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Neutron activation; A simple technique to measure mercury and arsenic in Ayurvedic Drugs

Mercury and arsenic containing minerals are used widely as ingredients in Ayurvedic Drugs. The special branch in Ayurveda which deals with processing and therapeutic

use of mercury and other metals, minerals allied products is called Rasa Shastra. The treatment with Rasa preparations is considered to be superior in comparison to treatment with herbal drugs and surgical therapeutics since they are therapeutically effective even when administered only in small doses and produce therapeutic effects instantaneously.

This study reports on measurements of arsenic and mercury using neutron activation analysis for nine selected Ayurvedic drugs; Baddaraja Kalkaya, Mahmathupaha, Rmabana Rasa, Vijaya Kumara Kalkaya, Makaradvajaya, Sanda Vatiya, Mruthunjaya Vatiya, Suranvidura Vatiya and Garba Shanthiya obtained from the government and Private Manufacturers. Five of the said samples were further tested using emission transmission method of X-ray fluorescence (XRF) analysis. The measured values were then compared with those calculated using recipes in Ayurvedic Pharmacopoeia.

The values obtained for mercury ranged from 1.52% to 23.24%. A very high concentration of 95% was obtained for one sample. The arsenic concentration ranged from 1.23%-3.16%. Concentrations of both arsenic and mercury in preparations obtained from the government manufacturer showed a variation of less than 30% calculated according to Ayurvedic Pharmacopoeia. The results obtained from the two techniques were within 25% agreement except for two samples.