No OTA in Fresh Cocoa Beans

LCI Cologne

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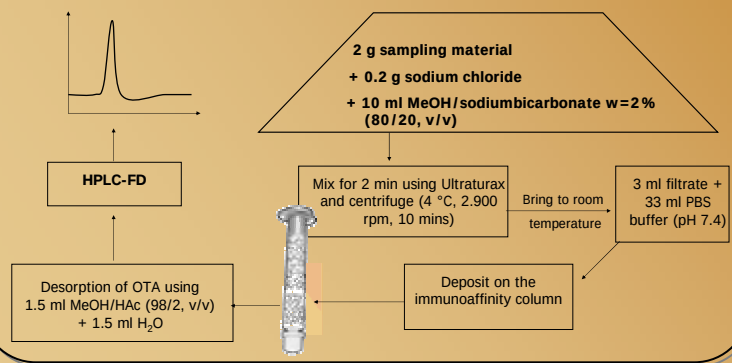
Objective

Ochratoxin A (OTA) is a secondary metabolite of toxigenic moulds, particularly of the genus Aspergillus ochraceus. It typically occurs in native types of cereal, nuts, coffee, and spices, etc. In addition, positive findings of this mycotoxin have also been made in cocoa [1-3]. There is no previously published data available on the source and development of ochratoxin A producing moulds and ochratoxin A itself in cocoa nor on the exact contamination timepoint within the cocoa extraction process or during cocoa processing.

Within the scope of an European (CAOBISCO) research project, the LCI examined a selection of fresh and undamaged cocoa pods from various growing regions for mycotoxin OTA content. With respect to possible contamination paths involving contact with OTA-producing fungi, there is a possibility that airborne fungal spores found their way directly into the cocoa plant tissue through rain, wind, etc. This contamination path comes into question for damaged, diseased cocoa plants. Furthermore, it is feasible that fungi occurring in the ground everywhere might have been picked up by the plant.

Both the cocoa beans and the pulp clinging to them were examined. In addition, a small selection of damaged or mouldy cocoa pods was included in the examination.

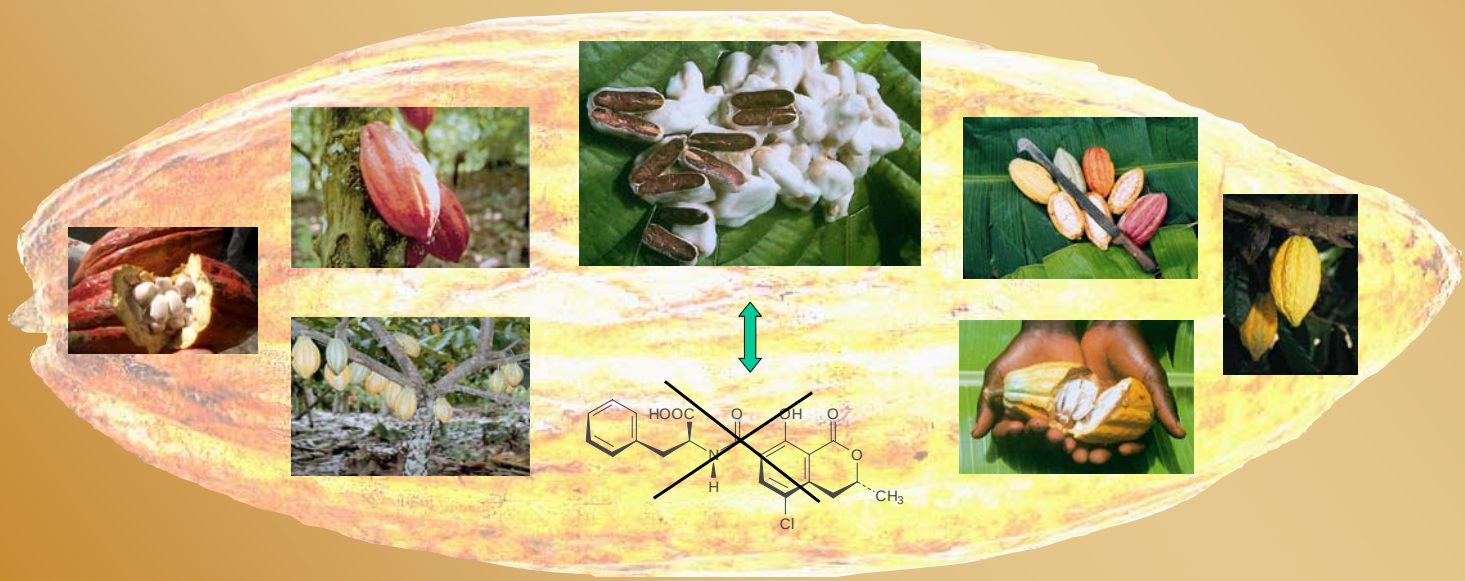
Analytics



Testing

A total of eight, outwardly healthy cocoa pods from the growing regions Dominican Republic (year of cultivation 1999) and Ghana (year of cultivation 2000) were separated into pulp and beans and tested for ochratoxin A content. The cocoa pods reached us still half-frozen and were immediately deep-frozen at -18 °C on arrival. In preparation for testing, they were manually opened and separated into beans and pulp. In addition, a small selection of damaged or mouldy cocoa pods was included in the examinations.

Analysis of fresh cocoa for ochratoxin A content was carried out according to the diagram above.



Conclusions

Our tests show that the ripening phase of cocoa pods from the tree up to being harvested was not a critical timepoint for the generation of the mycotoxin ochratoxin A. None of the analysed, fresh, healthy cocoa pods tested positive for mycotoxin above the limit of detection (NG=0.02 µg/kg).

This finding, however, by no means indicates that a contamination of damaged cocoa pods through OTA-producing moulds is ruled out; it all depends on the individual case at hand.

References

[1] Petzinger E (1998) Ochratoxin A aus toxikologischer Sicht. Getreide Mehl Brot 52:358-361
[2] Deutsche Forschungsgemeinschaft (1990) Ochratoxin A – Vorkommen und toxikologische Bewertung. VCH Verlagsgesellschaft, Weinheim
[3] Raters M, Matissek R (2003) Neue Studien zur Analytik und zum Vorkommen von Ochratoxin A in Kakao und kakaohaltigen Erzeugnissen (unpublished)

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