

DETERMINATION OF AFLATOXINS IN CACAO POWDER AND COCOA-DERIVATIVES BY HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY

G. Salas¹, S. Lorán¹, T. Juan¹, J. J. Carramiñana¹, A. Herrera¹, C. Yagüe¹, M. Martínez-Pineda², A. Ariño¹, M. Herrera¹

¹*Instituto Agroalimentario de Aragón-IA2 (Universidad de Zaragoza-CITA), Facultad de Veterinaria, 50013 Zaragoza, España.*

²*Facultad de Ciencias de la Salud y del Deporte (Universidad de Zaragoza), 22002 Huesca, España.*

herremar@unizar.es

Aflatoxins are mycotoxins that can appear in the food chain as a result of crops infection by *Aspergillus* moulds before or after harvest in different food commodities, such as cereals, dried fruits, nuts, cocoa beans and spices. As aflatoxins are known to be genotoxic and carcinogenic for humans (Group 1 by IARC), exposure through food should be kept as low as possible. In addition, climate change is expected to have an impact on the presence of aflatoxins in food in Europe and worldwide.

In the present work, 81 samples of cacao powder and 38 samples of intermediate and final products of cocoa manufacturing were analyzed by HPLC-PHRED-FLD. Regarding the samples of cacao powder, 45 (55.56%) presented aflatoxin concentrations higher than the limit of detection (0.02 µg/kg), with a mean and maximum values of 0.79 µg/kg and 3.33 µg/kg, respectively. A direct relationship was observed between the cocoa content of the positive samples and the aflatoxin concentrations. On the other hand, 22 (57.89%) of the cocoa-derivatives were positive for aflatoxins, showing a mean value of 1.32 µg/kg and a maximum concentration of 4.05 µg/kg. The highest prevalence of aflatoxins was found in intermediate products from the fermentation of cocoa pods, such as NIBS, cocoa paste or the beans themselves, while final products after processing showed lower aflatoxin incidence.

This work provides reliable data on aflatoxin contamination in cacao products and on the distribution of aflatoxins during cocoa processing. The results obtained can contribute to a better risk assessment of the presence of aflatoxins in food and the resulting human health impacts.

Keywords: aflatoxins, cocoa, liquid chromatography, risk

Acknowledgements: The authors thank the financial support of the Spanish State Research Agency (PID2019-106877RA-I00) and the Government of Aragón (Grupo A06_20R).