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Safety aspects related to the Bisphenol A migration process in packed meat and milk products – a review

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Abstract: Bisphenol A (BPA), a chemical compound found in food packaging, who can migrate from the packaging material to the packaged product, under the action of certain factors (light, temperature, contact time, pH, type of product, type of food contact materials). Its presence has been detected in a wide range of foods such as meat and meat products, milk and dairy products, fruits and vegetables and products derived from them, fish and seafood, plain or carbonated water, juices, sauces. The purpose of this review was to develop a study, based on the literature, on BPA levels in different types of products, focusing on meat and milk and products derived from them.

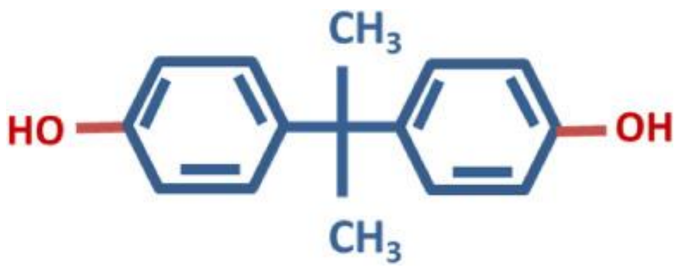

Fig. 1. Chemical structure of BPA [8]

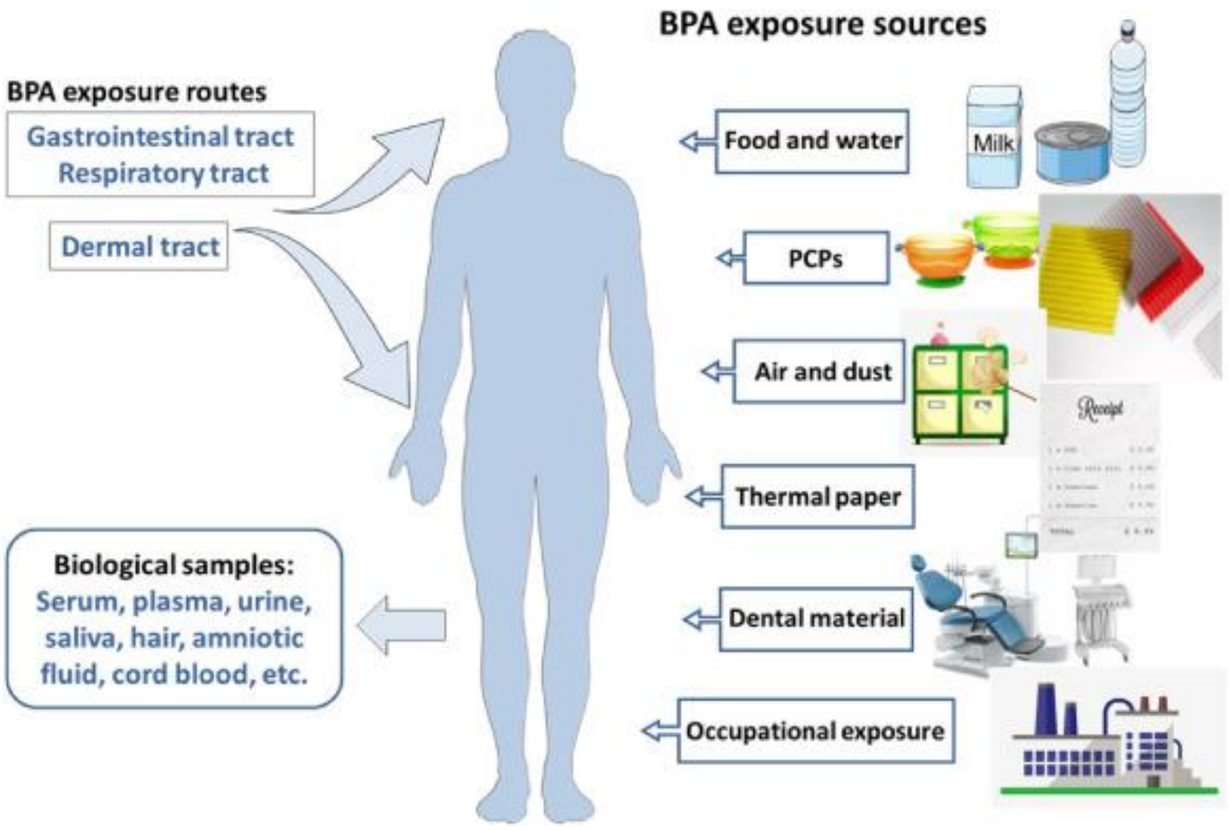

Fig. 2. Sources of BPA exposure sources and routes [8]

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Table 1. BPA levels of meat and meat products / milk and milk products

Food category	Origin	Packaging type	Concentration of BPA	Method	Reference
Meat , Cut of meat, Swine muscle, Chicken breast, Chicken meat, Turkey breast, Veal meat, Bovine muscle, Cut of bovine meat, Ovine meat, Sausages, Roast pork, Raw ham, Parma ham, Bovine liver	French	non-canned (pre-packaged/cut-to-order)	1,91 - 61,42 µg/kg	SPE-UHPLC-MS/MS	[1]
Tripe, Meat ball	Cordoba, Spain	Canned food	62 ± 2 - 82 ± 3µg/kg	HPLC/FLD	[2]
Meatballs in tomato sauce, Beef goulash	Serbia	Canned food	3,2 – 64,8 µg/kg	HPLC – MS	[3]
Pork and beans, Chicken broth, Condensed chicken soup, Ready to eat chicken soup	USA	Canned food	12 - 110 ng/g	HPLC-MS/MS	[4]
Milk	Turkey	Paper box	81,09 ± 1,39 – 156,22 ± 1,6 µg/kg	HPLC	[5]
Milk	-	-	1.32 – 176 µg/kg	MIP-SPE–HPLC-FLD	[6]
Pasteurized milk	Italy	PET, PEHD, Tetra Pak	< 2,5 – 481,0 ± 2,0 ng/ml	SPE-LC - FLD	[7]
Lowfat UHT milk	Italy	PET, PE, PEHD, Tetra Brik, Tetra Pak	< 2,5 – 521,0 ± 8,0 ng/ml	SPE-LC - FLD	[7]

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Conclusion

It can be observed that food packed in cans is more susceptible to be chemically contaminated with BPA compared to the rest of the packaging materials. This fact is due to the type and quality of inner coatings, type of heat treatment or composition of the food product [9, 10].

Certain measures are needed to limit and prevent the BPA migration to food product. The literature recommended the replacement of BPA with other compounds with similar properties, such as Bisphenol S that is more stable and resistant to heat, sunlight and acidic pH compared to BPA. Another measure would be to reduce foods packing in lacquered cans or polycarbonate plastics, and turning to the foods packaging into the glass because these containers do not contain any more BPA.