Indian Journal of Experimental Biology
Vol. 62, September 2024, pp. 730-746
DOI: 10.56042/ijeb.v62i09.8299

Bio-functional properties and anti-inflammatory activity on the RAW macrophage cell line of *Tungrymbai*, a traditional fermented soy food of Meghalaya

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Received 25 January 2024; Revised 03 April 2024

Tungrymbai is an ethnic fermented soy food that is popular amongst the Meghalaya's Khasi and Garo tribes. In our study, we tried to standardise the traditional fermented soy product with well-characterised *Lactobacillus* cultures and studied its bio-functionalities. *Tungrymbai*, a fermented soy product, was prepared and studied for up to eight days for its biofunctional properties, total phenolic contents, isoflavone bioconversion, and anti-inflammatory activity on cell culture study during the storage study. Two lactic acid bacteria, namely K4E (*Lacticaseibacillus rhamnosus* KX950834.1) and K14 (*Lactobacillus helveticus* KU644578.1), were used for the preparation of the *Tungrymbai*. The storage study of *Tungrymbai* was carried out for eight days and was sampled every two days for further analysis. The sensory scores were greater than six up to day 6, whereas beyond that point, the scores began to decline. The pH of the *Tungrymbai* decreased to 5.34 with an increase in storage time, whereas the acidity increased to 0.054% lactic acid. The LAB counts were found to be highest during the initial time of the study (7.83±0.33 log CFU/mL). The maximum level of ACE inhibitory activity was noted during the initial day of the study to be 56.70±1.35%. Anti-diabetic activities such as α-glucosidase, α-amylase, and anti-lipase activities were performed for *Tungrymbai*. The greatest level of α-amylase inhibition was 34.07±2.31% observed during the initial time of the study, whereas α-glucosidase inhibitory activity was found highest on the eighth day of the study to be 37.67±1.24%, and lipase inhibitory activity increased with an increase in storage time up to the sixth day of the study (22.23±0.18%), which significantly decreased on the eighth day of the study. Antioxidative activity was found highest on the sixth day of the study, i.e., 73.65±0.54%. The total phenolic content of *Tungrymbai* decreased with an increase in storage time and was found to be highest on the initial day at 2.08±0.031mg/mL. Aglycone isoflavones, i.e., Daidzein and Genistein were estimated for *Tungrymbai*, where Diadzein content decreased with an increase in storage time, while Genistein content increased up to the fourth day of the study as 38.16±4.84%, which was significantly decreased on the sixth and eighth days of the study, respectively. MTT tests revealed that the lowered dosage of *Tungrymbai* exhibited no cytotoxicity in Raw 264.7 macrophages cell line.

Keywords: α-glucosidase, α-amylase, Anti-lipase, Isoflavone, Phenolic contents, Lactobacillus