

Members of the EU parliament excrete glyphosate with their urines

Monika Krüger^{1,2}, Andrea Lindner¹, Johannes Heimrath³

¹BioCheck, laboratory of veterinary and environmental diagnostics limited partnership, Mölkauer Straße 88 · D-04288 Leipzig

²Albrecht-Daniel-Thaer Institute, Veterinary Faculty, University of Leipzig, An den Tierkliniken 29, 04103 Leipzig.

³Citizen Initiative Landwende, Am See 1, 17440 Lassan, Klein Jasedow

Summary

48 urines of members of the EU-parliament were investigated for glyphosate and creatinine. No urine was zero for glyphosate. The participants belonged to 13 countries. The relatively small numbers of participants were the cause of no significant results between the groups. All participants excreted glyphosate by urine. This means that glyphosate could be also a health problem of EU-parliament members.

Introduction

Last 25 years the application of glyphosate increased. Applications focused on inhibition of not wanted annual and perennial weeds, brushwoods in forestry and agriculture; weed control in agriculture, industry, forestry, and housing complexes. Glyphosate containing herbicides are increasingly used by farmers with not soil turning tillage and also in preharvest siccation of grains and corn. For WHO commission IARC (International Agency for Research of Cancer) the results of animal trials are „sufficient proof for cancerogenicity”. DNA- and chromosomal injuries were estimated in human cells. Genotoxicity was estimated from other scientists too (Poletta et al., 2009; Paganelli et al., 2010; Antoniou et al. 2012; Carrasco, 2013). Glyphosate was detected in air, in water and food. Due to manifold using of glyphosate humans are stressed. The concentrations of glyphosate in urines are relatively few (IARC, 2015). Seralini et al. (2014) estimated in long time studies in rats that low concentrations (0,1µg/L) of the whole glyphosate containing formulation widely below the official safety threshold value could induce severe hormone depended changes in mammas, livers, and kidneys of these rats. The detection of glyphosate in urines of chronically challenged humans is published in few papers. Take it in mind that about 1/3 of oral

ingested glyphosate is absorbed, distributed in body and excreted by kidneys (about 99% of absorbed glyphosate). 2/3 of ingested glyphosate remains in gastrointestinal tract until excretion by feces and are able to injure the microbiota and epithelia cells. Krüger et al. (2016) investigated 2009 urines of German persons. They only found eight persons with glyphosate urine levels below the lower value of determination of the used method (0,0751µg/L). The challenge with glyphosate was considerable because of detected concentrations in urines were 5 until 42 times over maximum value of residues of drinking water in Europe. Most of the participants (46%) excreted 0. 51-1µg/L with their urines. Males (N=888) were highly significant stressed (P<0.0001) than females (N=1113), the age group 70+ differed highly significant (P<0.0001) from all other age groups with lower glyphosate concentrations in urine. Interestingly the young people (age groups 0-9 years and 10-19 years) were higher stressed than the other age groups. In the present paper the results of glyphosate determination in urine of 48 members of the EU parliament were published. To overcome the problem of different water intake of the participants the creatinine levels of urines were determined and the glyphosate concentration per Gramm excreted creatinine realized.

Material and methods

48 members of the EU parliament (13 nationalities) collected their morning urine and sent it cooled to the accredited laboratory BioCheck-Holzhausen by post. Urine samples were diluted 1:20 with distilled water (aqua distillated, Braun, Germany) and tested for glyphosate by ELISA (ABRAXIS, USA) according to the manufacturer's instructions. The participants had to answer a questionnaire. In tab. 1 the questionnaire is shown.

Tab. 1. Questionnaire ¹

name, first name:	
adress:	
date:	signature:
Investigation attorney for Glyphosat	expense loading 45.00€ plus. 19% value added tax 53.55€
Anamnese (please tick the box <input checked="" type="checkbox"/> , respectively fill it)	

gender:	<input type="checkbox"/> m	<input checked="" type="checkbox"/> f
age:	weight (kg):	
actual job:	size (cm):	
nutrition:	<input type="checkbox"/> mixt eater	<input type="checkbox"/> vegetarian
	<input type="checkbox"/> vegan	<input type="checkbox"/> organic

¹BioCheck, laboratory of veterinary and environmental diagnostics limited partnership, Mölkauer Straße 88 · D-04288 Leipzig.

Note for sampling: Please, fill the provided vessel with central ray urine until half ! Afterwards put the vessel in boiling water for 10 min to prevent transport of possibly infectious material. Only use the provided addressed protective bag.

Results

The results are shown in tab. 2-7 and fig. 1-5. ,

Tab.2. Average glyphosate concentrations in urines of all 48 persons of the EU parliament in relation to creatinine content in urines

	µg/L glyphosate	g/L creatinine	µg glyphosate/ g creatinine
maximum	3.57	25.8	0.138
minimum	0.17	1.3	0.131
average	1.73	13.2	0.131
standard deviation	0.87	5.9	0.147

Tab. 3. Glyphosate and creatinine concentrations in urines of 48 members of the EU parliament in relation to their nationality

Country	N	glyphosate				Creatinine		glyph. crea. ¹ quotient µg/g
		average µg/L	max	min	stand. deviat.	average g/L	stand. deviat.	average
BELGIUM	20	1.63	3.57	0.56	0.90	12.62	5.81	0.129
Czech REPUB	1	0.17	0.17		0.00	1.29	0.00	0.132
FRANCE	7	2.10	2.45	0.39	0.70	14.34	5.42	0.146
GERMANY	7	1.87	2.59	0.68	0.72	14.81	4.47	0.126
HUNGARY	1	2.63			0.00	21.61	0.00	0.122
ITALY	4	0.98	2.63	2.53	0.00	14.14	4.85	0.069
LITHUANIA	1	2.84			0.00	13.93	0.00	0.204

NETHERLANDS	1	1.18			0.00	10.7	0.00	0.110
SPAIN	1	2.40			0.00	25.77	0.00	0.093
UK	2	1.6	2.53	0.67	14.81	7.18	2.54	0.223
CROATIA	1	2.46			0.00	9.59	0.00	0.342
FINLAND	1	0.62			0.00	7.62	0.00	0.081
IRELAND	1	0.80			0.00	8.84	0.00	0.090

¹ glyph. crea. quotient = glyphosate creatinine quotient

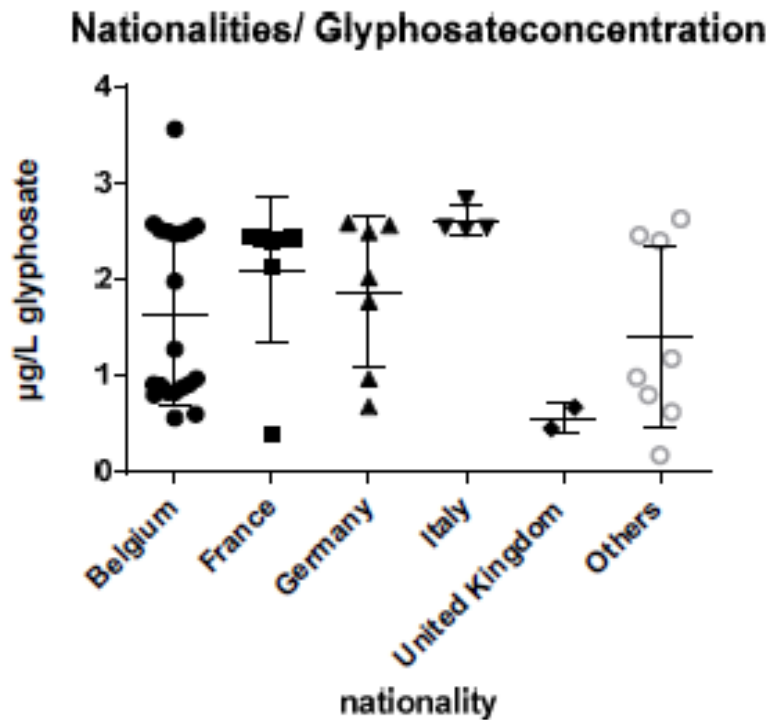


Fig. 1. Distribution of glyphosate amounts in urines of members of the EU parliament in relation to nationality. No significant differences between the participants of the different countries.

Tab. 4. Glyphosate and creatinine amounts in urines of 48 members of EU parliament as well as glyphosate-creatinine quotient, calculated in μg glyphosate / g creatinine, in relation to gender.

		glyphosate				creatinine		gly./crea. Quotient	
gender	N	$\mu\text{g/L}$ average	max.	min.	stand. deviat.	average g/L	stand. deviat.	$\mu\text{g/g}$	
Male	25	1.96	2.84	0.17	0.83	14.75	6.44	0.133	
female	23	1.48	3.57	0.45	0.88	11.22	4.62	0.132	

No significant differences were detected between males and females calculated in μg glyphosate / g creatinine.

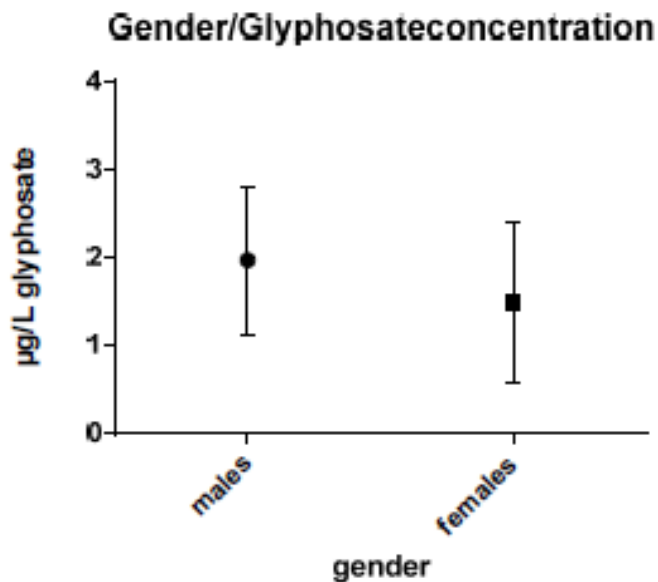


Fig. 2. Glyphosate amounts in urines of 48 members of the EU parliament. No significant differences were detected between the genders. No significant differences were detected between genders.

Tab. 5. Glyphosate and creatinine amounts in urines of 48 members of EU parliament as well as glyphosate-creatinine quotient, calculated in μg glyphosate / g creatinine, in relation to age.

		glyphosate				creatinine		gly./crea. Quotient	
age groups	N	average $\mu\text{g/L}$	max.	min.	stand. deviat.	average g/L	stand. deviat.	$\mu\text{g/g}$	
28	1	2.57				14.27	0.00	0.180	
30-39	6	2.26	2.84	0.80	0.00	15.91	6.22	0.142	
40-49	11	1.84	2.56	0.83	0.67	14.90	5.37	0.123	
50-59	19	1.39	3.57	0.17	0.71	11.63	6.13	0.120	
60-68	11	1.87	2.83	0.39	0.95	12.03	5.02	0.155	

No significant differences between age groups.

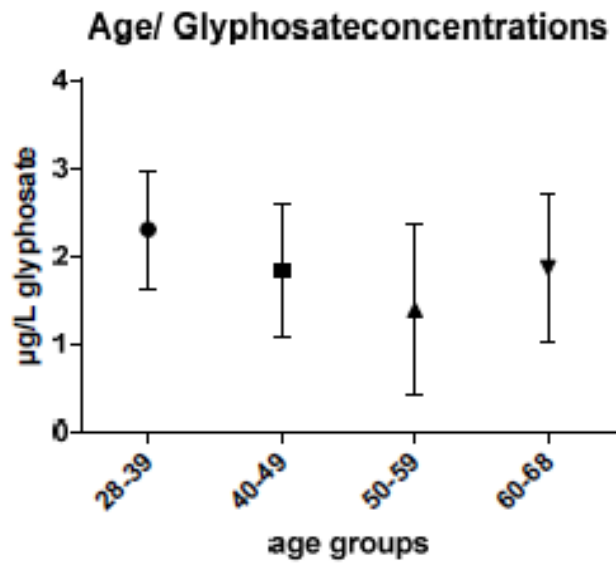


Fig. 3. Glyphosate amounts in urines of 48 members of EU parliament in relation to age. No significant differences were detected.

Tab. 6. Glyphosate and creatinine amounts in urines of 48 members of EU parliament as well as glyphosate-creatinine quotient, calculated in μg glyphosate / g creatinine, in relation to diets.

diet	N	glyphosate				creatinine		gly/crea. $\mu\text{g}/\text{g}$
		average $\mu\text{g}/\text{L}$	max.	min.	stand. deviat.	average g/L	stand. deviat.	
mixes	31	1.59	3.57	0.17	0.91	12,13		0.131
vegetarian	9	2.10	2.58	0.91	0.66	14.95		0.140
vegan	2	2.57	2.59	2.55	0.02	14.20		0.181
No information	6	???						

Kinds of food intake/ Glyphosateconcentration

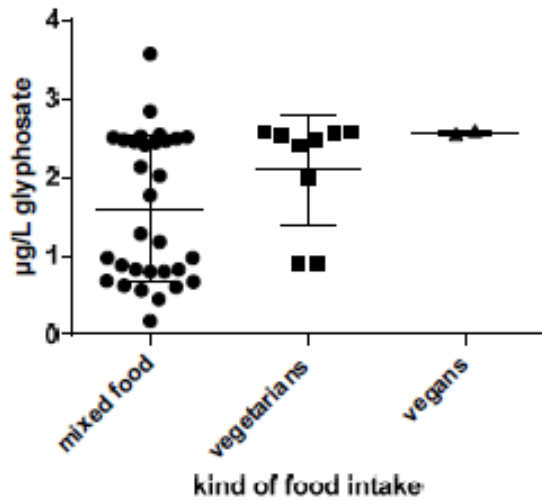


Fig. 4. Influence of kinds of food intake on glyphosate excretion with urines. Significant differences between groups in standard deviations ($P < 0.05$, Brown-Forsythe test), not among mean values but in medians ($P < 0.05$, Kruskal-Wallis-test).

Tab. 7. Glyphosate and creatinine amounts in urines of 48 members of EU parliament as well as glyphosate-creatinine quotients, calculated in μg glyphosate / g creatinine, in relation to their diet form.

		glyphosate				creatinine		gly/crea
food	N	average $\mu\text{g/L}$	max.	min.	stand. deviat.	average g/L	stand. deviat	$\mu\text{g/g}$
conventional	29	1.70	2.84	0.17	0.87	12.62	5.55	0.134
organic	16	1.76	3.57	0.45	0.89	13.88	6.71	0.126
no information	3							

Diet form/ Glyphosateconcentration

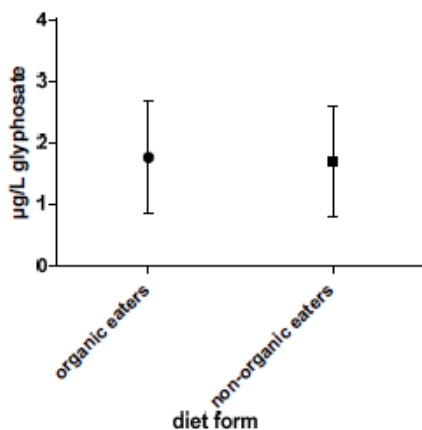


Fig. 5. Influence of diet form on glyphosate excretion with urines. No significant differences between organic and non-organic eaters.

Discussion

The 48 members of 13 countries of the EU-parliament interested in their urinary glyphosate concentrations are important examples of responsibility for their own health but also for the health of the inhabitants of their countries. Unfortunately only 48 persons of the whole EU parliament were interested. The EU-parliament members of Belgium, France and Germany were 80.7% of the whole investigated participants. Highest stress with glyphosate was found in participants of Lithuania, Spain and Croatia. The lowest concentrations were in urines of participants of Italy, Finland and Ireland (tab. 3, fig. 1), but there were only one or four people in that groups. The few interested and investigated persons are the cause of no significant results. Females excreted less glyphosate concentration than males but due to the relatively small groups and the standard deviations of the glyphosate concentrations in urines of participants no significance were detected. Krüger et al. (2016) found significance between females and males but the groups of investigation were bigger. The same situation was in relation to age. The younger people had higher glyphosate concentrations in their group but 7 persons in these groups were too few to get significant differences with the other groups (tab. 5 and fig 3.). The median glyphosate value of participants with mixed food were significant different from vegetarians and vegans (tab. 6 and fig.4). These results are similar to these of Krüger et al. (2016). They also found significant lower glyphosate concentrations in urines of participants with mixed food. Nevertheless all investigated EU-parliament members were glyphosate contaminated. This will show glyphosate is also in the food chain of members of the EU-parliament.