Thermostability assessment, profiling and localization of peroxidase activity in stem tissues of *Leptadenia pyrotechnica*: a defensive enzyme for survival in high temperature conditions

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Plants are known to overcome the biotic and abiotic stresses through various adaptive measures. Lignification is one such process that fortifies the cell wall wherein peroxidases play an important role. Here, we studied the thermostability and optimum pH of peroxidase activity, isozyme profile and its localization in stem tissues of the perennial desert shrub, *Leptadenia pyrotechnica* (Forsk.) Decne, locally called 'khip', belonging to the family Apocynaceae (subfam. Asclepiadaceae). *L. pyrotechnica* is an important component of the extreme arid environment of the Thar Desert. Apart from lignifications, peroxidase plays vital role in, suberization, detoxification of hydrogen peroxides, fruit ripening, cross-linking of cell wall components and salt tolerance. The highest (72%) and lowest (8.5%) relative activity of peroxidase was observed at pH 6 and pH 3, respectively. Peroxidase of *L. pyrotechnica* was highly active within a broad range of pH 6-8. The maximum (81.5%) relative activity was observed at 40° C for 25 min. Relative activities of 52.3-23.1% were observed at 60 and 80°C, respectively, for 5 min of treatment. Five isozymes of peroxidase were observed in the zymogram. The bright amber and red colour of peroxidase and lignin were observed, respectively, in the stem tissues. Co-localization of peroxidase and lignin in xylem tissues of stem in *L. pyrotechnica* can be correlated with the role of peroxidase in lignin biosynthesis and for adaptive modification of arid zone plants under extreme climatic conditions.

Keywords: Abiotic stress, Adaptation, Kheemp, Khip, Lignification, Thar Desert