

RESULTS OF RESEARCH OF PERSONAL HYGIENE PRODUCTS FOR SUITABILITY FOR SPECIAL PROCESSING IN ZONES OF CHEMICAL, RADIOACTIVE CONTAMINATION AND IN COMBAT CONDITIONS

N. Kurdil¹, O. Khudaikulova¹, B. Palamar³, O. Yushchenko², L. Ustinova⁴, A. Zulfigarov⁵, Y. Havrylko⁵, V. Bohaienko⁴



¹ L.I. MEDVED'S RESEARCH CENTER OF TOXICOLOGY MH UKRAINE

² SARAYA CO., LTD, HIGASHISUMIYOSHI-KU, OSAKA, JAPAN

³ BOGOMOLET'S NATIONAL MEDICAL UNIVERSITY, UKRAINE

⁴ UKRAINIAN MILITARY MEDICAL ACADEMY, UKRAINE

⁵ IHOR SIKORSKY KYIV POLYTECHNIC INSTITUTE, UKRAINE

Conflict of interest: The Authors declare no conflict of interest.

Corresponding author: Natalia V. Kurdil, PhD, Executive Director of L.I. Medved's Research Center of Toxicology MH Ukraine, Kyiv, Ukraine, tel. +380674020905, kurdil_nv@ukr.net

Aim: Research of personal hygiene products with detoxification properties by evaluating their formulation composition, emulsifying and complexing ability to heavy metal ions and radionuclides.

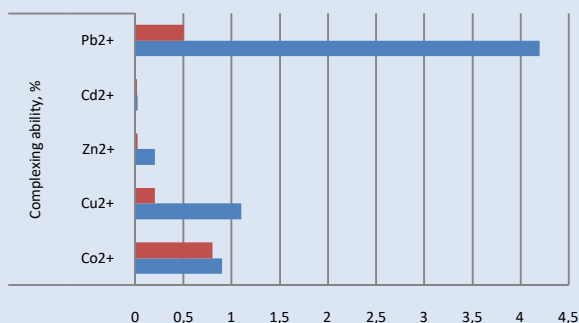
Materials and methods: The complex-forming ability of raw materials with heavy metal ions was determined in vitro, the content of heavy metals was determined by the method of atomic emission spectrometry with inductively coupled plasma (BS EN 13805:2014); determined the content of ¹³⁷Cs, ²³²Th, ⁴⁰K, ²²⁶Ra, ⁹⁰Sr in washings from the surface of the skin of hands treated with personal hygiene products. The means were tested for compliance with the standard on scintillation spectrometers of gamma radiation energy "SEG-001" "AKP-S" and beta radiation (SEB-01-70); methods used: MI 12-04-099 and MI 12-05-099.

Results: A high complexing ability of the pectin-containing "Liana" shampoo (Shokur A.A. technology) was found in relation to heavy metal ions (Co²⁺, Cu²⁺, Zn²⁺, Cd²⁺, Pb²⁺), as well as in their combined presence. It was established that the effectiveness of removing fatty impurities from the surface of the skin of the "Liana" product was 10.1 times higher than that of liquid soap (p<0.001). A high level of deactivating, degassing and antibacterial properties of the personal care products "Bastion" and "Bastion-M" was revealed.

Conclusions: Today, there is significant potential in the creation of formulations for special (sanitary) skin and hair surface treatment, containing natural complexing agents - detoxifiers, and can be used in special professional activities associated with the risk of exposure to CBRN factors.

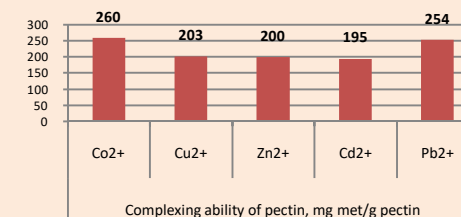
Results of studies of model environments No.1 and No.2 (combined sample) accordance to regulatory requirements for research methods – GOST 30178-96		
Indicator	Actual value, mg/dm3	
Object of study	model environments No.1	model environments No.2
Lead	0,602	0,010
Cadmium	not revealed	not revealed
Copper	2,806	0,050

Complexing ability of shampoo - control No.1 and No.2 in relation to heavy metal ions in their combined presence



Complexing ability, %					
	Co2+	Cu2+	Zn2+	Cd2+	Pb2+
Shampoo - control No.2*	0,8	0,2	0,02	0,01	0,5
Shampoo - control No.1*	0,9	1,1	0,2	0,02	4,2

Apple pectin



Pectin-containing deactivating shampoo "Liana"

