Mycobiota contaminating beef burger and sausage with reference to their toxins and enzymes.

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Abstract:

Forty samples of beef burger and sausage (20 for each) were collected from supermarkets in Assiut Governorate during the period from July to November 2011. Samples were mycologically analyzed using dichloran Rose Bengal Chloramphenicol (DRBC) and dichloran 18% glycerol (DG18) agar media. The total number of fungal species on DRBC was higher than that on DG18 (46 versus 31 species in case of beef burger and 41 versus 33 in sausage). In the individual samples the fungal load varied from 6 - 600 colonies/g whereas the number of fungal species fluctuated between 2 and 8 species. Aspergillus, Penicillium and yeasts were the most prevalent fungi contaminating 70-100 % of the samples. Aspergillus niger, A. terreus, A. flavus, Penicillium chrysogenum and P. citrinum were the most common mould species on both beef burger and sausage samples. Sequencing of rRNA gene revealed the identification of 12 species belonging to 6 genera of yeasts which comprised Candida parapsilosis, Galactomyces candidum, Pichia kudriavzevii and Trichosporon domesticum as common ones. Testing the natural occurrence of mycotoxins showed that diacetoxyscirpenol and zearalenone contaminated 25 and 5 % of beef burger samples respectively whereas aflatoxin B1 was found in only 10 % of sausage samples. Out of 24 fungal species isolated from both substrates 10 (40 %) were able to produce detectable quantities of mycotoxins. Aflatoxin B1 was detected in the extracts of A. flavus cultures while aflatoxin B1, B2, G1 and G2 were produced by three isolates of A. parasiticus. Sterigmatocystin was formed by one isolate of Emericella nidulans whereas fumonisin B1 was secreted by two isolates of F. verticillioides. Most fungal isolates were able to produce lipolytic and proteolytic enzymes with the most active belong to A. parasiticus and F. oxysporum, which were also toxinogenic.

Keywords:

beef burger, sausage, moulds, yeasts, mycotoxins, lipase, protease

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