat flour, brine water, bacteria, and yeast. Soy sauce fermentation includes two stages of fermentation which begins with *koji* fermentation and ends with *moromi* fermentation. *Koji fermentation* is a solid- state fermentation through the use of mold and it may last for 48 to 72 hours. Meanwhile, *moromi* fermentation is a submerged fermentation through the help of bacteria and yeast that may last from 3 months to 4 years. The long duration of the *moromi* fermentation is attributed to the high salt content, fluctuating fermentation temperature, and antagonistic relationships between microorganisms in the *moromi*. This is one of the problems due to the loss it caused in the soy sauce industry. There have been various studies regarding the acceleration of the *moromi* fermentation however the use of microorganism inoculation is still one of the most used methods. *Bacillus spp.* are one of the most predominant bacteria found in *moromi* fermentation. *Bacillus subtilis*, especially, has potential to accelerate the *moromi* fermentation by producing several important enzymes that will break down the substrates much faster. Therefore, this study aimed to investigate the potential effects of using *B. subtilis* as inoculum starter culture to accelerate the fermentation of soy sauce. There were two types of *moromi* samples in this study which were the control and the *B. subtilis* addition (BS). Both *moromi* underwent 4 weeks of fermentation at ambient temperature. After 4 weeks of fermentation, physicochemical analyses such as pH, total titratable acidity (TTA), total reducing sugar (TRS), and free amino nitrogen (FAN) were performed. There were significant differences ( $p < 0.05$ ) between control and BS on TTA, TRS, and FAN at week 2, week 0, and week 1 respectively. However, there were no significant differences ( $p > 0.05$ ) for each of the analyses after week 2. There were various factors that might cause these results such as high salinity, antagonistic relationship between microorganisms, and enzyme denaturation.

*Keywords: Bacillus subtilis, inoculated fermentation, accelerated moromi fermentation, physicochemical analysis*