

Quantification of Bisphenol Related Compounds in Polymeric Can Coatings and in Beverage Samples by Hplc-Fld and Confirmation by Lc-Ms/Ms

Antía Lestido Cardama*, Patricia Vázquez Loureiro*, Ana Rodríguez Bernaldo de Quirós*, M^a Isabel Santillana**, Juana Bustos**, Perfecto Paseiro Losada*, Raquel Sendón*

*Department of Analytical Chemistry, Nutrition and Food Science, Faculty of Pharmacy, University of Santiago de Compostela, 15782-Santiago de Compostela, Spain

**National Food Center, Spanish Agency for Food Safety and Nutrition, E-28220 Majadahonda, Madrid, Spain

Abstract: Major types of internal can coatings used for food and beverages are made from epoxy-based resins, which contain among their components bisphenol A (BPA) or bisphenol A diglycidyl ether (BADGE). These components can be released and reach the food. There is no specific European legislation for coatings, but there is legislation on specific substances setting migration limits. Many investigations have paid attention to BPA due to its classification as endocrine disruptor, however, studies are available concerning other analogues developed to replace it in the manufacture of these resins [1].

Ten cans of beverages were taken as study samples. The type of coating was verified using an attenuated total reflectance-FTIR spectrometer showing that most of the samples examined were coated with epoxy-phenolic resins.

The objective of the present work was to apply an analytical method based on high performance liquid chromatography with fluorescence detection (HPLC-FLD) to the simultaneous identification and quantification of fourteen compounds including bisphenol analogues (BPA, BPB, BPBP, BPC, BPE, BPF, BPG) and BADGEs (BADGE, BADGE.H₂O, BADGE.2H₂O, BADGE.HCl, BADGE.2HCl, BADGE.H₂O.HCl, cyclo-di-BADGE) in the material (cans) and in the beverage samples. For this, the cans were extracted with acetonitrile for 24 hours at 70 °C and the extract was analyzed directly (Figure 1), as well as the content of the cans. This method showed an adequate linearity ($R^2 > 0.9994$) and low detection levels down to 5 µg/L. In addition, a liquid chromatography coupled to tandem mass spectrometry (LC-MS/MS) method was optimized for confirmation purposes.

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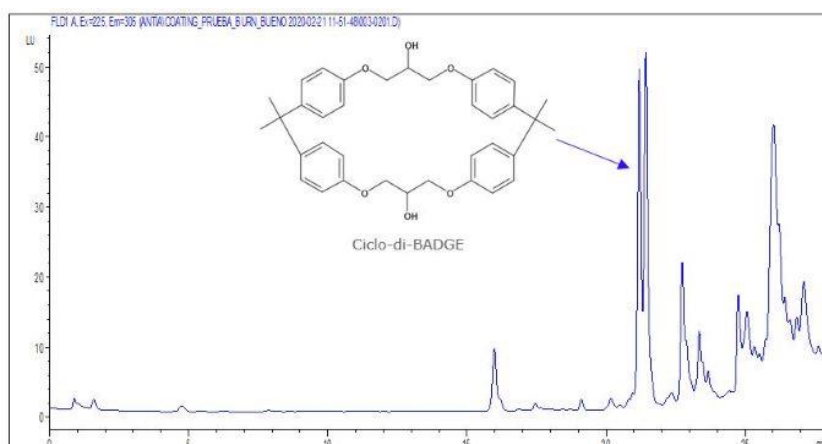


Figure 1. HPLC-FLD chromatogram of an extract of a can sample.

References

- [1] Lestido Cardama A. et al., *Polymers* 11 (2019) 2086.