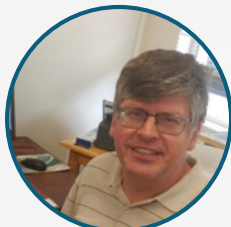




# INTERNATIONAL CONFERENCE ON CELL SCIENCE AND REGENERATIVE MEDICINE



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## The effect of Gamma Irradiation on nucleolar activity, the presence of chromosomal abnormalities and the efficiency of energy conversion as indicators for mutation breeding in *Triticum turgidum* ssp. durum L. cultivar Orania

**Abstract:** The effect of gamma irradiation of kernels on nucleolar activity, mitotic index, as well as the number of bridges, ring chromosomes, micronuclei and incomplete mitosis as indicators of metabolic activity and growth retardation, was investigated in root tip cells of tetraploid wheat *T. turgidum* ssp. durum. The efficiency of energy conversion into growth was used as an indicator for the optimal dosage for mutation breeding. Seeds of *Triticum turgidum* ssp. durum L. cv. Orania (AABB) were given gamma irradiation dosages of 50, 150, 250 and 350 Gy. Root tips were fixated in La Cour's 2BD from 17.5 to 47.5 h after the onset of imbibition to study the first mitotic division and its consequences on the cells that were in G2 and G1 phases at the time of gamma irradiation. Untreated material produced a maximum of four nucleoli formed by the nucleolar organizing regions (NORs) on chromosomes 1B and 6B. In irradiated material additional nucleoli were noted in the nuclei and nucleoli were also noted in the micronuclei. Highly significant increases in the number of bridges, micronuclei, ring chromosomes and interphase cells with incomplete mitosis occurred at different irradiation intervals. The efficiency of energy conversion into growth retarded accordingly with an increase in gamma irradiation dosages. The increase in number of nucleoli in the nucleus was due to incomplete mitosis and the overall increase in nucleoli in cells was due to activation of the NORs on chromosome 1A in micronuclei. The efficiency of energy conversion into growth decreased due to cell death and energy used for repairing of damaged cells.

**Keywords:** Chromosomal abnormalities, cytogenetics, efficiency of energy conversion, gamma irradiation, mutation breeding, nucleolar activity.

**Biography:** I am presently working for the Agricultural Research Council – Small Grain (18 years) as a wheat and mutation breeder as well as being the Curator of the Small Grain Germplasm Collection. I also have experience in human cytogenetics karyotyping. As mutation breeder, I have been involved in two projects collaborating with the IAEA. I am investigating methods to determine the optimal dosage for mutation breeding in seed propagated plants, making use of *Triticum* (wheat) as my model plants, because they form a polyploid complex. I am also a reviewer for 11 journals.