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# EFFECT OF PGRS ON THE ACTIVITY OF ENZYME LIPASE IN MEDICINALLY IMPORTANT OIL YIELDING *SIMAROUBA GLAUCA* SEEDLINGS

**Manasi. S. Patil[1] and D. K. Gaikwad[2]**
[1]Department of Botany, Sadguru Gadage Maharaj College, Karad
[2]Department of Botany, Shivaji University, Kolhapur
manasipatil202@gmail.com

**Abstract :**
*Simarouba glauca* is medicinally important oil yielding plant. The seeds of this plant have poor seed germination and viability. In the present study the effect of pretreatments of PGRs on the activity of enzyme lipase during seed germination of *Simarouba glauca* DC. was investigated. Seeds were treated with 100 ppm solutions of different PGRs such as GA, 6-BA, CCC, SA, Cysteine and Methionine. The results showed that the activity of enzyme lipase was induced in response to all the PGRs in 48 h soaked seeds as well as germinating seedlings after 15 and 30 days of growth. It was also noticed that as the seedlings matures the activity of enzyme lipase reduces. The enzyme lipase is primarily participated in lipid metabolism of fatty seeds, induction of enzyme lipase due to these PGRs will definitely and positively changes the overall lipid metabolism during germination of *S. glauca* seeds which helps to promote seedling growth.

**Keywords:** *Simarouba glauca,* Peroxidase, 6-BA, GA, SA, CCC, Cysteine and Methionine

## Introduction

*Simarouba glauca* is 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 drugs 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. *Simarouba* forms an important source of edible oil for various South and Central American Countries and is widely grown in countries like Costa Rica, El-Salvador, Honduras Cuba, Nicaragua, Mexico, Haiti, Jamaica [1]. From 1950 onwards, in El-Salvador and other Central American Countries the oil marketed for edible purposes under the trade name manteca vegetal "nieve" and oil is well accepted [2].

During germination of oil seeds lipid metabolism play a key role to provide energy through respiratory processes for growing embryos. In cereals the source of energy is exactly reverse that the starch content serves as energy source during early germination stages. The breakdown of lipids takes place through the process of β oxidation to produce fatty acids in the glyoxylate cycle in the glyoxysomes [3]. Succinate produced through TCA cycle is further metabolized in the mitochondria and by enzymes of EMP (Embden Meyerhof Parnas) pathway in the cytosol from the hexose sugar [4]. During the germination process of fatty seeds lipids are converted into sucrose. In the present study an attempt has been made to study study the effect of pretreatments of PGRs on the activity of enzyme lipase during seed germination of *Simarouba glauca* DC.

## Material and Methods

Freshly harvested seeds of *S. glauca* were purchased from Sri Sri Institute of Agriculture, Bangalore. The seeds were surface sterilized with 0.1% mercuric chloride ($HgCl_2$) thoroughly washed with distilled water. 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 germinating seeds were analyzed to find out the activity of enzyme lipase. 5 g of germinating seeds of *S. glauca* (from each treatment) were taken and seed coat was removed. For extraction and study of lipase activity titrimetric methods were used [5]. Enzyme activity was expressed as ml alkali consumed $h^{-1}$ $g^{-1}$ fresh tissue.

## Results and discussion

It is observed from figures 1- 4 that the activity of enzyme lipase is significantly induced in response to all the PGRs in 48 h soaked seeds as well as germinating seedlings after 15 and 30 days of growth. It is also noticed that as the seedlings matures the activity of enzyme lipase reduces.

Lipase is the initial enzyme responsible for lipid degradation and thus serves as analogous to that of α-amylase in cereals. Lipase activity is an essential process for the metabolism of storage lipids in germinating seeds. There are several reports on lipase activity involved in mobilization of reserve material in oil seeds controlled through hormones and plays an important role during germination. Lipase activity of germinating *Hura crepitans* (sandbox) seeds [6]. They observed lipase activity increased during initial stages of germination and

maximum value is obtained on 12th day and then decreased. Lipase is regulated by gibberellins[7]. In four oil seed rape cultivars of *Brassica napus* and *Brassica rapa* enhanced lipase activity was noticed by 1.5-7 fold over control. The effect of GA, NO3 - and NH4 + on germination of *Pinus halepensis* seeds and lipase activity at early germination were studied under controlled conditions [8] they concluded that GA, NO3 - and NH4 + stimulated lipase activity in seeds at early germination stage. Seed treatment with CCC and SA (100 ppm) increases lipase activity in soybean germinating seeds [9].

Conclusion

The activity of enzyme lipase is stimulated during germination of *S. glauca* seeds in response to presowing soaking treatments with different plant growth regulators which can be controlled through hormonal actions. As the enzyme primarily participated in lipid metabolism of fatty seeds induction of enzyme lipase due to these PGR's will definitely positively changes the overall lipid metabolism during germination of *S. glauca* seeds.

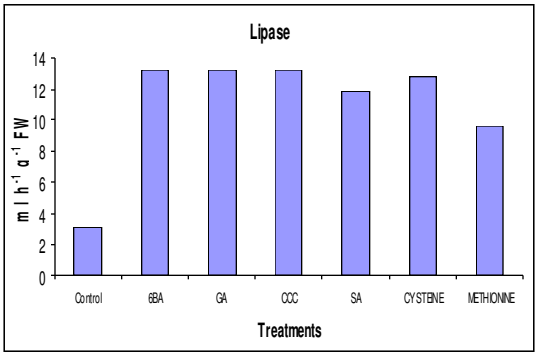


**Figure 1:** Effect of presowing soaking treatments of PGRs on the activity of enzyme lipase in 48 h soaked seeds of *S. glauca*

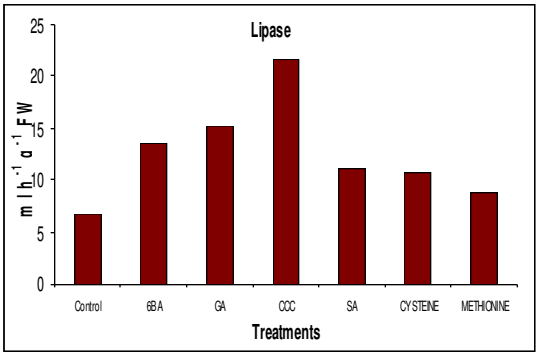


**Figure 2:** Effect of presowing soaking treatments of PGRs on the activity of enzyme lipase in 15 days germinating seedlings of *S. glauca*

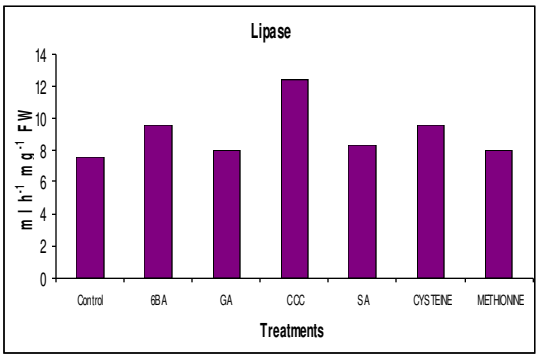


**Figure 3:** Effect of presowing soaking treatments of PGRs on the activity of enzyme lipase in 30 days germinating seedlings of *S. glauca*

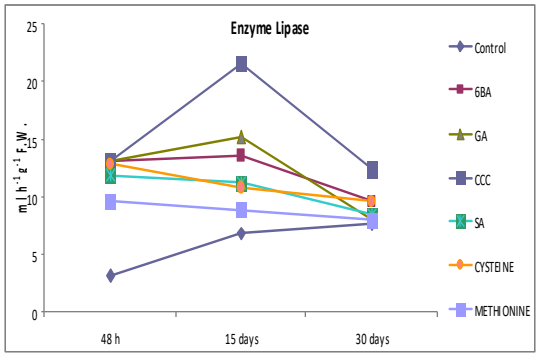


**Figure 4:** Effect of presowing soaking treatments of PGRs on the activity of enzyme lipase in seedlings of *S. glauca*

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