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Effects of hardness on decoction of Chinese medicine

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Influence of hardness of water on the decoction of ingredients from herbs to decoction formulation was investigated. The effect of hardness of water on sensory qualities such as color, turbidity, taste, and flavor which affect patient compliance were also surveyed. Sho-saiko-to (Xiao-Chai-Hu-Tang, 小柴胡湯) was selected as a model prescription. Saikosaponnin b₂ (SA), baicalin (BA) and glycyrrhizic acid (GL) were selected as index ingredients for quantitative analysis. Commercially available natural mineral waters, A (hardness, 83 mg/L) and B (hardness, 1500 mg/L), and tap water (hardness, 80 mg/L, T) were used for preparing decoction formulations. The amount of BA and GL decocted were not changed among commercial and tap water, while the SA amount decocted in B was about half of that in A and tap waters. Further studies were carried out using water of which the hardness (hardness 0-1000mg/L) was variously adjusted. The SA amount decocted was not affected by hardness of water up to 1000 mg/L. Since the pH of decoction formulation using B is higher than those with A and T, a different experiment in which pH was variously changed was carried out. It was shown that pH was a cause of the lowering of SA by B. In the sensory test for 50 pharmacists, 80% of

them answered that color and turbidity of the decoction formulations prepared with B were lightened compared to those with A and tap waters. These results demonstrate that hardness of water has mineral influence for extraction of index ingredients from Sho-saiko-to, even though it may have a visual affect.