

## Introduction

The safety of packaging materials is a crucial element for food safety authorities since low-molecular substances can migrate from the packaging into the food and can cause harmful effects to human health through dietary exposure.

Exposure assessment is one of the essential steps in risk assessment process. To estimate the exposure to migrants from food contact materials several methods have been applied. In the European Union, a conservative assumption is adopted, namely a person of 60 kg body weight consumes daily 1 kg of food packed in a cubic container of 6 dm<sup>3</sup>. The exposure can also be estimated more realistic combining the migrant concentration in food and the consumption data obtained from consumer surveys. More refined approaches have also been used; in the framework of the European Project FACET (Flavours, Additives and Food Contact Materials Exposure Task) a probabilistic modelling tool to estimate the exposure to migrants from food contact materials was designed. This model allows the exposure assessment of migrants by using information of packaging (use, composition), consumption data, etc. [1,2].

In the present work, the dietary exposure from cereal based foods in plastic packaging, to acetyl tributyl citrate (ATBC), a common plasticizer used in the manufacture of packaging materials was determined using a Total Diet Study (TDS) approach and was also estimated by using the FACET exposure tool.

**Keywords:** exposure assessment, TDS, ATBC, FACET exposure tool

## Materials and methods

### Total Diet Study (TDS): Exposure estimation



- Packaging analysis: migrants identification



- Pool preparation and food analysis

$$E_i = \sum_{k=1}^n \frac{C_{i,k} \times L_k}{BW_1}$$

- Dietary exposure estimation: food consumption survey

### FACET exposure tool

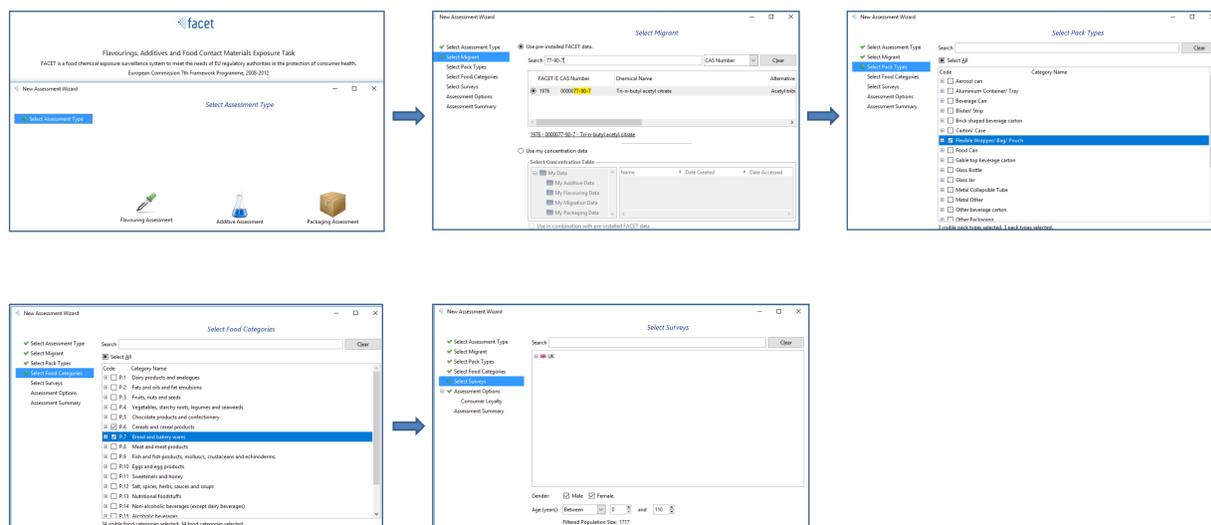


Figure 1.- Scheme employed to estimate dietary exposure to ATBC from packaging materials.

Figure 2.- Dietary exposure estimation of ATBC by using FACET tool.

## Results

In Table 1 are presented the results of dietary exposure of ATBC from cereal based products packed with plastic materials. The age groups considered in the study were: 1-3 years, 3-9 years and 10-17 years.

| Acetyltributyl citrate (ATBC)      | Dietary Exposure (µg/kg bw/day) |                  |                    |                  |                  |                    |
|------------------------------------|---------------------------------|------------------|--------------------|------------------|------------------|--------------------|
|                                    | TDS                             |                  |                    | FACET Tool       |                  |                    |
|                                    | 1-3 years (mean)                | 3-9 years (mean) | 10-17 years (mean) | 1-3 years (mean) | 3-9 years (mean) | 10-17 years (mean) |
| <br>TDI: 1.0 mg/kg body weight [3] | 1.01                            | 2.01             | 1.27               | 1.5              | 1.52             | 0.94               |

## Conclusions

➤ The results obtained with the TDS approach agree closely with those estimated with the FACET exposure model.

➤ In all cases, mean dietary exposures to ATBC were below the tolerable daily intake (TDI) of 1.0 mg/kg body weight set by the EU for ATBC.

## References

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- [3] EFSA, 2005. Opinion of the Scientific Panel on food additives, flavourings, processing aids and materials in contact with food (AFC) on a request related to a 10th list of substances for food contact materials EFSA Journal 273, 1- 26.

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