



**HAL**  
open science

## Transfer of persistent organic pollutants in camel milk

Farida Amutova, Matthieu Delannoy, Moldir Nurseitova, G Konuspayeva,  
Stefan Jurjanz

### ► To cite this version:

Farida Amutova, Matthieu Delannoy, Moldir Nurseitova, G Konuspayeva, Stefan Jurjanz. Transfer of persistent organic pollutants in camel milk. EAAP. 70th Annual Meeting of the European Federation of Animal Science, Aug 2019, Ghent, Belgium. Book of abstracts, 25 (2019), pp.592, 2019. hal-03953575

**HAL Id: hal-03953575**

<https://hal.univ-lorraine.fr/hal-03953575v1>

Submitted on 24 Jan 2023

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial - NoDerivatives 4.0  
International License

# Transfer of persistent organic pollutants in camel milk



UNIVERSITÉ DE LORRAINE



UNITE DE RECHERCHE ANIMAL & FONCTIONNALITES DES PRODUITS ANIMAUX



antiGen

<sup>1,2,3</sup>F. Amutova, <sup>1</sup>M. Delannoy, <sup>3</sup>M. Nurseitova., <sup>2,3</sup>G.Konuspayeva, <sup>1</sup>S. Jurjanz

<sup>1</sup>URAFPA, University of Lorraine-INRA, Vandoeuvre, France

<sup>2</sup>Faculty of Geography and Environmental Sciences, Al-Farabi Kazakh National University, Almaty, Kazakhstan

<sup>3</sup>Antigen LLP, Scientific and Production Enterprise, Almaty region, Kazakhstan

e-mail: amutovafb@gmail.com

## 1. INTRODUCTION

Camels as well as other mammals can transfer environmental pollutants to milk when they live in contaminated areas. Nevertheless, these animals run through large areas and can so ingest feed or water contaminated at very different levels by environmental contaminants as persistent organic pollutants (POPs). As camel milk consumption corresponds to approximately 7% of total milk (FAO, 2013), this pathway can become a real risk for human exposure. Camel milk is the only food produced in arid and semi-arid zones for some countries as Kazakhstan. Camels are raised in very extensive conditions i.e. they are strongly in touch with environment. Therefore these animals can be exposed by environmental pollutants.

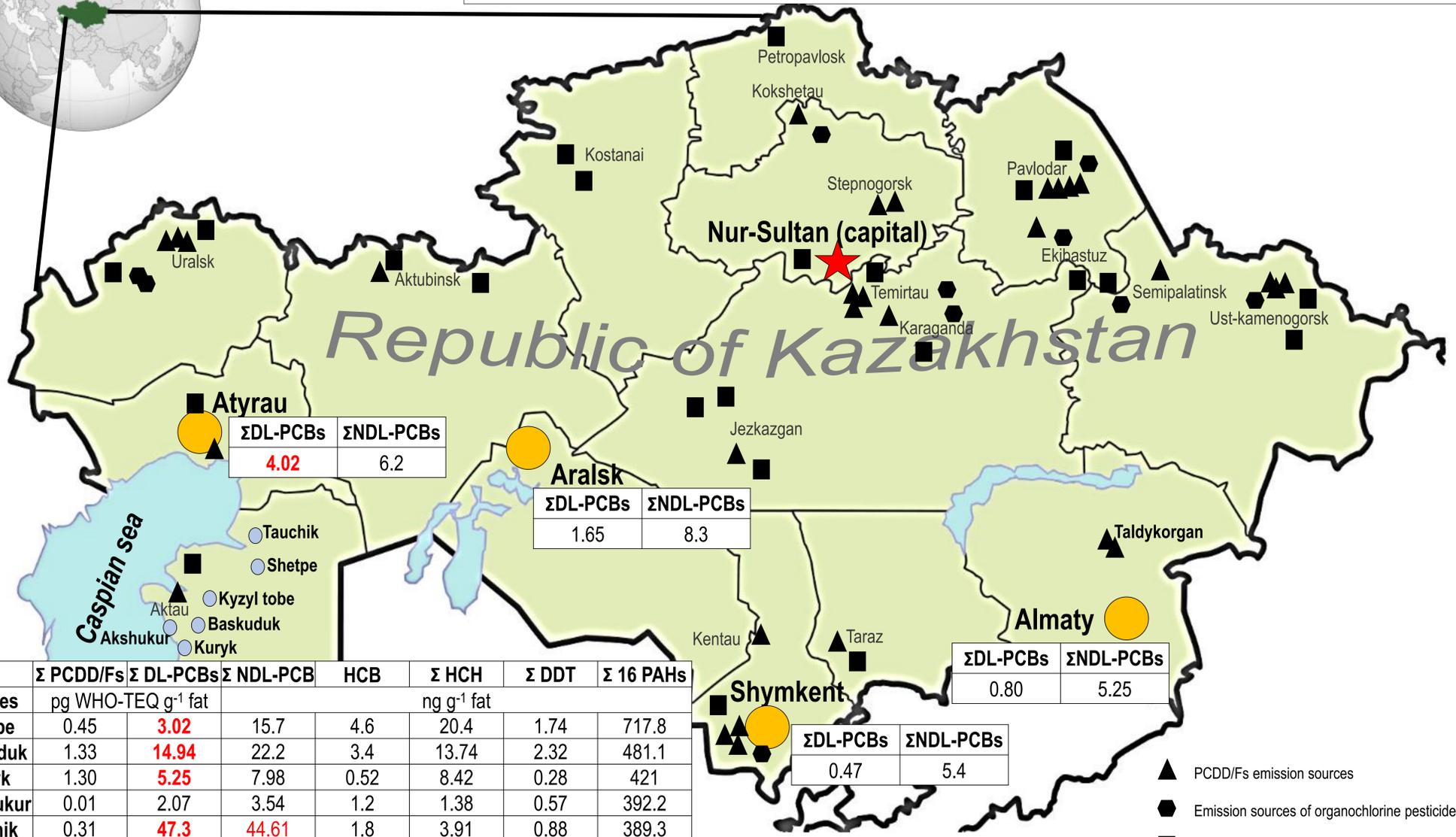
## 2. OBJECTIVE OF THE STUDY

How important is the transfer of POPs in milk of camels?

## 3. MATERIAL AND METHODS

Three peer-reviewed research articles and one monitoring report about POP concentrations in camel milk were integrated in the study using the following criteria:

- 1) Key words: camel milk, PCDDs/Fs, PCBs, OCPs, concentrations, residue levels, monitoring
- 2) Sums of PCDDs/Fs, PCBs, OCPs (HCB,  $\Sigma$ HCH,  $\Sigma$ DDT), PAHs concentrations in camel milk were derived from the relevant articles and mapped in respect to EU MRLs and to main POP emission sources
- 3) European MRL for OCPs in milk is 0.01 mg kg<sup>-1</sup> fresh weight and camel milk fat 38.2 g fat L<sup>-1</sup> milk was transformed into 262 ng OCP in g<sup>-1</sup> fat.



	$\Sigma$ PCDD/Fs	$\Sigma$ DL-PCBs	$\Sigma$ NDL-PCB	HCB	$\Sigma$ HCH	$\Sigma$ DDT	$\Sigma$ 16 PAHs
Villages	pg WHO-TEQ g <sup>-1</sup> fat						
Shetpe	0.45	3.02	15.7	4.6	20.4	1.74	717.8
Baskuduk	1.33	14.94	22.2	3.4	13.74	2.32	481.1
Kuryk	1.30	5.25	7.98	0.52	8.42	0.28	421
Akshhukur	0.01	2.07	3.54	1.2	1.38	0.57	392.2
Tauchik	0.31	47.3	44.61	1.8	3.91	0.88	389.3
Kyzyl Tube	0.24	3.24	0.82	-	-	-	<0.1
EU MRL	2.5	3	40		262*		-

EU MRL - Maximum Residue Levels approved by EU  
Red bold - overpass thresholds of EU MRL

\*Calculated using EU MRL for OCP in milk fresh weight and mean fat content in camel milk (3,82 %)

## 4. RESULTS

Monitoring studies of PCDD/Fs in different villages in W-Kazakhstan (Mangistau region) showed presence in camel milk up to 1.33 pg WHO TEQ g<sup>-1</sup> fat what would respect EU MRLs.

Contrary the same studies reported about DL-PCBs in milk samples of West Kazakhstan ranging up to 47 pg WHO TEQ g<sup>-1</sup> fat. Indeed, nearly all samples from this region overpassed European MRLs. In contrast low concentrations (<2.1 pg WHO TEQ g<sup>-1</sup> fat) are reported for the other regions of Kazakhstan.

Finally, NDL-PCBs have been revealed samples all over the country but only sample from Tauchik (Mangistau village) overpassed EU MRL with value 44.6 ng g<sup>-1</sup> fat.

All OCPs have been observed in all samples but in concentrations under the equivalent of EU MRL.

## 5. DISCUSSION

- The presence of all POP families have been showed all over the country.
- Nevertheless only PCBs, especially DL, overpass EU MRLs.
- Transfer rates of PCBs to camel milk is very low (less than 2%) due to the 2 elements that could explain it:

- 1) Steady state conditions was not completely reached (56 days of exposure)
- 2) Camel hump is a big fat storage compartment that could limit extrapolation of transfer rates especially in comparison with other mammals such as cows and goats.

## REFERENCES

1. Jurjanz, S., M. Nurseitova, Z. T. Gaukhar Konuspayeva, and B. Faye. "Kinetics of Polychlorinated Biphenyls in Bactrian Camels". *Emirates Journal of Food and Agriculture*, Vol. 30, no. 4, May 2018, pp. 312-9;
2. Petrik J., Kalmykov D., Zatloukalova K. Technical Report «Toxic pollutants in camel milk from the Mangystau Region of Kazakhstan Results of sampling conducted in 2015–2016».
3. Konuspayeva Gaukhar, Faye Bernard, De Pauw Edwin, Focant Jean-François. 2011. Levels and trends of PCDD/Fs and PCBs in camel milk (*Camelus bactrianus* and *Camelus dromedarius*) from Kazakhstan. *Chemosphere*, 85 (3) : pp. 351-360.
4. Konuspayeva, G., Jurjanz, S., Loiseau, G., Barci, V., Akhmetadykova, S., Meldebekova, A.A., Faye, B. Contamination of Camel Milk (Heavy Metals, Organic Pollutants and Radionuclides) in Kazakhstan. *Journal of Environmental Protection*, 2 (1), pp. 90-96.
5. Konuspayeva G., Faye B., Loiseau G. The composition of camel milk: A meta-analysis of the literature data. *Journal of Food Composition and Analysis* 22 (2009) 95–101. doi:10.1016/j.jfca.2008.09.008

