Background

- By EU standards, Slovenia is not considered a large consumer of fish. The average Slovenian consumes approximately 10.8 kg per capita per year of fish, which is less than half of the EU8 average (25 kg per capita per year) and has one of the lowest expenditures of fish per household in the EU28 [1].
- Consumption of fish per capita has been steadily increasing and the National Slovenian Institute of Public Health continues to promote fish as part of a healthy diet [2].
- Fish are an excellent source of omega-3 fatty acids (DHA & EPA) - 0.5-1.8 g of DHA + EPA per day significantly reduces deaths from heart disease and all causes.
- FAO dietary guidelines on eating healthy recommends eating 2-3 portions of fish per week [3].

Problem Statement

- People need to balance nutritional benefits of eating fish and the potential exposure to harmful contaminants.
- FAO/WHO recommends that countries "develop, maintain and improve existing databases on specific contaminants, particularly methylmercury and dioxins and dioxin like compounds in fish consumed in their region".
- Few studies estimating the risk posed from dioxin and dioxin like compounds in fish readily available on the Slovene market exist such that data on exposure to these compounds is at best limited.

Objectives

- Obtain information related to PCB, dioxin, and furan residues in commonly consumed wild, farmed, and frozen fish (and squid) available on the Slovenian market.

Methods: Sampling

- In total, 121 samples were collected from various supermarkets and fish markets in Slovenia including:
  - Fish and squid caught in the Northern Adriatic;
  - Farm raised fish in Slovenia;
  - Imported fish and squid species (10 samples).
- Fish were first eviscerated and fillets set aside for sampling (squid were analysed individually).
- Samples were transported on ice, snap frozen (liquid nitrogen) and homogenized.

Results

- Samples were Soxhlet extracted with hexane and acetone (9:1, v/v) for 16 h (EPA 1668B and 8082A)
- Lipid removal: H2SO4 (96% p.a.) and residual water with Na2SO4
- Purified extracts: Florisil column (60/100 mesh)
- Analysis: GC (Apilent) with ECD detection
- Column: DB-5 (30 m x 0.25 mm ID., 0.25 µm film thickness). Oven: 100 °C, (1 min) to 300 °C at 10 °C/min. Injection: 1 µl, splitless, carrier gas He (1 ml/min).  
- Confirmatory analysis: 450-PC coupled to a 240 IT-MS (Varian USA) in Cl mode.
- Dioxins and furans were analysed at ALS Group (CZ).

Method: Sample Analysis

1. Samples (20 g) were Soxhlet extracted with hexane and acetone (9:1, v/v) for 16 h (EPA 1668B and 8082A) 
2. Lipid removal: H2SO4 (96% p.a.) and residual water with Na2SO4 
3. Purified extracts: Florisil column (60/100 mesh) 
4. Analysis: GC (Apilent) with ECD detection 
5. Column: DB-5 (30 m x 0.25 mm ID., 0.25 µm film thickness). Oven: 100 °C, (1 min) to 300 °C at 10 °C/min. Injection: 1 µl, splitless, carrier gas He (1 ml/min).

References

1) https://www.eufroma.eu/consumptionmonster

Funding Source: EU

Slovene National Project CRP V4 1120 "Quality of fish on Slovenian market" ISO-FOOD received funding from the European 7 Framework Programme under grant agreement no 621329 (2014-2019)

www.isofood.eu