

THE FREQUENCY OF THE CHROMOSOMAL ABERRATION UNDER GAMMA IRRADIATION OF DYPLOID AND TETRAPLOID FORMS OF THE TUBERS OF THE *S. TUBEROSUM* SPECIES

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Summary. The frequency of chromosomal aberrations was studied with gamma irradiation of dihaploid (2n) and tetraploid (4n) tubers of *S. tuberosum*.

Introduction and aim. One of the most important criterion of the evaluation of the radiosensibility of the target material in the effectiveness of the mutagenic agent is the frequency of induced chromosomal aberration. In our experiment, to determine the causes of the different reaction of dihaploid (2n) and tetraploid (4n) forms of potatoes to the effect of gamma radiation, chromosome rearrangements in anaphrose and telophases of the first mitotic division in the meristematic tissues of the primary roots after irradiation of tubers in doses of 10 and 25 Gr were investigated .

Materials and methods. A comparative study of radiosensibility was carried out on 9 grades and hybrids of tetraploid potato (4n), primary dihaploid (2n) PDS 83-44 (*S. tuberosum* Ukrainian NIIKH) and secondary dihaploids with a wide genetic basis T-707 (dihaploid *S. tuberosum* x *S. chacoense* USA). For cytological analysis, the primary roots were fixed in acetic alcohol (3 parts of alcohol: 1 part acetic acid) and stored in 80 ° alcohol. To view under microscope prepare acetocarmic pressure drugs. The percentage of chromosomal aberrations (bridges, fragments, bridges + fragments) was taken into account in the antenna and telophases of the first mitotic division. Investigated 20-30 roots in each variant. In one version, 10 - 30 ana- and telophases were viewed.

Results and conclusion. The results of the cytologic analysis showed that 4n had more damaged cells than 2n. So, at the dose of irradiation of 10 Gr the frequency of the appearance of the bridges and fragments in anaphase and telophase of the mitosis was 7,2 – 8,7 % in 4n and 4,1 – 4,5 % in 2n. The same consistent pattern is noticed at the dose of the irradiation of 25Gr. Taking into consideration the fact that tetraploid cells have more chromosomes, there is almost the same number of aberrations per one chromosome in all studied variants. There is even a trend to reducing aberration per one chromosome in tetraploid forms. So, at the dose of irradiation of 25 Gr in 2n it was 0,36 – 0,38%, and in 4n – 0,33 –

0,35%. In the control variant all the aberrations are represented with the bridges, and under gamma irradiation, apart from bridges, there are fragments or, seldom, combined aberrations(bridges + fragments). There are fewer anaphases with fragments than with bridges. This can be explained by the fact that chromosomes in the potato are very small and fragments appearing under the influence of gamma irradiation are even smaller, therefore a part of them is badly visible under the microscope and remain unaccounted. Consequently, the results of the primary growing processes in tubers and data of the cytologic analysis prove that radioresistance accompanies the increase of the ploidy. It might be probably explained by the quicker recovery of the cell nucleus in tetraploid forms due to the larger number of chromosomes. The number of aberrations per one chromosome in all studied variants is nearly the same.

Keywords: gamma irradiation, radiosensibility, chromosomal aberration, dyploid, tetraploid.