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Toxicological aspects of aconite alkaloids in decoction by using a microwave oven

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We have previously reported that some Kampo medicines such as Kakkonto could be decocted by using a microwave oven at the condition of 500W for 30 min instead of the conventional method.

In this study, we investigated toxic components in decoction of Keishikabushito by using a microwave oven to confirm the safety of this method. We decocted a daily dose of Keishikabushito containing 1 g of processed Aconite root (Bushi) by a microwave oven in 600mL water at 500W for 30 min and the conventional decoction device in 500mL water at 600W for 40 min, respectively. The contents of toxic components from Bushi (aconitine, mesaconitine, hypaconitine), and three other effective as well as toxic components (benzoylaconine, benzoylmesaconine, benzoylhypaconine), the hydrolysates of the three toxic components in heating process, were analyzed with HPLC method.

In both decoctions obtained by these methods, toxic components such as aconitine, mesaconitine and hypaconitine couldn’t be observed because of hydrolysis in heating process. Benzoylaconine, also not observed, may be further hydrolyzed. The contents of benzoylmesaconine and benzoylhypaconine were 0.68±0.06 mg, 4.75±0.15 mg in decoction decocted by a microwave oven, and 0.70±0.01 mg, 4.89±0.12 mg in decoction decocted by the conventional method, respectively.

There was no significant difference of the contents of toxic components between two methods. Decocting Keishikabushito by using a microwave oven is as safe as the conventional method. In addition, the decoction time can be saved. This new decoction method may be applied widely.

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Induction of Nrf2-regulated enzymes by falcarindiol isolated from notopterygium incisum extract leads to protection against oxidative and electrophilic stress

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Xenobiotic metabolizing enzymes, such as glutathione S-transferases (GSTs) and NAD(P)H:quinone oxidoreductase 1 (NQO1), play an important role in the detoxification of chemical carcinogens and suppression of oxidative stress. The induction of these detoxifying enzymes is regulated by a cis-acting sequence, referred to as the antioxidant response element (ARE). The most effective transcription factor that binds to ARE is the NF-E2 related factor 2 (Nrf2), a member of the NF-E2 family of basic leucine zipper transcription factors. Many lines of evidence indicate that Nrf2 activation enables adaptation to oxidants and electrophiles. In the present study, various herbal medicines were screened for inducers of Nrf2-regulated enzymes. This assay showed that Notopterygium incisum extract potently increased GST and NOQ1 at both mRNA and protein levels. According to bioactivity-guided cell-based assays, falcarindiol was isolated from the extract and identified as a novel Nrf2 activator. Several experimental models were used to understand effects of falcarindiol on normal cells. Pretreatment with falcarindiol activated Nrf2 in vitro and in vivo and conferred protection against menadione-induced cytotoxicity through enhancement of the menadione detoxification process and carbon tetrachloride-induced liver toxicity through suppression of lipid peroxidation. Dextran sulfate sodium (DSS) has been known to induce intestinal inflammation and nitrosative stress. DSS-induced colitis was suppressed in accordance with Nrf2 activation by falcarindiol. These results demonstrated that falcarindiol has a key role for Nrf2 in controlling the ability to withstand oxidative and electrophilic stress.