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Research Article

Effect of Plant growth regulators on catalase activity in *Simarouba glauca* seedlings

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Abstract

Plant growth regulators play important role in plant growth and development. The present investigation was carried out with the objectives to understand the effect of different plant growth regulators (PGRs) such as GA, 6-BA, CCC, SA, Cysteine and Methionine on enzyme catalase activity of *Simarouba glauca.* The seeds were soaked in 100 ppm solutions of 6BA, GA, CCC, cysteine, SA and Methionone for 48 hours at room temperature and Distilled water as control. The results showed that the activity of enzyme catalase was positively influenced by GA, CCC and methionine in cotyledon while it was considerably decreased in shoot tissue of two-month-old seedlings of *S. glauca*

INTRODUCTION

Simarouba glauca is rainfed wasteland evergreen ediable oil tree commonly known as 'Laxmitaru' or 'paradise tree' belonging to family Simaroubaceae. *Simarouba glauca* has a long history in herbal medicine in many countries. It is one of the important herbal drug used against dysentery hence its bark is also known as dysentery bark. The bark and leaf extract of *Simarouba* is well known for its different types of pharmacological properties.

Plant growth regulators are organic compounds, which are synthesized in very small quantity in plants and play an important role during seed germination growth and development of horticultural and forest plants, hence, are becoming most popular in forest and horticultural nurseries.

MATERIALS AND METHODS

Freshly harvested seeds of *S. glauca* were purchased from Sri Sri Institute of Agriculture, Bangalore. Before treatment seeds were surface sterilized by $HgCl_2$ (0.1%) and washed with distilled water. There are six treatments of four replicates. The seeds were soaked in 100 ppm solutions of 6BA, GA, CCC, cysteine, SA and Methionone for 48 hours at room temperature. The twenty-five seeds were sown in plastic trays densely filled by FYM and soil (1:3). The germinated seeds and seedlings were analyzed to find out the activity of enzyme catalase. Catalase activity was determined by following the method of Luck (1974) as described by Sadasivam and Manikam (1992). The soluble proteins in the enzyme extract were determined according to the method of Lowry *et al.* (1951). The enzyme activity is expressed as unit min^{-1} mg^{-1} protein.

RESULTS AND DISCUSSION

The activity of enzyme catalase was significantly elevated in mechanically broken seeds soaked for 48 h in GA (Fig. 1) and slightly declined in response 6-BA, CCC, cysteine, SA and methionine. The activity of enzyme catalase significantly increased after 30 days of growth and this increase was more pronounced in response to SA, CCC and GA treatments (Fig. 1).

It was also noticed that the activity of enzyme was positively influenced by GA, CCC and methionine in cotyledon while it was considerably decreased in shoot tissue of two-month-old seedlings (Fig. 2).

Positive correlated was recorded by Nanda (1960) between activity of catalase and growth of seedlings. Mukherji and Paul (1971) noticed that catalase activity in rice seed germination was enhanced till 96 hr. afterwards there was declined activity. CCC inhibits the activity of catalase whereas GA increases it (Sangeeta and Varshney 1991). Chen (2009) studied change in enzymes activity during seed germination of *Ardisia crenata* after soaking with GA and 6BA and observed that catalase activity was increased in early seed germination and then it was declined. The increased catalase activity was found in Manilla grasss pretreated with SA, 6-BA, $CaCl_2$ and H_2O_2 (Wang *et.al.,* 2009). Ren Ji-Jun *et al*., (2006). Reported increasing concentration of CCC increases catalase activity in French Marigold. Increased activity of catalase was observed by Yusuf *et al.* (2008) in *B. juncea*.

In the present study a decrease in catalase activity during early hours of germination which further induced after one-month growth and again it declined after two months growth of seedlings. According to Karpinski *et al.* (1999) during early periods of germination catalase activity was decreased due to less amount of H_2O_2 to induce the necessary enzyme systems required for germination. While there was increase in the activity of enzyme catalase in seeds and cotyledons in response to GA which leads to induce the activity of enzyme amylase which results in the breakdown of carbohydrates which are utilized by embryo axis for development of radical and plumule. This might be helpful for the development of S. glauca in nursery and also helps in improve the vigour of seedling. Thus, pretreatments of *S. glauca* seeds with GA helps to improve the seed germination and seedling growth during nursery development.

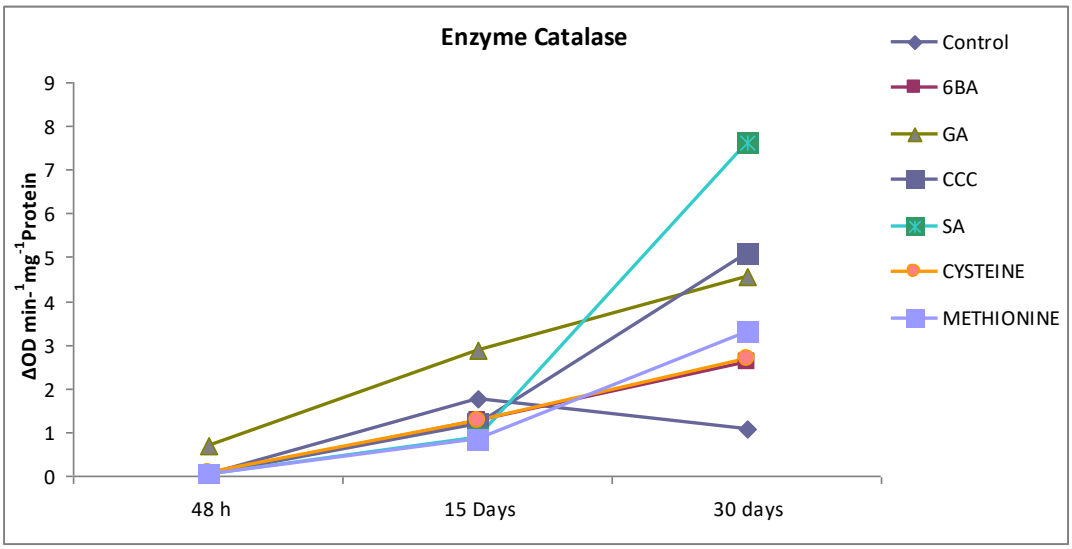

Fig.1 :Effect of presowing soaking treatments of PGRs on the activity of enzyme catalase in seedlings of *S. glauca*

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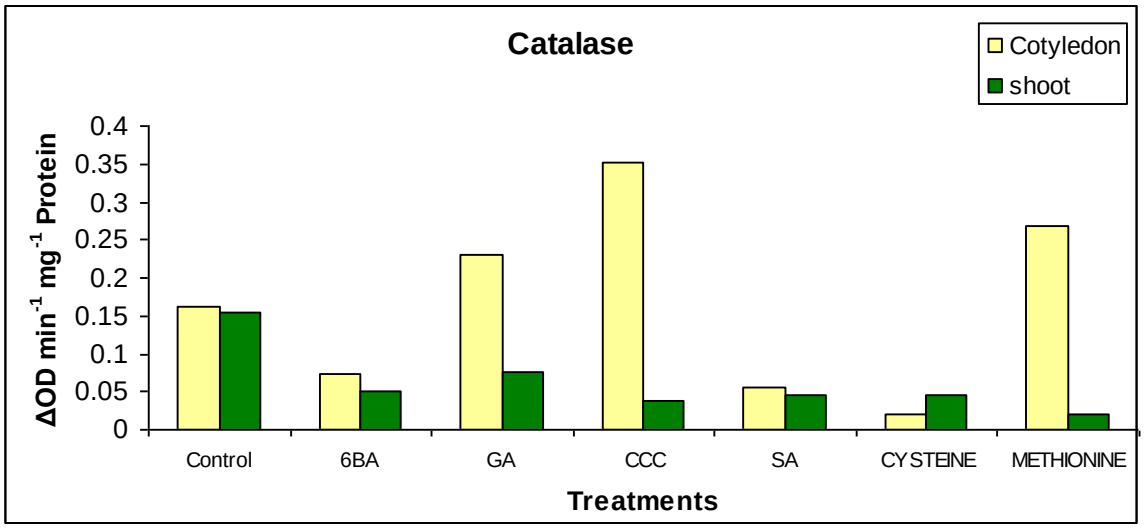

Fig. 2: Effect of presowing soaking treatments of PGRs on the activity of enzyme catalase in 60 days old seedlings of *S. glauca*

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