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Title: Effect of Temperature on Biochemical Changes Induced by *Bacillus subtilis* (SDA3) During Starter Culture Fermentation of Soybean into Condiment (Soy-Daddawa)

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Abstract: In an attempt to upgrade the traditional fermentation technology of soybean into daddawa, the effect of fermentation temperature on the biochemical and organoleptic properties of soy-daddawa produced by starter culture was studied. *Bacillus subtilis* SDA3 previously selected as a good starter for soy-daddawa production was used to ferment sterile dehulled cooked soybeans at 25, 30, 35 and 40°C for 72 h. The viable cell counts of *B.subtilis* SDA3 increased throughout the 72 h fermentation process at 25 to 35°C while the counts decreased after the 24th h at 40°C fermentation. pH value increased throughout the fermentation with a rather low increase in the fermentation at 25°C. Relative proteolytic activity increased with fermentation, attained a peak at 48 h and then dropped in fermentations at 30-40°C. Proteolytic activity which was not detected by the 12th h increased thereafter till the end of the fermentation at 25°C. Free amino acid content increased throughout the 72 h fermentation at 30-40°C while an initial drop was observed in the first 12 h with subsequent increase till the end of the fermentation at 25°C. Alpha amylase activity increased, attained a peak at the 48 h and then dropped in 30 and 35°C fermentations. Alpha amylase activity increased throughout the 72 h fermentation at 25°C while at 40°C, the activity attained a peak at the 24th h and then dropped. Fermentation at 35°C gave the highest levels of proteolytic and alpha amylase activities, pH and free amino acids in soybean inoculated with *B. subtilis* SDA3. Organoleptically, soybean fermented by *B. subtilis* SDA3 at 35°C produced the best quality soy-daddawa as judged by a panel of regular soy-daddawa consumers. Fermentation at 35°C was therefore chosen as the optimised temperature for the production of soy-daddawa by *B. subtilis* SDA3 starter culture.

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