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## Development of microbial inoculum for preventing aflatoxin contamination in corn silo

Ildiko Bata-Vidacs, Katalin Inotai, Akos Toth, Judit Kosztik, Szabina Luzics, Dorottya Sarkany and Jozsef Kukolya

National Agricultural Research and Innovation Centre, Hungary

Aflatoxin producing *Aspergillus flavus* strains, typical for the Balkan region, have appeared in large amounts in Hungary in 2012 due to global warming, which became evident from the reports of the European alarm system (RASFF) about the aflatoxin M contamination of Hungarian milks samples. The contamination reached the cattle herd interestingly not from the grain crops but from the corn silo. Namely, the mold produces aflatoxin as a stress metabolite under silage conditions. Our aim is to develop an inoculum that makes colonization and aflatoxin production of the mold impossible in silos. There are three possible ways of microbiological detoxification: Toxin degradation, toxin binding and toxin biosynthesis inhibition by other microorganisms. Regarding toxin degradation, only few microorganisms have been found to produce enzymes that could alter the structure of mycotoxins making them less toxic. *Rhodococcus* species have these abilities and so were used as components of the open silo inoculum. Toxin biosynthesis inhibition by bacteria is more plausible; according to the literature several *Lactobacillus* species produce small molecular weight metabolites that inhibit the growth and toxin production of molds. During this study four *Aspergillus flavus* strains, isolated in 2009 from maize, with the ability to produce aflatoxin and near 100 LAB strains from our collection were co-cultivated and the inhibition zones were measured. Against the studied four aflatoxins producing *Aspergillus flavus* strains, *Lactobacillus salivarius*, *Lactobacillus plantarum* and *Pediococcus pentosaceus* strains have the best inhibition ability. Growth of toxin-producing *Aspergillus flavus* can be hindered by other non-toxin-producing *Aspergillus* species, provided that the strain has better reproductive capacity than *Aspergillus flavus*. *Aspergillus oryzae* strains have been shown to produce no health hazardous substances. Fifteen *Aspergillus oryzae* strains have been purchased from international strain collections (DSMZ, BCRC) and tested for their antagonistic effect on *Aspergillus flavus* strains by five different methods. To be used as open silo inoculum, best growth parameters were obtained for the strain of *Aspergillus oryzae* DSMZ 1862. Based on the results of these experiments, the inoculum for the detoxification of corn silo consists of the selected strains of *Lactobacillus salivarius*, *Lactobacillus plantarum*, *Pediococcus pentosaceus* as starters and *Rhodococcus* sp. and *Aspergillus oryzae* for open silos.

## Biography

Ildiko Bata-Vidacs is a Senior Researcher of the Department of Environmental and Applied Microbiology of the Agro-environmental Research Institute, NARIC. She has received PhD degree in Food Science in 2002. Her current research fields include lactic acid bacteria, pre- and probiotics spore forming bacteria, food hazard microbes of plant origin, microbiological aspects of food preservation (novel and combined treatments) and food hygiene. She is a Member of the Board of the Hungarian Scientific Society for Food Industry and Member of the Hungarian Society for Microbiology.

batane.vidacs.ildiko@akk.naik.hu

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