

THE STATUS OF FOOD IRRADIATION RESEARCH IN LOMONOSOV MOSCOW STATE UNIVERSITY

Tuesday, 12 July 2022 13:30 (20 minutes)

Radiation technologies are commonly used in different areas, such as medicine, in treatment of tumors, radioecology, to ensure radiation safety of the natural environment, and agriculture, to combat with pests and stimulate the growth of crops. Moscow State University (MSU) is currently focusing on five aspects of research in food irradiation.

Our researchers are particularly involved in the development of irradiation technology with accelerated electrons. Such a focus is determined by economic demand in view of the fact that electron accelerators have proved to be more efficient in terms of dose rate and processing speed, and much safer compared to radioisotopes. Moreover, it is possible to determine the irradiation depth by varying electron beam energy. However, it is still unclear how to achieve a consistent dose uniformity in objects of different geometry and texture. To solve this problem we have developed and tested a dose uniformity method using aluminium modifiers placed between the accelerator output and the treated object. Researchers of MSU are now improving this method to ensure the 100 % irradiation dose uniformity in objects with the linear dimension of up to 8 cm.

Another area of MSU research is the reconstruction of electron beam spectrum using experimental depth dose distributions in phantoms developed specifically for simulation and measuring dose values. Knowing the spectrum of industrial accelerator allows to calculate depth dose distribution in the objects of different geometry and precisely estimate the dose uniformity throughout the treated food item. In search of optimal irradiation treatment parameters, our researchers are studying the effect of the dose value and rate, as well as type of irradiation on microbiological and chemical composition of a range of foods. The data obtained during the research can be used for the development of state irradiation guidelines. One more area of the research is detecting the fact of foodstuff irradiation by means of gas chromatography to identify organic volatile compounds, which show that some irradiation treatment has been performed on the item. Also the fluorescent fingerprinting express method is being assessed as a potential strategy to prove the fact of irradiation treatment. To address the needs of agriculture our university is studying the impact of pre-seeding irradiation treatment on crops infected with different fungi to increase the yield and its phytosanitary safety.

The speaker is a student or young scientist

No

Section

1. Nuclear technology and methods in medicine, radioecology

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Session Classification: Nuclear technology and methods in medicine, radioecology.