Receipts with easily erasable ink contain cancer- and infertility inducing substances, study finds

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Research news

Ninety per cent of tickets and receipts — those whose ink fades after some time because they are made of ‘thermal paper’ — contain bisphenol A (BPA). BPA is a well-known endocrine disruptor that alters hormonal balance in people exposed to it and leads to hormonal diseases such as genitourinary malformations, infertility, obesity and cancer in hormone-dependent organs (such as breast cancer).

This is the conclusion of a study led by the University of Granada (UGR) and carried out in collaboration with the Biohealth Research Institute in Granada (ibs.GRANADA), "San Cecilio" University Hospital, the National School of Public Health (Rio de Janeiro, Brazil), Université Paris Descartes (France) and the Hôpital Necker Enfants Malades hospital (Paris, France).

Currently, there is great concern about the unnoticed exposure of the general population to bisphenol A. The industry has sought alternatives in order to gradually replace BPA in most of its applications, as is the case of the thermal paper used in tickets and receipts.

“We can identify this kind of paper because it instantly turns black if we put it close to a heat source like, for example, a match,” the lead authors of the study, Nicolás Olea, professor of Medicine at the UGR, and José Manuel Molina from ibs.Granada, explain. One alternative is the use of bisphenol S (BPS), which has a similar molecular structure to that of BPA but includes a sulfur atom (S) instead of a carbon atom (C) in its formula.

In their paper, published in the journal Environmental Research, the researchers analyse the presence of BPA and BPS in the thermal paper receipts we use on a daily basis, as well as the hormone-like activities of these substances that are found in receipts.

Study carried out on 112 receipts from Brazil, Spain and France

To conduct the study the researchers analysed 112 thermal paper receipts and tickets from Brazil, Spain and France. “Customers can easily identify these receipts since the ink fades with time and when, for instance, you try to return the trousers that you bought, the shop assistant tells you that they can’t see anything”, Olea explains. “Very often the only thing you find is a fine white powder that comes off them when you take them out of a handbag or purse. BPA is, precisely, that white powder that sticks to your fingers.”

According to the findings, more than 90% of the receipts collected in Brazil and Spain had BPA and presented hormone-like, anti-androgenic activity.

However, only half of the receipts collected in France contained BPA, which confirms measures taken by the French Government since 2014 to reduce the use of the chemical compound in thermal paper, with the aim of protecting the general population.

“What’s bad about the French alternative is that it appears to use BPS, which we found mostly in samples from that country and seldom found in Brazilian or Spanish samples. Unfortunately, BPS is also an endocrine disruptor, and its environmental persistence is greater than that of BPA, so it’s not a valid option,” the UGR professor emphasises.

Despite these issues, the researchers fear that there will be an increase in the use of BPS in years to come, since its use is not as strictly regulated as that of BPA.

More vigilance

“This is further evidence that something is failing in toxicity controls for chemical compounds in our environment. It seems like regulatory policies are established a posteriori, when human exposure is evident. In fact, the protection of hundreds of thousands of young people working as cashiers in supermarkets and other shops is not being implemented sufficiently,” Nicolás Olea warns.

The researchers recommend the population to proceed with caution until the Spanish Government takes action or until shops, restaurants and other businesses acknowledge the problem.

“For example, tickets should not come into contact with foods such as meat or fish when unpacking them in the kitchen. Moreover, we should not crumple the tickets when throwing them away, play with them, write notes on them, or store them in cars, purses, wallets or handbags,” Olea says. “In short, we should handle these kinds of receipts as little as possible.”

Until measures are taken to tackle what could be an important public health problem “we should reject thermal paper receipts and demand that the substitution of BPA in thermal paper — promised by the Spanish Government for 2020 — is not carried out using BPS.”

Bibliographic reference:

Determination of bisphenol A and bisphenol S concentrations and assessment of estrogen- and anti-androgen-like activities in thermal paper receipts from Brazil, France, and Spain

Molina-Molina JM, Jiménez-Díaz I, Fernández MF, Rodriguez-Carrillo A, Peinado FM, Mustieles V, Barouki R, Piccoli C, Olea N, Freire C.

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