P-214 - ANTIFUNGAL EFFECT OF ORGANIC ACIDS ON ASPERGILLUS FLAVUS AND PENICILLIUM NORDICUM

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Background

The control of fungal contaminations is of great importance, since moulds are responsible for the loss of approx. 10% of the world's food production. Additionally, certain fungi produce highly toxic compounds known as mycotoxins.

Biological methods are being considered to combat fungal contamination, meeting consumers' demands for healthier and safer food. Lactic acid bacteria (LAB) are interesting for biopreservation because of their combined antifungal and probiotic properties. Antifungal ability of LAB is mainly associated to the production of organic acids (OA). Concerning mycotoxins, there are insufficient works demonstrating the influence of these acids in their production.

In this perspective, several OA produced by LAB were tested against two major mycotoxin-producing fungi: *Aspergillus flavus* and *Penicillium nordicum*, respectively producers of aflatoxins (AFs) and ochratoxin A (OTA).

Method

Lactic (LA), acetic (AA), propionic (PA), butyric (BA), phenyllactic (PLA), hydroxyphenyllactic (OH-PLA) and indole lactic acids (ILA) were tested by incorporation in MRS medium (0.1-8.0 mg/mL). Petri plates were centre inoculated with a spore suspension and incubated at 25 ºC for 7 days. Fungal diameters were measured daily and mycotoxins analyzed by HPLC at the end. All experiments were conducted in triplicate. Inhibitory concentrations (IC) were calculated.

Results & Conclusions

All tested OA were able to inhibit to some extent the fungal growth and the production of mycotoxins, with strongest effects observed on mycotoxins. Fungal growth was specially affected by BA, PA and AA, with 2 g/L being sufficient to suppress totally the growth of both fungi. However, AA evidenced a reduced effect on mycotoxins inhibition comparing to BA and PA. The least efficient of all acids was LA. Mycotoxin inhibition by BA, PA and AA resulted mainly from its capacity to impair fungal growth, while PLA, ILA and OH-PLA inhibited the mycotoxins production without affecting significantly fungal growth. Overall, higher IC values were obtained for *P. nordicum* than for *A. flavus*. IC_{90} (g/L) for AFs inhibition were: BA(0.25) < PA(0.38) < PLA(0.87) < AA(1.17) < ILA(1.47) < OH-PLA(1.8) < LA(3.92). IC_{90} (g/L) for OTA inhibition were: BA(0.95) < PA(1.53) < AA(1.66) < ILA(3.15) < PLA(4.5) < OH-PLA(13.09) < LA(45.9).

These properties of OA can make LAB a promising solution to reduce mycotoxin levels in food systems. The use of LAB with well-studied anti-mycotoxin properties and high production of most active OA can be an important advantage for food products.

References & Acknowledgments

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