

Antioxidative and angiotensin I-converting enzyme inhibitory activities of sufu (fermented tofu) extracts

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Objectives

Traditional fermented soybean foods have long been an important nutritional staple in Asian societies. Recently, researchers have become increasingly interested in the physiological functionality of these foods. Some research has shown that many types of fermented soybean foods exhibit significantly stronger antioxidative activity than unfermented ones, yet there have been few investigations associated with such functions in sufu and tofuyo. Sufu is a fermented tofu product popular throughout China, while tofuyo, a similarly fermented tofu product considered to have originated in China, is commonly produced in Okinawa. Understanding the physiological functionality of sufu may help to improve the fermentation process required to produce a highly functional food product. In our study, antioxidative activity and angiotensin I-converting enzyme (ACE) inhibitory activity was analyzed in water extracts from four types of tofuyo and five types of sufu. ACE is an enzyme that increases blood pressure, and thus materials that inhibit ACE are considered to be useful for preventing hypertension.

Results

The antioxidative activities of the tofuyo and sufu extracts determined by the DPPH radical scavenging method are shown in Fig. 1. Antioxidative activity varied depending on the conditions of production, but all the sufu extracts except one sample showed higher antioxidative activities than the four tofuyo extracts. ACE inhibitory activities of the tofuyo and sufu extracts are shown in Fig. 2. All samples exhibited ACE inhibitory activity, and sufu displayed higher ACE inhibitory activity than did tofuyo.

Research showed a positive correlation between antioxidative activity and ACE inhibitory activity of the extracts from the nine samples. The SDS-polyacrylamide gel electrophoresis patterns in the extracts indicated that the molecular weights of most peptides were less than 10 kDa. Researchers estimated that samples with high antioxidative and ACE inhibitory activities also contained high quantities of small peptides. Significant variations in these activities of the extracts from several types of tofuyo and sufu were observed. Such variations might be closely related to the conditions of processing, *e.g.* the kind of microorganism used or the duration of fermentation. Thus by changing the fermentation conditions, researchers are able to produce many kinds of peptides with different activities.

It was shown that sufu contained highly active components and could be used as a functional food. Division researchers are continuing research to analyze the relationship between the conditions of processing and function.

Through continued research, researchers will be able to improve processing methods to produce highly active, functional sufu that will ultimately increase the demand for sufu products.

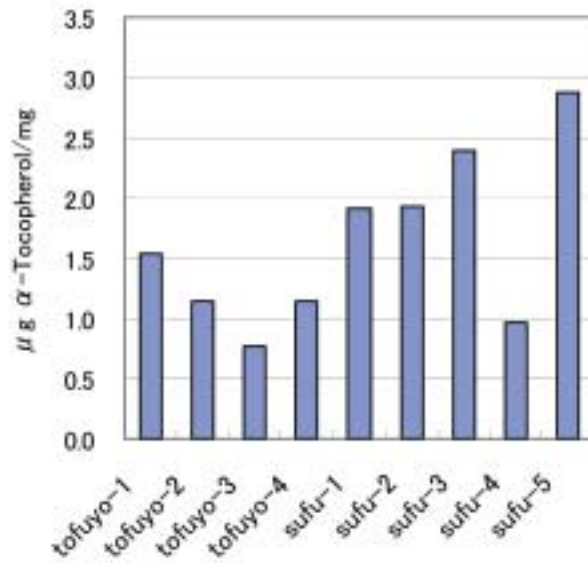


Fig. 1. Antioxidative activities of tofuyo and sufu extracts. Tofuyo 1 to tofuyo 4, various types of tofuyo from Okinawa, Japan; sufu 1 to sufu 5, various types of sufu from China.

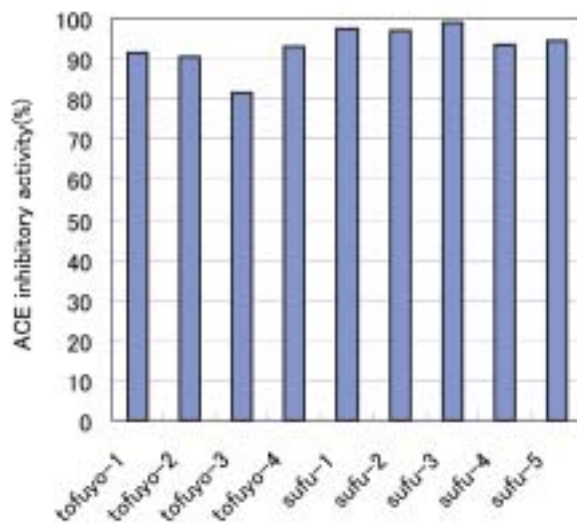


Fig. 2. ACE inhibitory activities of tofuyo and sufu extracts. Tofuyo 1 to tofuyo 4, sufu 1 to sufu 5, same as in Fig. 1.

References

Wang, L., Saito, M., Tatsumi, E. and Li, L. (2003): Antioxidative and angiotensin I-converting enzyme inhibitory activities of sufu (fermented tofu) extracts. *JARQ*, 37(2), 129–132.

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