

Effect of Rasashastra preparation techniques for detoxification of minerals

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Abstract

Rasashastra purification techniques are well-known among the Ayurvedic physicians as traditional methods for the removal of toxic metals from the mineral sources. However, possible retention of toxic metals in the Rasashastra drugs could have adverse impact on human health. Therefore, it is very essential to investigate the effectiveness of mineral purification used in Rasashastra preparation techniques. Thus, in the current study, chemical alterations of two selected minerals biotite mica and orpiment during traditional drug preparation were examined by following the traditional methods. Biotite alterations were achieved conventionally by heating (1000 °C/1 h) and quenching (in cow urine) techniques, while orpiment samples were immersed in calcium hydroxide and ash gourd separately and heated at 80 °C – 100 °C for 3 h. Chemical characterization of the treated and untreated biotite- and orpiment-samples as well as for the liquid samples was done by AAS (Atomic Absorption Spectrophotometer), ICPMS (Inductively Coupled Plasma Mass Spectrophotometer), WD-XRF (Wavelength Dispersive X-ray Fluorescence) spectrometry, voltammetry and EDX (Energy Dispersive X-ray) analysis. Elemental composition of altered biotite at different stages of treatment showed removal of trace cations such as Cs, Li, Rb, Pb, Sn and Tl. However, the removal of some elements such as Zn, Mn and Co from biotite was negligible. It was revealed that basic medium (calcium hydroxide) can remove more arsenic from the orpiment samples than that of acidic medium (ash gourd and lemon). However, the treated orpiment products contained high concentrations of As (III) with other toxic elements such as Pb, Hg, Sn and Se. According to the results it can be concluded that heating and quenching techniques used for the biotite alteration in Rasashastra preparations play an effective role in the removal of toxic elements. However, the traditional treatments used for the orpiment detoxification may not be sufficient.

Keywords: Rasashastra, detoxification, trace elements, biotite, orpiment

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