

GC-MS/MS ANALYSIS OF TRACE LEVEL DECHLORANE FLAME RETARDANTS IN FOOD AND FEED AND POSSIBLE EXPOSURE ROUTE TO HUMANS

*Chiara Calaprice*², *Benjamin L'Homme*¹, *Catherine Brasseur*¹, *Cosima Damiana Calvano*³, *Jean-François Focant*¹

¹ OBiAChem – University of Liège, Alle du 6 Août, B6c, B-4000 Liège, Belgium

² Dipartimento DICATECh - Politecnico di Bari, via Orabona, 4, 70125 Bari – Italy, chiara.calaprice@poliba.it

³ Dipartimento di Chimica – Università degli Studi di Bari, 4, 70125 Bari - Italy

Dechlorane, also known as Mirex, was extensively used not only as a pesticide but also as an additive in flame retardants in USA during 60s and 70s. After its ban, due to its suspected carcinogenic activity and its persistence in the environment, other related compounds such as Dechlorane Plus (DP), Dechlorane 602, Dechlorane 603, Dechlorane 604, and Chlordene Plus (CP) replaced Mirex due to their similar properties [1]. The environmental occurrence of dechlorane-related compounds was first reported in 2006 in North America when DP was detected in air, sediment and fish samples from the Laurentian Great Lakes [2]; recent reports from Canada assess their presence in environmental samples [3]. So far, no data are available on the route of exposure to humans.

As first part of the study, we reported levels of Dechloranes in human serum from France [4], and suggested that possible routes of exposure should be investigated, such as food consumption. With this aim we have developed a GC-MS/MS method to detect Dechlorane 602, 603, 604, DP, CP, and Mirex in feed/food samples collected during continuous EU monitoring for dioxins. We firstly optimized the MRM transitions, then we established, by means of experimental design, the best injection parameters with the aim to enhance the signal and detect trace levels (< ppb).

Then we validated the method on standards and we acquired preliminary data on Dechloranes determination in foodstuffs. These data can be crossed with food habits to possibly estimate the human dechlorane daily intake.

References

- [1] International Program of Chemical Safety: Environmental health criteria 44, mirex. Report available at: <http://www.inchem.org/documents/ehc/ehc/ehc44.htm>. Accessed May 2013
- [2] E. Hoh, et al., *Environmental Science & Technology*, 40, 1184-1189 (2006)
- [3] E. Sverko, et al., *Environmental Science & Technology*, 44, 574-579 (2010)
- [4] C. Brasseur, et al, *Environmental International*, 65, 33-40 (2014)