программирования C++, хотя для подобных целей подавляющее большинство использует Python. Выбор обусловлен:

- Низким уровнем языка, что означает более высокую скорость компиляции;
- Наличием небольшого опыта работы с этим языком;
- Наличием всех необходимых библиотек в открытом доступе.

ELECTRON BEAM ENERGY CONTINUOUS MEASURING DEVICE

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Developing the device for controlling electron energy in sterilization process. As the electron beam goes through the set of aluminum plates, electric charges are formed in them. Charge distribution in the depth of the absorber allows one to determine primary beam's electron energy.

In modern medicine, various sterilization methods for medical products and personal protective equipment are used to ensure the sterility of the used ones. Radiation sterilization uses either electronic or gamma radiation. The Innovative Center for Radiation Sterilization in the Ural Federal University implements radiation treatment, including sterilization, of various products using the electron accelerator UELR-10-10C.

The process of radiation sterilization is strictly regulated by international and internal standards of production activity; it requires certification of accelerator set and validation of radiation effects on each type of product. The fulfillment of the established norms guarantees the quality of medical products and its safety.

The electron energy is one of the monitored parameters of the accelerator, which determines the penetrating power of electrons and their distribution into the depth of production. When the energy changed, for whatever reason, it is necessary to re-conduct the equipment certification and validate the process of radiation sterilization. Therefore, monitoring the value of electron energy is an integral task of the production process.

The target device is an assembly of aluminum plates, with dielectric material placed between them. Since the maximum range of electrons with energy of 10 MeV in aluminum is of the order of 1.4 cm, and the thickness of the metal plate is about 2.3 mm, we made 6 plates in all.

As the electron beam passes through this device, the particles will lose some of the energy in each plate, mainly due to ionization and excitation, until they lose their energy completely. As a result, the plates will accumulate a charge proportional to the energy losses. Further, measuring the charge accumulated on each plate, we will obtain

its depth distribution and determine the range of electrons and the energy of the particles.

During irradiation, the accumulated charge and its depth distribution in aluminum are measured. Further, according to the empirical formula, a calculation of the energy is carried out according to a certain projective range.

At the moment leakage currents and electrical breakdowns between the plates have a significant impact on the result. It is demand the selection of dielectric for elimination this problem. The dielectric material must be able to withstand severe external conditions: high temperature and the disrupt effects of ionization radiation.

ENZYMATIC TREATMENT TO INCREASE EXTRACT YIELD FROM CHLORELLA ALGAE

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Algae has shown to contain bioactive compounds which is of interest for researchers in different fields. Feasible extraction methods are essential for researchers to perform their experiments on those bioactive compounds and for industry for mass production. The use of enzymes to pre-treat algae before extraction lead to much better yield and higher quality extract [1].

Chlorella is a single cell green algae. Chlorella growth factors are a group of water soluble proteins and peptides found in the algae which have proved to be of interest for researchers due to their biological activity in different fields [2]. Water extraction is the usual extraction method used in industry to extract Chlorella growth factors . We studied the effect of pre-treatment of the algae with Cellolux-A enzymatic preparation on the outcome of water extraction and to find the most efficient enzymatic treatment time.

Dry Chlorella powder and water as a solvent have been used to prepare extracts. Hot water at T=95°C is used for 20 minutes to make the extraction. The final extracts were subjected to spectrophotometer analysis at 260 nm (Shimadzu U-1800, Japan). Other samples were prepared by treating them with Cellolux-A enzyme (Sibbiopharm, Russia) in different time. They were then processed with hot water the same as before. The final extracts were measured using spectrophotometer Shimadzu U-1800 (Japan) at the same wavelength to compare them with non-treated samples and to compare between the different treatment time applied.

Enzymatic pre-treatment has dramatically increased the final quality of extract. Growth factors content is calculated based on spectrophotometer analysis and the weight of solid extracted materials in the sample and shown in Table 1 .

Table1. GF Index for samples with enzymatic treatment and for non-treated ones