

Evaluation of Deoxynivalenol in Foods of São Paulo State, Brazil

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INTRODUCTION & AIM

- ✓ Deoxynivalenol (DON) is a mycotoxin primarily produced by fungi of the *Fusarium* genus, and its consumption has been linked to outbreaks of acute illnesses, with symptoms such as nausea, vomiting, dizziness, gastrointestinal disorders, and diarrhea in both humans and animals. It is the most common mycotoxin found in cereals, especially wheat.
- ✓ Considering the importance of cereal-based foods for human nutrition and their significant economic role, the monitoring of these products becomes essential.
- ✓ In the European Commission, the limits for DON are 400, 600, and 750 µg/kg for bakery products, pasta and popcorn, respectively (EC, 2024). In Brazil, the maximum tolerated is 1,000 µg/kg for the same products (BRASIL, 2022).
- ✓ This study aims to analyze the presence of DON in wheat and corn products marketed in São Paulo state, Brazil.

METHOD

- ✓ **SAMPLES:** 56 samples, including 3 mini bread rolls, 17 toasts, 13 pasta, 11 instant noodles, and 12 popcorn, from different brands and batches, were collected in 2024 from commercial establishments in São Paulo state.
- ✓ **EXTRATION AND PURIFICATION:** The samples were ground, homogenized. DON extraction was performed using deionized water and agitation, followed by centrifugation, filtration, and purification with immunoaffinity column (DONtest WB, Vicam) (ALMEIDA et al., 2017).
- ✓ **QUANTIFICATION AND CHROMATOGRAPHIC CONDITIONS:** The analysis was carried out using a Shimadzu HPLC system. Mobile phase: water:methanol (85:15, v/v), flow rate: 0.8 mL/min, column and pre-column: Agilent Zorbax C18), column oven temperature: 35°C, injection volume: 50 µL, UV detection: 220 nm (ALMEIDA et al., 2017).

RESULTS & DISCUSSION

- ✓ The method used proved to be suitable for the analysis of DON in wheat and corn products, ensuring precision and reliability in the results obtained. The method validation data are presented in **Table 1**.
- ✓ The chromatograms of standards of DON are presented in **Figure 1**, with a retention time of DON in 9.7 ± 0.2 min.
- ✓ 48.2% of samples showed results below 200 µg/kg (LOQ), especially the popcorn analyzed. DON was quantified in 51.8% of samples, with concentrations ranging from 240.0 to 658.4 µg/kg (**Figure 2**).
- ✓ No sample exceeded the limit set by Brazilian legislation of 1,000 µg/kg (**Figure 3**). But 60% of bakery products were unsatisfactory by the European Community

Table 1 – Validation parameters for the determination of DON in wheat and corn products.

Linearity (ng/mL)	LOD (µg/kg)	LOQ (µg/kg)	Added DON Concentration (µg/kg)	Recovery (%)	Coefficient of Variation (%)
			400	98.6	2.4
50 – 1,000	60	200	800	91.8	3.2
			1,600	93.7	1.6

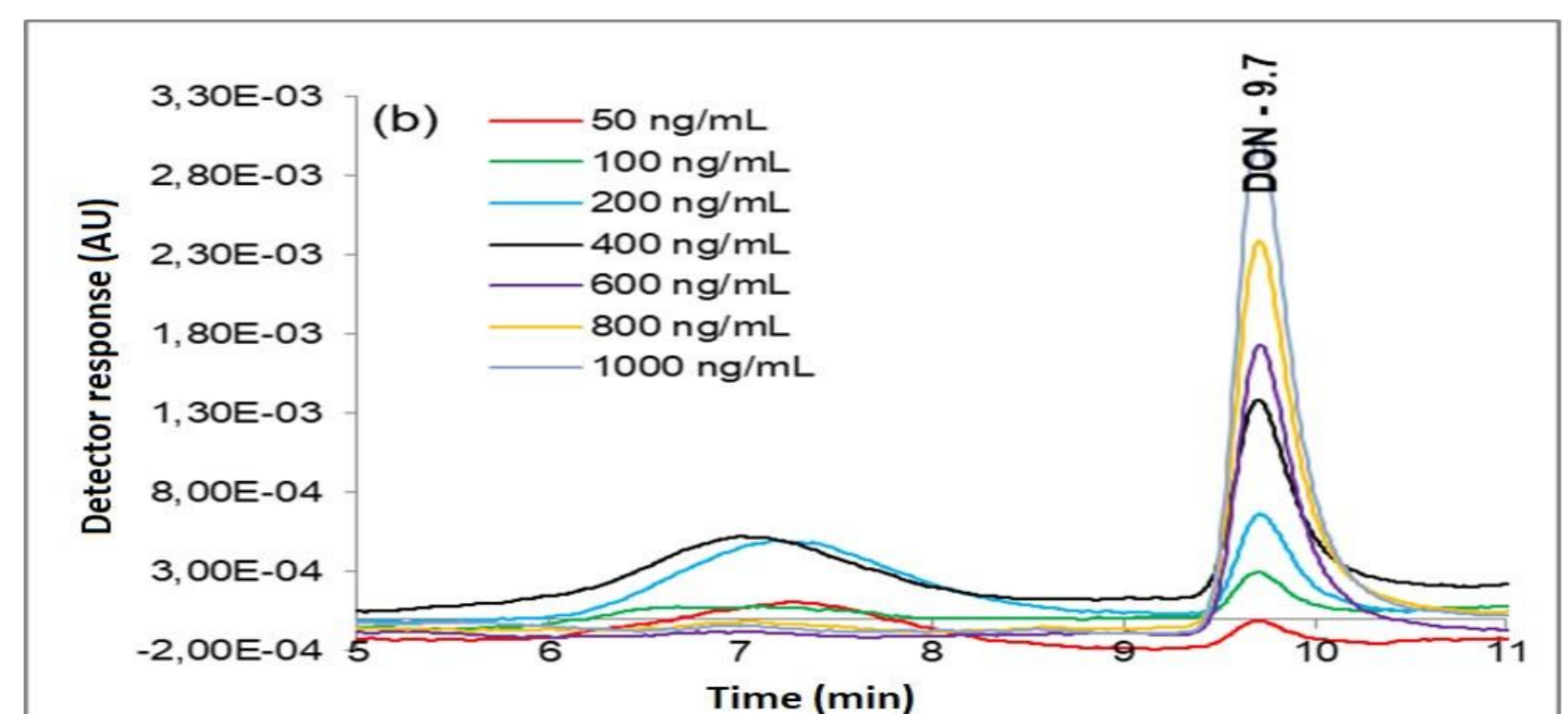


Figure 1 - Chromatograms of standards of DON.

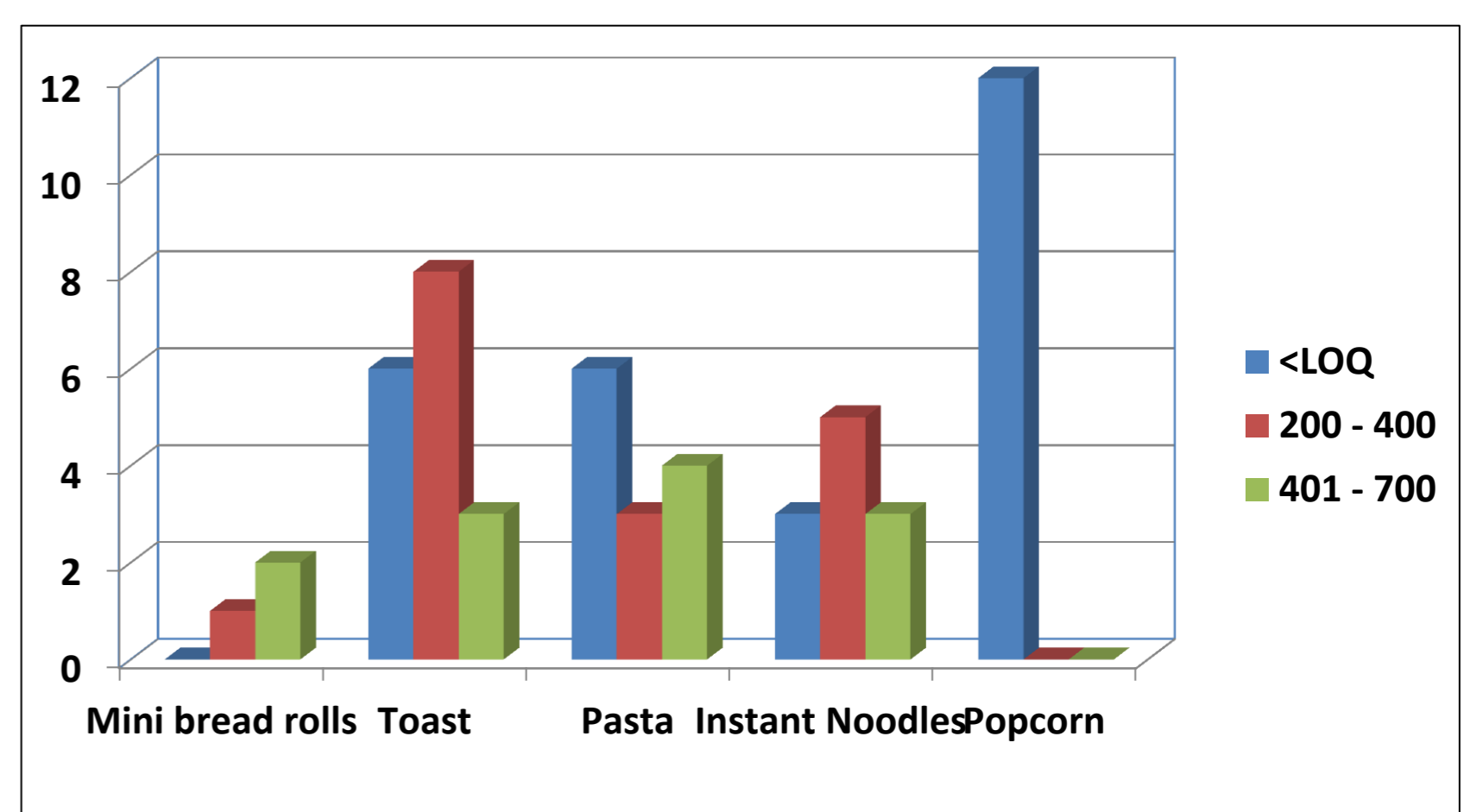


Figure 2 - Distribution of DON contamination in samples analyzed.

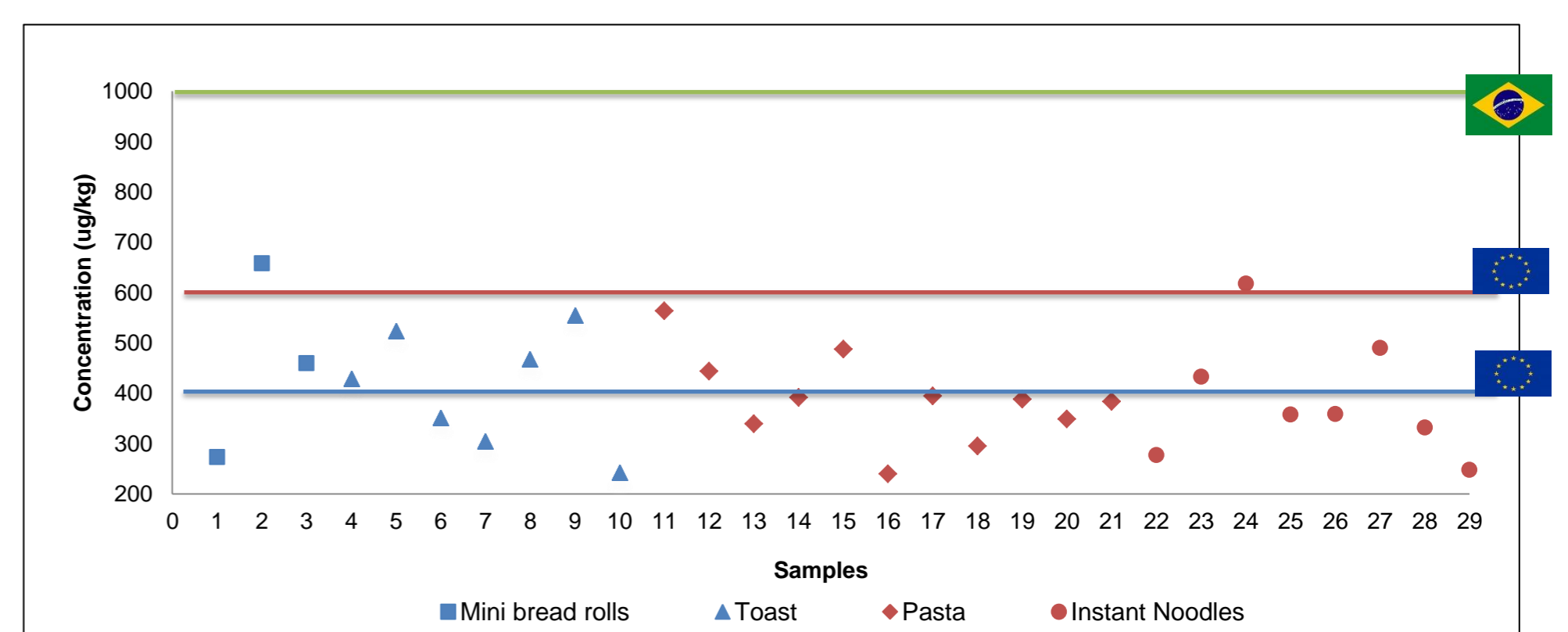


Figure 3 – Concentrations of DON above of LOQ in samples analyzed.

CONCLUSION

The frequent occurrence of DON, particularly in wheat products in Brazil, underscores the necessity for robust oversight by government authorities, considering the high consumption of these products by the Brazilian population and the potential health risks associated with this mycotoxin.

Although corn samples did not show contamination by DON in high concentrations, monitoring is important due to the diversity of corn products and their high consumption by the population.

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