

INTRODUCTION

Acrylamide is a carcinogenic substance produced by a chemical reaction between reducing sugars and asparagine, when exposed to high temperatures (over 120°C), which often occurs in roasting, baking or deep frying. Some food products such as potato chips, coffee and toasts have been extensively studied and have acrylamide benchmark levels tightly regulated by the European Regulation (EU) 2017/2158. However, novel food products such as sweet potato chips and other vegetable tubers-based foods have been steadily arising in the food markets as healthier alternatives to regular potato chips and French fries. These alternatives usually comprise sweet potato and other tubers such as beetroot, parsnip, turnip, carrots, etc., but also pulses such as lentils, chickpeas and often corn. However, to the best of our knowledge, there is little or no information about the acrylamide levels in these novel foods. Under this context, the aim of this pilot study was to compare the acrylamide levels in fried potatoes and other snack alternatives for human consumption. Despite being a small-scale pilot study, these results could help us to be more aware of the level of acrylamide exposure on these foods and to bring awareness to the need to reevaluate the current regulations for this contaminant.

MATERIAL AND METHODS

Several brands and chips were randomly selected from commercial food stores and were analyzed with the help of the Food Hygiene, Safety and Health class of 2022/2023 of the Faculty of Veterinary Medicine in Lusófona University.

All samples were store-bought in a random fashion and comprised several commercial brands, as described in table 1 (see below).

For acrylamide extraction, samples were homogenized in water, in a 1:20 (g/ml) ratio, using a Stomacher.

The quantitative determination of acrylamide was made using the hydrolysis method developed by Chong et al (2019). Briefly, acrylamide was hydrolyzed using a strong base and the resulting ammonia was quantified with Nessler’s reagent, at 420 nm.

Acrylamide was quantified through a standard calibration curve with different known concentrations of commercial acrylamide, with a minimum of 3 to 6 replicates for each brand.

Sample description

Table 1: Food samples used in this work and number of commercial brands tested

Sample source	Number of brands tested
Regular potato chips (fried in sunflower oil or olive oil)	7
Sweet potato chips	2
Veggie chips (carrot, beetroot and parsnip - oven baked)	2
Lentil veggie puffs (oven baked)	1
Veggie puffs for babies (carrot, beetroot and corn - oven baked)	1
Corn chips	1

RESULTS AND DISCUSSION

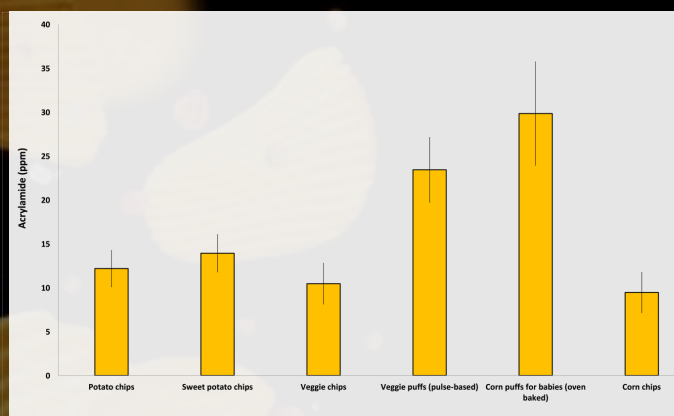


Figure 1: Acrylamide levels in several brands and types of chips, using a spectrophotometric method. Results are expressed as ppm levels and represent an average of 3-6 replicate experiments.

Here, our main goal was not to evaluate the acrylamide levels in potato chips, but to compare the levels of acrylamide in alternative snacks presented with those found in regular chips.

When compared to regular potato chips (average of 12 ppm of acrylamide), all the samples present significantly similar or significantly higher levels of this contaminant ($p < 0.001$). Moreover, these levels were particularly higher in veggie puffs and in baby foods (29 and 23 ppm, respectively).

Although these are preliminary results, with a low sample number, they strongly suggest that the novel foods arising as alternatives to potato chips should also be regulated concerning their acrylamide levels. Particularly since they are advertised as healthy foods and/or baby foods.

CONCLUSION

The knowledge about acrylamide in ready-to-eat snacks is key to better understand the risk exposure to this carcinogenic substance, especially in children.

Overall, our preliminary results point to the need to revise the regulations of acrylamide levels in alternative chips, including sweet potato, tubers, lentils and baby foods.

REFERENCES

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2. REGULAMENTO (UE) 2017/2158 DA COMISSÃO de 20 de Novembro de 2017