

# TEMPORAL VARIABILITY OF URINARY CONCENTRATIONS OF PHTHALATE METABOLITES, PARABENS AND BENZOPHENONE-3 IN A BELGIAN ADULT POPULATION

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## 1. INTRODUCTION

Phtalates are used as plasticizers and solvents in numerous daily life items, such as food contact materials, clothes, toys, personal care products (PCP), medical and pharmaceutical devices. Parabens can be found in PCP but also in food and pharmaceutical products where they are used for antimicrobial purposes. BP-3 (benzophenone-3) is a UV-filter mainly used in sunscreens but also in polymers and packaging to protect their content from the UV rays.

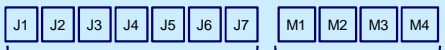
Phtalates, parabens and BP-3 are three chemicals classes of non-persistent endocrine-disrupting pollutants eliminated from the human body within a day. Since human exposure occurs daily, the question of the temporal variability of urinary concentrations of these pollutants was investigated.

## 2. MATERIAL AND METHOD

### Study Population

n = 32 (12 ♂ - 20 ♀)  
[20-73 years]  
11 urine samples / person

urine spot



short term variability      long term variability

### Analytical Method

Sample  
↓  
Enzymatic hydrolysis  
↓  
Solid phase extraction  
↓  
UPLC-MS/MS analysis  
(Quattro Premier XE, Waters, USA)

### Statistical Analysis

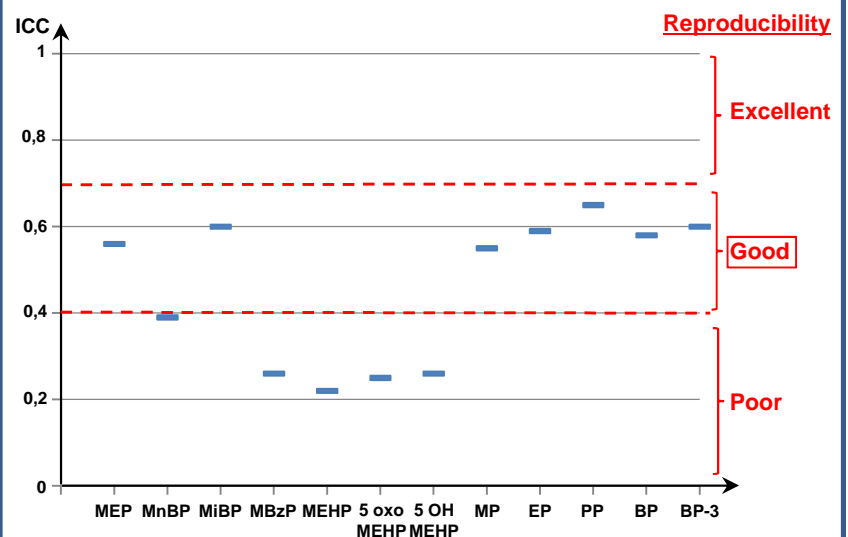
Determination of intraclass coefficient correlations (ICC) calculated by dividing the between-subject variance ( $\sigma_b^2$ ) by the total variance which is the sum of the within-subject variance ( $\sigma_w^2$ ) and the  $\sigma_b^2$ .

$$ICC = \frac{\sigma_b^2}{\sigma_w^2 + \sigma_b^2}$$

## 3. RESULTS AND DISCUSSION

Analyte	ICC	[95% Ci]	
Phtalates	MEP	0,56	0,44-0,74
	MnBP	0,39	0,28-0,61
	MiBP	0,60	0,49-0,77
	MBzP	0,26	0,18-0,51
	MEHP	0,22	0,15-0,48
	5 oxo MEHP	0,25	0,17-0,50
	5 OH MEHP	0,26	0,18-0,51
Parabens	MP	0,55	0,44-0,74
	EP	0,59	0,48-0,76
	PP	0,65	0,55-0,81
	BP	0,58	0,47-0,76
BP-3	BP-3	0,60	0,49-0,77

MEP = monoethylphtalate; MnBP = mono-n-butylphtalate; MiBP = mono-iso-butylphtalate; MBzP = monobenzylphtalate; MEHP = mono-2-ethylhexylphtalate; 5 oxo MEHP and 5 OH MEHP = major metabolites of MEHP; MP = methylparaben; EP = ethylparaben; PP = n-propylparaben; BP = n-butylparaben.



Reproducibility improves if 3 urine samples instead of 1 urine spot sample are collected with calculation of ICC based on the mean of the 3 results

## 4. CONCLUSION

A spot urine sample can provide imperfect but acceptable estimates of the exposure level of an individual for phtalates, parabens and BP-3.

For MBzP, MEHP and metabolites, estimation is better after collection of 3 urine samples.