

Abstract No: MR-03

Beneficial functions of plant materials used in *shodhana* process of mercury in Ayurveda *Rasashastra*

T. A. N. R. Gunaratna^{1,2}, W. R. M. de Silva^{3*}, P. K. Prajapati⁴ and K. M. N. de Silva³

¹Gampaha Wickramarachchi Ayurveda Institute, University of Kelaniya, Sri Lanka

²Faculty of Graduate Studies, University of Colombo, Sri Lanka

³Department of Chemistry, University of Colombo, Sri Lanka

⁴All India Institute of Ayurveda, University of Delhi, India

rohini@chem.cmb.ac.lk*

Shodhana process in *rasashastra* is a mandatory process for each material prior to use in herbo-mineral pharmaceutical preparations. Although different types of mercury (Hg) *shodhana* processes are described in *rasashastra*, in Sri Lanka, Ayurveda herbo-mineral manufacturers use a three-step method with *Allium sativum* extract, *Piper betel* extract and the decoction using *Terminalia chebula*, *T. bellerica* and *Phyllanthus emblica*. Although this method is well-known within the Ayurveda community, there are no research evidences available to identify the support and the functions given by the plant materials in the mercury *shodhana* process. Therefore, this research was carried out to analyse the elemental changes that would occur to commercially available mercury during the *shodhana* process. *Shodhana* process was carried out as mentioned in the *Rasa Jala Nidhi* textbook (volume I) of *rasashastra* literature under the mercury section (eighth process). As the *shodhana* process involves three steps, there were four samples to be analysed namely, crude mercury, first step completed Hg, second step completed Hg and final step completed Hg. Samples were microwave digested using HNO₃: HCl in 3:1 ratio and diluted prior to the Inductive Coupled Plasma Mass Spectroscopy (ICPMS) analysis. These four Hg samples were then, subjected to ICPMS analysis. Standard 2A was performed to check Ag, Al, As, Ba, Be, Cd, Co, Cr, Cs, Cu, Fe, Ga, K, Li, Mg, Mn, Ni, Pb, Rb, Se, Sr, Tl, U, V, Zn elements and standard 2A Hg was performed to check Hg element. Cu, As and V were measured in He gas mode and rest were measured in no gas mode. The analysis was carried out in triplicate. Origin and R software were used for the comparison. According to the results obtained, Mg, Al, Fe, Co, Zn, Cd, Ba and Pb were present in the crude mercury as noticeable elements, but the element levels were changed with each *shodhana* step. Most importantly, it clearly shows the reduction of Pb level from 2347.25 ± 0.01 ppb to 173.20 ± 0.02 ppb. Furthermore, trace elements such as Li, Ni, Ga and U were completely removed from mercury after the completion of *shodhana* process. The reason for the reduction of metal ions can be attributed to metal iron chelation, detoxification procedures with plant bioactive compounds such as organic sulphides, polyphenols and flavonoids. Therefore, these results reflect the benefit of *shodhana* process and clearly explains the use of plant extracts as a removal agent of unwanted metal ions, which are trapped in Hg.

Keywords: Mercury, Ayurveda, *Shodhana*, Plant extracts

Acknowledgment

This work was supported by the University Grants Commission, Sri Lanka under the research grant UGC/VC/DRIC/PG2018(I)/KLN/01