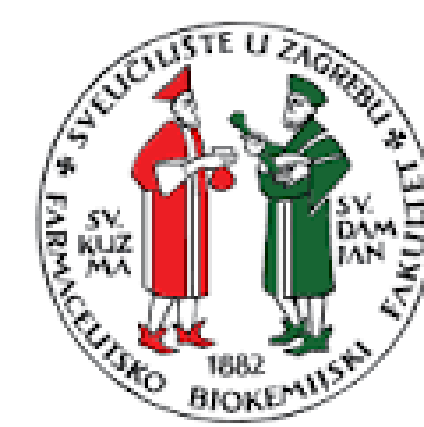


TRACE AND HEAVY METAL IMPURITY EVALUATION IN DIETARY SUPPLEMENTS USED IN THE TREATMENT OF INFLAMMATORY BOWEL DISEASE

PROCJENA ELEMENATA U TRAGOVIMA I TEŠKIH METALA KAO ONEČIŠĆENJA U DODACIMA PREHRANI KOJI SE KORISTE U LIJEČENJU UPALNIH BOLESTI CRIJEVA



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INTRODUCTION

Trace and heavy metal impurity in dietary supplements (DS) poses a serious potential risk to health. Furthermore, trace metals play a significant role in reactions that lead to the formation of the active chemical plant constituents and are responsible for their curative and toxic properties.

For all mentioned above, this study aimed to evaluate the content of metal impurity in DS containing one or more plant species used to alleviate the symptoms of inflammatory bowel disease (IBD): Indian frankincense, Green chiretta and turmeric.

SAMPLE



Rhizomes of turmeric
(*Curcuma longa* L.,
Zingiberaceae)



Indian frankincense
(*Boswellia serrata* Roxb.
ex Colebr., Burseraceae)



Green chiretta
(*Andrographis*
paniculata (Burm. f.)
Wall. ex Nees,
Acanthaceae)

Fifty-four collected samples were in different dosage forms: tablet, hard and soft capsule, tea mixture, bulk and tincture.

SAMPLE PREPARATION

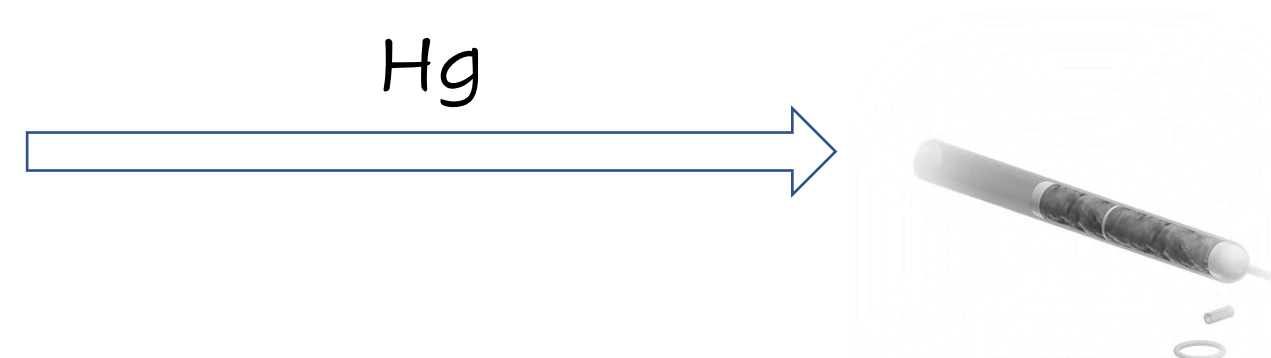
Approximately 200–400 mg of each sample was weighed into polytetrafluoroethylene (PTFE) vessels and dissolved in 9.0 ml of nitric acid (65–71% HNO₃, TraceSelect, Fluka) and 1.0 ml of hydrogen peroxide solution (30% H₂O₂, TraceSelect, Fluka). Digestion was carried out in a microwave oven (Ethos UP systems, Milestone; Sorisole, Italy) and the operating program included two steps. In the first step, the temperature was increased to 200 °C during 15 min (power 1800 W), while in the next step the temperature was held constant at 200 °C (15 min, 1800 W). Three replicated digestions were conducted for each investigated sample and three blanks were prepared in an identical way without the sample. Furthermore, the standard solutions of each metal were digested three times by the above described procedure.

METHODS

Total Hg content in the studied samples was analyzed using mercury analyzer.



Mercury analyzer



The contents of Ag, As, Ba, Cd, Co, Cr, Cu, Mo, Ni, Pb, Sb, Se and Sn were analyzed by GF-AAS.



AAS

Ag, As, Ba, Cd,
Co, Cr, Cu, Mo,
Ni, Pb, Sb, Se, Sn



RESULTS AND DISCUSSION

The obtained results of metal impurities were in a wide range (Table 1).

Table 1. Trace and heavy metal content in dietary supplements used in the treatment of IBD

Metal	Ag	As	Ba	Cd	Co	Cr	Cu	Mo	Ni	Pb	Sb	Se	Sn	Hg
	(µg/g)	(µg/g)	(µg/g)	(µg/g)	(µg/g)	(µg/g)	(µg/g)	(µg/g)	(µg/g)	(µg/g)	(µg/g)	(µg/g)	(µg/g)	(µg/kg)
mean	0.02	0.12	36.44	0.04	0.73	3.77	37.62	0.42	3.12	1.28	0.10	5.99	0.32	3.99
median	0.01	0.11	11.96	0.03	0.26	1.77	5.04	0.16	0.79	0.33	0.08	0.18	0.28	0.56
min	0.01	0.06	2.07	0.01	0.02	0.01	0.34	0.02	0.06	0.01	0.03	0.05	0.11	0.06
max	0.05	0.21	174.49	0.17	6.78	41.80	683.32	7.22	44.48	11.85	0.49	26.53	0.59	64.32

CONCLUSION

Trace and heavy metal impurity in DS used in treating IBD were borderline or higher than the safety level. Notably, Pb and Hg posed the highest risk.

Acknowledgements

This research was funded by Croatian Science Foundation, grant number UIP-2017-05-3949