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BOOK OF ABSTRACTS

TABLE OF CONTENTS

Click on the title of the abstract to access it

INVITED TALK

CONFERENCE ABSTRACTS

Effect of ionizing radiation on sprouting and phenology of potatoes infected by fungus *R. Solani*

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Radiation treatment of agricultural products, in particular potatoes, is an effective way both to combat a wide range of fungal, viral, and bacterial diseases and to have a suppressive effect on the germination of agricultural crops during long-term storage. The study was carried out to observe the effect of 1MeV accelerated electrons in doses ranging from 20 Gy to 3000 Gy on the sprouting and phenology of potato tubers of the cultivar Agata naturally infected with the fungus *Rhizoctonia solani Kuhn*.

Seedling development of unirradiated seed potato tubers was recorded on the 15th day after planting. Shoots of irradiated potato tubers came later: at a dose of 20 Gy - 5 days later, at 40 and 150 Gy - 10 days later, and at 100 Gy - 12 days later than in the case of the control tubers. During the growing season, a significant delay in the differentiation of shoots was observed in irradiated potato plants even at the lowest doses. Thus, at doses of 20 and 40 Gy, mass shoots were recorded on the 33rd and 35th days, and full shoots - on the 56th and 40th days from planting, respectively. At the same time, in the control tubers samples, these phenophases occurred on the 17th and 19th days after planting. Mass shoots of potatoes grown from planting tubers irradiated at a dose of 100 Gy were observed on the 52nd day, and the phase of full shoots didn't come. A dose of 150 Gy prevented the potatoes from reaching the phases of mass and full emergence. Exposure to seed tubers at a dose of 200 Gy and more completely inhibited germination of tubers.

The tendency of lagging behind was observed in the development of potato plants and continued in the budding phase of potatoes. The beginning of flowering was recorded on the 72nd and 57th days after planting only in samples irradiated by 20 and 40 Gy, respectively. Moreover, in the control samples, this phenophase occurred on the 43rd day after planting, which is 29 and 14 days earlier than in samples irradiated by 20 and 40 Gy, respectively. Radiation treatment of tubers with doses of 100 and 150 Gy did not allow the plants to bloom. Thus, ionizing radiation in the dose range from 20 to 150 Gy had a negative impact on the growth and development of the potato culture. Doses over 200 Gy resulted in complete inhibition of tuber germination.

A study of new crop potatoes was carried out for the development of Rhizoctonia in pre-planting tubers after irradiation. The prevalence of sclerotia in tubers decreased with an increase in dose compared to non-irradiated control samples. The prevalence of sclerotia on potato tubers after irradiation by the dose of 20 Gy was at the control level. Irradiation of potato seed tubers with the dose of 40 Gy decreased *Rhizoctonia solani* on the surface of tubers of the new crop by half compared with the control samples, while irradiation of potato tubers with 150 Gy completely eliminated *Rhizoctonia solani*.

The lesser amount of sclerotia on the surface of the new crop samples irradiated with the doses of 40-150 Gy in comparison with the control samples can be explained by a long process of plant formation, a shorter period of tuber accumulation, and, consequently, a shorter period of tuber exposure to *R. solani*.

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Research of the effects of electron and X-ray radiation on the volatile content of turkey meat

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To solve the problems of ensuring the country's food security, it is necessary to introduce environmentally friendly technologies that enable the growth of production as well as reduce losses during storage and processing.

These requirements are met by radiation technologies used to extend the shelf life and sanitary control of agricultural and food products.

At the same time, the task of increasing the efficiency of radiation processing continues to remain urgent, an optimal irradiation scheme is selected, and the possibilities of using various types of radiation sources are evaluated.

The purpose of the work is to compare the effects of X-rays and accelerated 1 MeV electrons in the same dose rate on the composition and concentration of volatile compounds in chilled turkey meat.

As an object of research, samples of turkey were selected that had been stored in a refrigerator at a temperature of 2 ℃ for no more than two days from slaughtering. The irradiation of the samples was carried out on a UELR-1-25-T-001 continuous electron accelerator with an energy of 1 MeV, an average beam power of 25 kW at an average beam current of 600 nA at an ambient temperature of 20 ℃. In the case of X-ray radiation, the samples were irradiated using an X-ray diffractometer with a PUR5 / 50 power source and a BSV-23 X-ray tube with a copper anode. The tube current in all experiments was 25 mA, the voltage was 30 kV, and the operating power of the tube was 0.75 kW. The ambient temperature was 20 ℃. A Frikke dosimeter was used to measure the dose absorbed by the samples during irradiation. A promising method of gas chromatography combined with mass spectrometry (GC-MS) was used to identify volatile compounds in irradiated products.

As a result, the dependences of the concentrations of volatile compounds after irradiation with electron and X-rays were obtained. Based on the results of the study, approximations were constructed and it was noted that the concentration of aldehydes in irradiated samples increases linearly with the increase in the dose, regardless of the type of radiation. With X-ray irradiation, an increase in the concentration of volatile compounds relative to electron irradiation was observed. The slope coefficients in the linear approximation were also large. The concentration of acetone increased linearly with the increasing dose for both types of radiation; for the control (not irradiated) sample, this compound was not detected, which makes it possible to use this ketone as a marker that allows identifying the fact of radiation treatment of meat products.

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