Application of gamma radiation as a preservative of cereal mix and prevention of aflatoxigenic fungi

Laury Francis Costa

Energetic and Nuclear Technology, Brazil

Abstract

The cereal or bran mix is a flour composed of a mixture of ingredients, including flax, sesame and oats. The filamentous fungus Aspergillus flavus can contaminate this type of food and produce aflatoxin. The objective of this study was to analyze samples of cereal mix, irradiated or not, to verify if the gamma radiation can inhibit the contamination by aflatoxigenic fungi, besides maintaining the nutritional characteristics of the food. Methods: 9 different samples of cereal mix (M1 to M9) were analyzed in plastic or metallized packaging, commercialized in two ways: bulk and industrialized. Mycological analyzes (total and aflatoxigenic fungi), physical-chemical tests (ashes, moisture, proteins, lipids, carbohydrates, water activity) and labeling analysis were performed. Results and Discussion: The lowest dose of gamma radiation (2.5kGy) was sufficient to inhibit aflatoxigenic fungi in most samples, but the optimal dose was 5kGy. The bulk sample M3 had the highest fungal contamination (1.2×10^4 UFC / g), but the M8 had a greater variety of fungi. Since 75% of bulk cereal mix samples were positive for aflatoxigenic fungi. Sample M2 was the most irregular in the labeling, in violation of RDC nº360/2003 and RDC nº259/2002. Statistical tests showed both nutritional composition and grain germination were not affected by radiation. The MALDITOF method confirmed the Aspergillus flavus. Conclusion: It is necessary to standardize the list of ingredients of the cereal mix, to regulate labeling with the companies, and to guide consumers to buy cereal mix only in sealed packaging, since the bulk sale facilitates the contamination by aflatoxigenic fungi due to the manipulation and poor conservation.

Biography:

Laury Francis Costa had Bachelor in Biomedicine (UFPE, 2005), Specialization in Microbiology (FAFIRE, 2007), Specialization in Sanitary Surveillance (2015), Master in Nuclear and Energy Technologies (UFPE, 2011) and PhD in Nuclear and Energy Technologies (UFPE, 2016). I have experience in the area of Clinical Analysis and Food irradiation. I worked as a teacher in the Clinical Analysis technical course (ETEASD), in the disciplines Microbiology, Parasitology, Urinalysis, Biosafety and supervisor of internship. I was coordinator of distance technical course in Renewable Energy Systems-SER, e-Tec Brasil network (IFPE). I am currently an Analyst at the Central Laboratory (LACEN) of the State Department of Health and professor in Biomedicine graduation course at the University Center Mauricio de Nassau-UNINASSAU, in the disciplines Urinalysis and Clinical Biochemistry.