J Biotechnol Biomater 2016, 6:3(Suppl)
http://dx.doi.org/10.4172/2155-952X.C1.053

Development of immunoaffinity column and HPLC analysis method for simultaneous detection of aflatoxin B1, B2, G1, G2 and M1

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Aflatoxins are toxic and carcinogenic secondary metabolites produced by *Aspergillus* species. Due to their effects on health, its limits in food and feed are regulated by authorities. In determination of Aflatoxin (AFL) levels in food and feed, HPLC analysis upon clean-up with immunoaffinity column (IAC) is the mostly used method. IACs are used to concentrate and purify toxin content of the food or feed sample by the use of antibodies. In this study, 8G8 monoclonal antibody that recognizes AFL B1, B2, G1, G2 and M1 with high affinity was developed, produced in cell culture and immobilized on CNBr activated Sepharose resin without purification of antibody for cost effective and labor saving production of IACs. Antibody immobilized column matrix was filled within column and AFL spiked samples were applied to the columns. Aflatoxin content of eluates was analyzed with HPLC. Recovery % and relative standard deviation of developed IACs is calculated as 99.17% and 2.4 % relatively. These results show developed columns can be used for high performance clean-up of AFL B1, B2, G1, G2 and M1 containing food and feed samples. In addition, we developed an HPLC analysis method to discriminate AFL B1, B2, G1, G2 and M1 peaks for simultaneous detection of these aflatoxin types. By the use of IAC and HPLC analysis method developed in this study, easier and quicker analysis of the samples that have the risk of having multiple aflatoxin types can be achieved.

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The affect of *Lactobacillus plantarum, paracasei, casei* and *sanfranciscensis* on reducing acrylamide in bread

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Acrylamide as a possible carcinogenic compound is known to produce in heated carbohydrate-rich food such as bread. In this study, the effect of the fermentation process by four lactic acid bacteria (LAB) and yeast on an industrial scale, on acrylamide reduction in bread was studied. Results were shown that the flour specifications and the kind of microorganisms in the fermentation process are important factors for acrylamide formation in bread. Acrylamide content in control bread that fermented by yeast, which contained the highest amount of reducing sugars was found to be the highest (239.12 µg/kg). Fermentation by LAB and yeast reduced acrylamide formation. Fermented bread with *Lactobacillus paracasei* showed the lowest amount of acrylamide (131.06 µg per kg) due to its lower pH of sourdough (3.51) and glucose content (5.44 mg/g). Bread leavened with lactic acid bacteria starters had the softest texture to yeast starter. The addition of sourdough starters with mean pH 3.56 decreased pH of bread, which causes of enhancing the texture and sensory properties as well as reducing acrylamide. The sourdough bread, especially fermented bread by *L. paracasei* had the lowest amount of acrylamide and softest texture during three days.

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