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Cytotoxic Activity against MCF-7 Breast Cancer Cells and Antioxidant Property of Aqueous Tempe Extracts from Extended Fermentation

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Abstract : During tempe fermentation, some chemical changes occurred and they contributed to sensory, appearance, and health benefits of soybeans. Many studies on health properties of tempe have specialized on their isoflavones. In this study, other components of tempe, particularly water soluble chemicals, was investigated for their biofunctionality. The study was focused on the ability to suppress MCF-7 breast cancer cell growth and antioxidant activity, as expressed by DPPH radical scavenging activity, total phenols and total flavonoids, of the water extracts. Fermentation time of tempe was extended up to 120 hr to increase the possibility to find the functional components. Extraction yield and soluble nitrogen content were also quantified as accompanying data. Our findings suggested that yield of water extraction of tempe increased as fermentation was extended up to 120 hr, except for a slight decrease at 72 hr. Water extracts of tempe showed inhibition of MCF-7 breast cancer cell growth, as shown by lower IC50 values when compared to control (unfermented soybeans). Among the varied fermentation timescales, 60-hr period showed the highest activity (IC50 of 8.7 ± 4.95 µg/ml). The anticancer activity of extracts obtained from different fermentation time was positively correlated with total soluble nitrogens, but less relevant with antioxidant data. During 48-72 hr fermentation, at which cancer suppression activity was significant, the antioxidant properties from the three assays were not higher than control. These findings indicated that water extracts of tempe from extended fermentation could inhibit breast cancer cell growth but further study to determine the mechanism and compounds that play important role in the activity should be conducted.

Keywords : tempe, anticancer, antioxidant, phenolic compounds
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