

PRESENCE OF PHTHALATES IN TOYS ANALYSED BY INSTITUTE OF PUBLIC HEALTH "DR MILAN JOVANOVIĆ BATUT" FOR A LAST FIVE YEARS PERIOD (2017-2021)

Milan Milenković^{1,2}, Milica Erceg^{1,3}, Zorica Blagojević^{1,4}, Danijela Đukić-Ćosić⁴, Biljana Antonijević⁴, Zorica Bulat^{4*}

¹Institute of Public Health of Serbia „Dr Milan Jovanović Batut“, Belgrade, Serbia

²University of Belgrade – Faculty of Pharmacy, Department of Drug Analysis, Belgrade, Serbia

³University of Belgrade – Faculty of Technology and Metallurgy, Department of Environmental Engineering, Belgrade, Serbia

⁴University of Belgrade – Faculty of Pharmacy, Department of Toxicology “Akademik Danilo Soldatović”, Belgrade, Serbia

*zorica.bulat@pharmacy.bg.ac.rs

Phthalates are commonly used plasticizers for plastic materials. Number of toys are made from plastic materials or are coated with plastic layer. No existence of chemical bond between phthalates and polymer layers means their easy migration. Children's exposure to phthalates is recognised as a threat to their health, since phthalates interfere with hormones level (endocrine disrupter chemicals – EDC), but can also induce hepatotoxicity, renal toxicity, allergic diseases and asthma and disrupt thyroid function. Rulebook on Toy safety (“Official Gazette of RS” No. 78/2019) was published in 2019, to set rules on toys safety and their free movement on the market. Phthalates are prohibited, individually or in combination in a concentration equal to or greater than 0.1% (m/m). Butylbenzyl phthalate (BBP), Di-n-butyl phthalate (DBP), Bis(2-ethylhexyl) phthalate (DEHP) and Diisobutyl phthalate (DIBP) are listed as prohibited, but DIBP restrictions start from July 2023 (1). In accordance with this legislative, laboratory of Institute of Public Health of Serbia “Dr Milan Jovanovic Batut” analyses part of these toys present on the market in Serbia. Total of 232 toy samples were analysed in the last 5 years (2017-2021), by HPLC-DAD. Phthalates are found in 40 samples (17.2%), 10 samples (4.3%) were bellow and 30 (12.9%) exceeded concentration of 0.1% (m/m). The most common elevated phthalates were DEHP and DBP. During 2019 and 2021 no phthalates are found in samples. Constant appearance of new toy manufacturers and control of existing ones demand monitoring of toys present on RS market, for the purpose of children's safety.

References

1. Rulebook on the Restrictions and ban of production, placing on the market and use of chemicals, “Official Gazette of the RS” No. 90/13, 25/15, 02/16, 44/17, 36/18, 09/20, and 57/22.

**PRISUSTVO FTALATA U IGRAČKAMA ANALIZIRANIM U INSTITUTU ZA JAVNO
ZDRAVLJE SRBIJE "MILAN JOVANOVIĆ BATUT" ZA PERIOD OD 5 GODINA
(2017-2021)**

**Milan Milenković^{1,2}, Milica Erceg^{1,3}, Zorica Blagojević^{1,4}, Danijela Đukić-Ćosić⁴,
Biljana Antonijević⁴, Zorica Bulat^{4*}**

¹Institut za javno zdravlje Srbije „Dr Milan Jovanović Batut“, Beograd, Srbija

²Univerzitet u Beogradu – Farmaceutski fakultet, Katedra za analitiku lekova,
Beograd, Srbija

³Univerzitet u Beogradu – Tehnološko-metalurški fakultet, Katedra za inženjerstvo
zaštite životne sredine, Beograd, Srbija

⁴Univerzitet u Beogradu – Farmaceutski fakultet, Katedra za toksikologiju
"Akademik Danilo Soldatović", Beograd, Srbija

*zorica.bulat@pharmacy.bg.ac.rs

Ftalati spadaju u najčešće korišćene plastifikatore za plastične materijale. Veliki broj igračaka izrađen je od plastike ili je plastificiran. Usled nepostojanja hemijske veze između ftalata i slojeva polimera, lako može doći do migracije ftalata. Izloženost dece ftalatima prepoznata je kao pretnja po zdravlje, budući da su ftalati klasifikovani u grupu jedinjenja endokrinih ometača (EDC), pošto utiču na promene nivoa hormona, ali takođe mogu dovesti i do oštećenja jetre, bubrega, poremećaja rada štitaste žlezde, alergijskih bolesti i astme. Pravilnik o bezbednosti igračaka Republike Srbije („Službeni glasnik RS” broj 78/2019) donešen je u cilju uspostavljanja pravila o bezbednosti igračaka i njihovom slobodnom kretanju na tržištu. Upotreba ftalata kao plastifikatora zabranjena je, pojedinačno ili u smeši, ako je koncentracija jednaka ili veća od 0,1% (m/m). Na listi zabranjenih ftalata su: butilbenzil ftalat (BBP), di-n-butil ftalat (DBP), di-2-etilheksil ftalat (DEHP), kao i di-izo-butil ftalat (DIBP) čija zabrana stupa na snagu od jula 2023. godine (1). U skladu sa postojećim propisima, laboratorija Instituta za javno zdravlje Srbije „Dr Milan Jovanović Batut“ analizira deo igračaka prisutnih na tržištu u Srbiji. Tokom prethodnih 5 godina (2017-2021) analizirano je ukupno 232 uzoraka igračaka. Ftalati su nađeni u 40 uzoraka (17,2%), od kojih je 10 uzoraka (4,3%) imalo ispod, a 30 (12,9%) preko granične koncentracije od 0,1% (m/m). Najčešće povišeni ftalati su DEHP i DBP. Tokom 2019. i 2021. godine u uzorcima nije utvrđeno prisustvo ftalata. Usled stalne pojave novih proizvođača igračaka, kao i kontrole već prisutnih, neophodan je redovan monitoring igračaka na tržištu RS radi bezbednosti dece.

Literatura

1. Pravilnik o ograničenjima i zabranama proizvodnje, stavljanja u promet, i korišćenja hemikalija, „Službeni glasnik RS“ broj 90/13, 25/15, 02/16, 44/17, 36/18, 09/20, i 57/22.