

## **SURFACE IRRADIATION INSTALLATION BASED ON URT-0,5M ACCELERATOR\***

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A surface irradiation installation based on the URT-0,5M accelerator (~ 0.45 MeV, 1 kW) [1] that includes built-in radiation protection and a radiation-resistant conveyor of products under the beam was developed based on the peculiarities of application in industrial poultry farming [2].

The oil-filled tank of the accelerator, where a circuit of high voltage generation is located, has detachable side covers for ease of installation and maintenance. A vacuum diode is used for double-sided irradiation with a beam diameter of ~ 100 mm. The core of the pulse transformer is made of 1V-M magnetic conductors.

Built-in radiation protection is made of grade S3 lead, the thickness of the sheets (up to 36 mm) is based on the calculation, moreover, the dose limit allowed in the Russian Federation (20 mSv/year) is provided at a distance of 1 m from the beam axis during operation 2000 hours/year.

The radiation-resistant conveyor consists of a console and a conveyor. The console contains ED3100 frequency converter, which allows to adjust conveyor belt speed by setting frequency within the range from 1 to 50 cm/s.

All systems are operated and controlled from a personal computer connected to the control panel using a fiber-optic communication line up to 25 m long. The operating and control program installed on the laptop runs on Windows 7. Information on vacuum level, high voltage level, pulse generation and status of all sensors is supplied to control and monitoring program and recorded in a text file [3].

Tests of the installation showed that the resulting doses of the electron beam are sufficient for surface disinfection of eggs (~ 12 kGy) simultaneously on both sides at a rate of movement of egg cassettes of 3.1 cm/s, which provides a productivity of up to 5400 eggs/hour. Dosimetry showed that the designed protection provides the required level of safety.

### REFERENCES

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