Asmachilca – an Andean herbal medicine with harmful but hidden side-effects *

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Background

• Asmachilca is a Peruvian medicinal herb preparation ostensibly derived from Aristegueta gayana (Wedd.) R.M. King & H. Rob. (Asteraceae: Eupatoricaceae). Deconstructions of the plant have a reported bronchodilation effect that is purported to be useful in the treatment of respiratory allergies, the common cold and bronchial asthma.

• During field work in Peru, asmachilca was observed to attract pyrrolizidine alkaloid-pharmacognosy moths (cf. Boppré 2011). 1,2-Dehydropyrrolizidine alkaloids (dehydro-PAs) are hepatotoxic, pneumotoxic and are genotoxic carcinogens. They can be rationally implicated in the etiology of chronically-deve-

• This study was undertaken to determine if commercial asmachilca samples, including fully processed herbal teas, contain potentially toxic dehydroPAs that may impact adversely on the health of consumers.

Methods

• Commercial samples of asmachilca plant material (Table 1) were examined morphologically and extracted for qualitative, quantitative and structural analysis using HPLC-esi(+)-MS and MS/MS, high resolution MS, and 1D and 2D NMR experiments.

• As a preliminary indicator of possible human exposure, hot water infusions of commercial asmachilca herbal tea bags were also analyzed for the presence of dehydroPAs.

Results

• Morphological evidence showed that the purchased asmachilca samples II and III, and sample V (Table 1) were sourced from at least two different plant species (Fig. 1).

• HPLC-esi(+)-MS and MS/MS revealed the characteristic similarity of the asmachilca samples comprising two distinct suites of dehydroPAs including the major presence of the dehydroPA monooesters rinderine (4) and supinine (6) and their N-oxides (Figs 2, 3).

• Sample V did not contain supinine or its N-oxide. This is consistent with morphological distinctiveness and confirms that it is a different plant species.

• The pharmacognosy moths proved to be a reliable bioindicator of the presence of toxic 1,2-dehydropyrrolizidine alkaloids.

• Asmachilca preparations lack standardization, and recipes for utilization of the plant vary.

• Exposures to high doses of dehydroPAs are known to cause diagnostic hepatic sinusoidal obstruction syndrome (hepatic veno-occlusive disease) while diseases such as cirrhosis, pulmonary arterial hypertension and various cancers associated with chronic low level exposures are generally not apparent without epidemiological studies (Edgar et al. 2015).

• The unequivocal determination of potentially toxic dehydroPAs in dried and fresh plant material sold as asmacilla, and in Asmachilca herbal teas indicates a potential health risk to consumers.

• Tisanes made using asmacilla expose consumers to amounts of dehydroPA in excess of existing regulations and/or recommendations in various countries (e.g., 0.1 μg/day (Germany); 0.007 μg/kg BW/day (UK); 0.1 μg/kg BW/day (Netherlands); and 1 μg/kg BW/day (Australia/New Zealand) (EMA 2014).

Future research needs

• Plant species used to prepare asmacilla need to be unambiguously identified and complete phytochemical characterization needs to identify beneficial bioactives (if any).

• Asmachilca use patterns and epidemiological studies needed to determine risks and benefits.

References


