Animal – supplementary materials

**Do farming conditions influence brominated flame retardant levels in pig and poultry products?**

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**Table S1** *Mean and maximum concentrations of the sum of eight PBDE congeners (polybrominated diphenyl ethers) and of the sum of three HBCDD stereoisomers (hexabromocyclododecane) in eggs, and pig and broiler muscle reported in French surveillance surveys from 2012 to 2016. Results are expressed as upper bound concentrations in ng/g fat. (Results available at* <https://agriculture.gouv.fr/plans-de-surveillance-et-de-controle>)

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  | Eggs |
| Year | N |  | ∑8 PBDEs |  | ∑3 HBCDD |
|  |  |  | Mean |  | Max |  | Mean |  | Max |
| 2016 | 18 |  | 2.98 | 46.4 | 0.14 | 1.27 |
| 2015 | 20 |  | 0.52 | 1.70 | 0.45 | 4.80 |
| 2014 | 20 |  | 0.35 |  | 1.03 |  | 0.10 |  | 0.60 |
| 2013 | 20 |  | 0.80 |  | 3.83 |  | 0.38 |  | 6.25 |
| 2012 | 20 |  | 0.75 |  | 2.44 |  | 0.34 |  | 2.53 |
|  |  |  | Broiler muscle |
| Year | N |  | ∑8 PBDE |  | ∑3 HBCDD |
|  |  |  | Mean |  | Max |  | Mean |  | Max |
| 2016 | 8 |  | 10.86 | 45.7 |  | 0.23 | 0.72 |
| 2015 | 10 |  | 2.99 | 21.7 |  | 0.19 | 0.48 |
| 2014 | 10 |  | 1.04 |  | 3.32 |  | 0.70 |  | 1.81 |
| 2013 | 10 |  | 1.73 |  | 7.70 |  | 1.57 |  | 13.3 |
| 2012 | 9 |  | 1.35 |  | 3.77 |  | 0.83 |  | 3.51 |
|  |  |  | Pig muscle |
| Year | N |  | ∑8 PBDE |  | ∑3 HBCDD |
|  |  |  | Mean |  | Max |  | Mean |  | Max |
| 2016 | 10 |  | 0.75 |  | 1.71 |  | 0.15 |  | 0.36 |
| 2015 | 10 |  | 1.70 |  | 5.59 |  | 0.22 |  | 0.69 |
| 2014 | 9 |  | 0.93 |  | 5.39 |  | 1.56 |  | 10.0 |
| 2013 | 10 |  | 0.28 |  | 0.82 |  | 0.13 |  | 0.49 |
| 2012 | 9 |  | 0.55 |  | 1.13 |  | 0.32 |  | 1.31 |

**Table S2** *Mean and maximum concentrations of brominated flame retardants in eggs, pig meat and broiler meat reported in scientific literature in Europe from 2012 to 2019. Results are expressed in ng/g fat. Publications with results in ng/g of whole product were excluded.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Country | Year | Product | RFB1 | N | Mean | Max | Ref |
| NED2 | 2009-2014 | Pork | Σ 17 PBDEs3 | 111 | 0.145 | 2.078 | Gebbink et al., 2019 |
| Chicken | 97 | 0.060 | 0.334 |
| Egg | 164 | 0.218 | 4.077 |
| Pork | α-HBCDD4 | 14 | n.r.5 | 0.250 |
| Chicken | 15 | n.r. | 0.090 |
| Egg | 36 | n.r. | 42 |
| POL2 | n.r. | Egg: free-range | Σ 10 PBDEs | 31 | 1.08 | 12.0 | Parjurek et al., 2019 |
| Egg: organic | 31 | 1.07 | 10.9 |
| Egg: barn | 25 | 0.94 | 8.2 |
| Egg: cage | 12 | 0.52 | 1.8 |
| FRA2 | 2014 | Pork: conventional | Σ 3 HBCDDs | 41 | 5.15 | 194.8 | Dervilly et al., 2017 |
| Pork: organic | 43 | 0.52 | 4.76 |
| Chicken: conventional | 31 | 0.63 | 3.02 |
| Chicken: organic | 41 | 0.47 | 1.99 |
| ITA2 | 2011-2012 | Egg | Σ 8 PBDEs | 7 | 2.538 | 9.729 | Martellini et al., 2016 |
| POL2 | n.r. | Egg: free-range | Σ 13 PBDEs | 20 | 0.164 | 0.736 | Rosko et al., 2014 |
| Egg: cage | 19 | 0.111 | 0.232 |
| ESP2 | 2009 | Pork | α- and γ-HBCDDs | 2 | 2.61 | n.r. | Eljarrat et al., 2014 |
| Chicken | 3 | 6.56 | n.r. |

1Brominated flame retardants

2 Country name abbreviations according to code ISO 3166-1 alpha-3

3 Polybrominated diphenyl ethers

4Hexabromocyclododecane

5Not reported

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A



B



C



Supplementary Figure S1 Geographical repartition of the sampled farms for A/ egg farms, B/ broiler farms and C/ pig farms (N=159 farms) (France, 2013-2015). Shading is dependent to the share of the area production into the national production.