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Extraction and Characterization of kefiran for potential detoxification of mycotoxin infections of food products.

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Introduction. The increasing demand for non-dairy milk alternatives is driven by several factors, including lactose intolerance, milk allergies, high cholesterol, and dietary preferences like veganism and vegetarianism[1]. Plant-based milks, derived from cereals, nuts, and seeds, are also sought after for their perceived health benefits. However, these products are susceptible to contamination with mycotoxins, particularly the highly toxic and carcinogenic aflatoxins. Produced by *Aspergillus* fungi, aflatoxins can develop in crops during harvesting, storage, or transportation, posing serious health risks such as liver cancer and other acute and chronic illnesses. The liver's role in metabolizing and detoxifying these toxins underscores the severity of the problem. Despite ongoing efforts to minimize fungal growth, aflatoxin contamination remains a significant concern, especially aflatoxin B1 which has been considered as a group 1 carcinogen by the International Agency for Research on cancer[2]. Some methods used in aflatoxin detoxification such as physical and chemical treatment approach have been found to have some effects on sensory and nutritional properties of the milk. A promising alternative for milk decontamination involves microorganisms, specifically lactic acid bacteria and their associated exopolysaccharides. Kefiran, the principal component of the kefir grain matrix, possesses a unique structure and composition that may offer advantages in mycotoxin binding. Aim: This research explores different extraction methods of kefiran and its impact on exopolysaccharide. This can be achieved by, (i) investigating the influence of different kefiran extraction methods on the quantity of extracted kefiran, (ii) To investigate the antioxidant activity of the kefiran, (iii) Using different methods in characterization of the exopolysaccharide.

Main part. Three Kefiran extract were obtained using three different methods of extraction described by [3]. Spectrophotometric method was used to quantify the protein and sugar content of the kefiran. Extraction methods which include extraction with 80℃ of boiling water, extraction with 80℃ boiling water with TCA treatment before ethanol precipitation and extraction using ultrasound at 60℃ yielded a kefiran concentration of 78.35 ± 1.63 mg/ml ,55.07 ± 4.29 and 81.4 ± 0.9 mg/ml for the sugars and 4.45 ± 0.49mg/ml, 2.23 ± 0.38 mg/ml and 5.69 ± 0.58 of proteins respectively. The result indicates that kefiran was successfully extracted and characterized with sugar as the most abundant constituents affirming it's exopolysaccharide nature and extraction methods M1 and M3 very effective. The antioxidant activities of the kefiran were recorded to be 9%, 7% and 9% respectively for M1, M2 and M3 indicating the potential and ability to scavenge free radicals in plant-based milk because of aflatoxin contamination. This antioxidant activity confirms the results established by [4]on dairy products

Conclusion. Kefiran was successfully extracted and characterized using the spectrophotometric method indicating sugars as the major component of the exopolysaccharide. Its antioxidant activity indicates its potential application in the food industrial for detoxification of mycotoxin infected products and other applications in yogurts and other fermented products to increase viscosity and control toxins.

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