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Studies on catalase activity in different Indian potato cultivars (*Solanum tuberosum* L.)

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In plants, supra-optimal light, salinity, insufficient supply of water and mineral nutrients, atmospheric and soil pollutants, attack by microbial pathogens and aerobic metabolic activities are some of the major contributing factors towards stress conditions which lead to the accumulation of reactive oxygen species (ROS). ROS include any derivative of molecular oxygen (O_2) such as superoxide (O_2^-), hydroxyl radical (·OH), singlet oxygen ($^1O_2$) and hydrogen peroxide (H_2O_2). H_2O_2 is a potential signal molecule involved in various metabolic processes involved in plant development. In plants, many enzymes are known to metabolize hydrogen peroxide such as catalases, ascorbate peroxidases (APX), peroxiredoxins (PRX), glutathione/thioredoxin peroxidases (GPX). Catalases have low affinity for H_2O_2 and therefore, notably high KM value and play an important role in stress-linked H_2O_2 signaling. In addition, they catalyze dismutation reaction without any reductant. In this study, we focused on some commercially important Indian potato cultivars namely Kufri Chipsona-1, Kufri Chipsona-2, Kufri Chandramukhi, Kufri Ashoka, Kufri Pukhraj and Kufri Jyoti. They represent early, medium and late maturing varieties. The exotic cultivar desiree was taken as reference. All these plants were grown under field condition and different tissues like tuber, stem and leaves, were collected at different stages of growth. The purpose was to carry out catalase assay in different tissues of the individual cultivars. Tissues were frozen in liquid nitrogen and homogenized in phosphate buffer (pH-7.0). The clarified crude extracts were used for both catalase assay and protein estimation. Catalase activities were found to be significantly different between growing and mature tubers within the cultivar and between the cultivars. The growing tubers showed significantly higher catalase activity as compared to the mature tubers. Leaf tissues showed considerable activities but it was very low in the stem tissues. Efforts were also made for purification of catalase from the tubers and other tissues. The data of the study clearly suggest significant variation regarding stress response between the cultivars.

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