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Herbal Transformation by Fermentation

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ABSTRACT

We herein show a dramatic change of herbal properties of the composition as well as function via fermentation of Cynanchi atrati Radix (family Asclepiadaceae). Cynanchi atrati Radix showed a high cytotoxicity against B16-F10 melanoma cell line, but the function of Cynanchi atrati Radix was completely changed into anti-melanin activity at very low concentration after Lactobacillus -fermentation. In addition, the compounds were drastically changed as shown in HPLC-based profile. Furthermore, this transformation has been achieved by only Lactobacillus -fermentation. This study proposes an strategy which we need to consider in the herb-derived material researches including pharmacopuncture.

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Natural fermentation has been adapted in long human being history. During probiotics fermentation, any materials including herbs could be modified as active ingredients with smaller molecule as well as less toxicity by enzymatic hydrolysis, while probiotics themselves can also produce metabolites having new properties [1]. We herein would like to show a dramatic change of herbal properties from the compositional as well as functional aspect. Cynanchi atrati Radix (family Asclepiadaceae) has been used for tumorous disorders in traditional Korean medicine. and its antimelanoma activity has been proved in an animal model [2]. As expected. *Cynanchi atrati* Radix (methanol extract) showed a high cytotoxicity against B16-F10 melanoma cell line, but its antimelanin activity was not obtained at non-cytotoxic concentration (1 ug/ml, Fig. 1C and E). After Lactobacillus-fermentation, the function of Cynanchi atrati Radix was completely changed into antimelanin activity at very low concentration (from 0.1 ug/ml) without cytotoxicity up to 2.5 ug/ml (Fig. 1D and F). In addition, the compounds were drastically changed as shown in HPLC-based profile (Fig. 1A and B).

It was well known that the distinctive variant compounds can be produced depending on the inoculated microorganisms [3]. We have tried the fermentations using different species of bacteria, but only *Lactobacillus*-fermentation product was fitted for anti-melanin function. This fact indicates the importance of proper choice of fermentation microorganisms focusing on the target of the final purpose or product. We would like to stress that researchers have to consider the fact in process of herb-derived material development including pharmacopuncture.

Declaration of competing interest

The authors declare no conflict of interest.

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Figure 1. Changes of chemical compositions and functions after fermentation. HPLC profiles of non-fermented *Cynanchi atrati* Radix (CAR) and *Lactobacillus*-fermented CAR (A, B) showing the main peaks disappeared (peak a, c and d) or increased (peak b), changes of their cytotoxicity (C, D) and anti-melanin effects (E, F) are presented.