

# Microwave pretreatment of tomato seeds and fruit to enhance plant photosynthesis, nutritive quality and shelf life of fruit

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## Abstract

The present study was undertaken to explore the effect of non-thermal microwave pretreatment of tomato seeds and fruit to enhance plant photosynthesis; nutritive value and shelf-life of fruit. The tomato fruit of two varieties i.e. NS-585 and NS-2535 were collected from the plants grown from control and single microwave dosed (9.3 GHz) seeds. The fruit collected from single dosed condition were again irradiated and further analyzed for various parameters. Cardinal points were calculated to assess the photosynthetic activity at the fruiting stage in plants of both the cultivars and were found to increase in plants raised from irradiated seeds in comparison to the control plants. The exposure of tomato fruit with double dosed microwave radiation showed high lycopene content, total protein content, phenolic and flavonoid content in unripe, ripe and overripe stages of both varieties. The activity of cell-wall degrading enzymes such as polygalacturonase, pectinmethylesterase and  $\beta$ -galactosidase decreased in doubled dosed microwave irradiated fruit of both varieties as compared with the other. The gene expression analysis of ACC synthase and ACC oxidase showed reduction in the enzyme activity in double dosed microwave irradiated tomato fruit. We conclude that post-harvest microwave exposure can be applied to increase the shelf-life of tomato fruit.