



Estimation of Arsenic and Mercury in a Polyherbal Formulation - Septiloc

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ABSTRACT

Herbal preparations are getting popular day by day as they are considered to be safe. Septiloc is also a herbal preparation which is useful in a wide range of wounds such as diabetic wounds, bed sores, ulcers, burns, post-surgical wounds etc. It was subjected to analysis by AAS-VGA for toxic heavy metals like arsenic and mercury. Levels of arsenic and mercury were estimated in ten different batches of Septiloc and evaluated with respect to permissible limit (PL) and provisional maximum tolerable daily intake (PMTDI). In most of the samples, As and Hg were either below the detection limit or below the PL and PMTDI. These results prove that Septiloc is a safe polyherbal preparation and is free from toxic effects of As and Hg.

Keywords: Arsenic, Mercury, Septiloc, AAS-VGA.

INTRODUCTION

Arsenic and mercury are considered to be the most toxic volatile heavy metals. Arsenic is reported to cause hypertension, peripheral arteriosclerosis, skin diseases and neurotoxicity^[1-4] whereas mercury causes neurological disorders, paralysis, digestive-tract inflammation, uremia, acrodynia and immunotoxicity.^[5-9]

Earlier researchers have reported the presence of As and Hg in various herbal preparations such as in ginseng products^[10]; natural drugs^[11]; traditional Chinese medicines^[12]; Dashmoola^[13]; mercury in *Smilax myosotiflora* herbal preparations and tongkat Ali hitam herbal preparations^[14]; arsenic poisoning from anti-asthmatic herbal preparations^[15] etc. These reports throw light on the fact that medicinal plants which are considered harmless and are used as starting material for any herbal product may also contain toxic metals like As and Hg. This study was done to assess and confirm the safety of Septiloc (a polyherbal preparation for non-healing chronic wounds) in relation to As and Hg levels.

MATERIAL AND METHODS

Samples of ten different batches of Septiloc (Table 1) were

procured from Venus Remedies Limited, Panchkula, India and were subjected to analysis by Atomic Absorption Spectrometer (AAS-VGA).

All the glasswares were of Borosil "A" grade. Deionised water was used throughout the study. All the chemicals used were of analytical grade (AR). Mixed working standard (1 and 10 microgram/ml) solutions were freshly prepared by diluting the stock solutions of 1000 microgram/ml (Merck India). Cold digestion for volatile heavy metals was followed and the method was developed and standardized in the laboratory. Weighed powdered sample (0.1 g) was digested in Erlenmeyer flask (100 ml) and the flask was left overnight after adding 10 ml of conc. Sulphuric acid. It was then incubated at 70°C in a water bath for one hour. The flask was then placed in an ice bath with constant shaking saturated aqueous potassium permanganate solution was added slowly. The process was continued till the colour of the permanganate persisted. After the flask reached room temperature, one ml of hydroxylamine hydrochloride (20 % w/v in distilled water) was added to reduce excess potassium permanganate. This solution was made to desired volume by deionized water and used for estimation of As and Hg by Atomic Absorption Spectrophotometer (AAS) with Vapour Generation Assembly (VGA).

RESULTS AND DISCUSSION

Levels of arsenic and mercury were estimated in ten different batches of Septiloc and evaluated with respect to permissible limits and provisional maximum tolerable daily intake. Arsenic was detected in five samples only and was found to

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be highest in SEP05 (0.28 ± 0.04 mg/kg) and lowest in SEP02 (0.05 ± 0.01 mg/kg). The US-FDA's allowable limits for arsenic are 0.5 ppm in uncooked muscle and 2.0 ppm in liver and other edible uncooked tissues. Results were below this limit ^[16] and Provisional maximum tolerable daily Intake (PMTDI) ^[17-20] of 0.10 mg/kg body weight in all the samples. Mercury was detected in seven samples only and was found to be highest in SEP05 (0.51 ± 0.06 mg/kg) and lowest in SEP09 (0.10 ± 0.02 mg/kg). It was below the permissible limit of 1.0 mg/Kg ^[21] and Provisional maximum tolerable daily Intake (PMTDI) ^[17-20] of 0.30 mg/kg body weight in all the samples. Mean levels were also within the safe limits (0.07 mg/kg for As and 0.18 mg/kg for Hg) and were found to be below the permissible limits and Provisional Maximum Tolerable Daily Intake (PMTDI). These results prove that Septiloc is a safe polyherbal preparation as far as As and Hg contamination is concerned.

Table 1 : As and Hg content in Septiloc

Sample Code	As (mg/kg)	Hg (mg/kg)
SEP01	0.09 ± 0.02	0.21 ± 0.03
SEP02	0.05 ± 0.01	0.12 ± 0.02
SEP03	BDL	0.30 ± 0.04
SEP04	BDL	BDL
SEP05	0.28 ± 0.04	0.51 ± 0.06
SEP06	0.20 ± 0.03	0.43 ± 0.03
SEP07	BDL	BDL
SEP08	0.11 ± 0.02	BDL
SEP09	BDL	0.10 ± 0.02
SEP10	BDL	0.13 ± 0.01

BDL : Below Detection Limit

Values are Mean $\pm$ S.D. of 3 readings each.

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