

Effects of Ionizing Radiation on Respiratory Capacity of Pea

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Peas are legumes widely consumed around the world and ionizing radiation (IR) is a non-conventional technique that reduces post-harvest losses. However, studies suggest that IR stimulates radical oxygen species (ROS) production and can affect respiration of plants leading to growth decreasing. This study aims to evaluate the effect of different doses of radiation on respiratory capacity of pea seedlings during 7 days of germination. Consumption of O₂ was evaluated by Oxygraph Hansatech in irradiated seeds with 100 and 250 Gy during 7 days of germination. The radicle and caulicule growth until day 4 remains in a similar profile in all groups of seeds, although after the day 4 were observed an inhibition of growth in a dose-dependent way being 49,01% and 68,1% in radicle and caulicule of irradiated seeds with 250 Gy, respectively. On the 5th day of germination of irradiated seeds we showed less O₂ consumption compared to non-irradiated seeds in about 92,5% in radicle with a dose of 100 Gy, and 75,8% in caulicule with 250 Gy. Interestingly, an addition of 10mM of glucose decreases O₂ consumption about 61% in caulicule in 7th day of germination, 1mg/ml oligomycin does not promote inhibition of O₂ consumption in all doses tested and 1mM FCCP were unable to accelerate O₂ consumption as expected to do in radicle of irradiated seeds on day 5 of germination. In conclusion, ionizing radiation inhibits growth of seeds and reduces O₂ consumption, suggesting that ionizing radiation can affect respiratory capacity, probably by uncoupling the respiration to ATP synthesis.

Keywords: peas, ionizing radiation, O₂ consumption and germination.

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