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Studies on Biochemical Changes during Dormancy, prouting and Developing Gladiolus (*Gladiolus x grandiflorus L.*) Corms

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Abstract—*The present study was carried out to determine the changes in some reserve molecules of gladiolus corms during dormancy, sprouting and initial plant development. Four varieties named, Red Ginger, Sunset Jubilee, Pacifica and Little Prince were taken as experimental materials to examine the changes of Reducing sugar, Non reducing sugar and Vitamin C (Ascorbic acid) activities in corms. The results indicate that total reducing sugar (2.97, 3.42, 3.09 mg g^{-1} f.w) and non reducing sugar (1.63, 1.67, 1.17 mg g^{-1} f.w) levels showed increasing trend up to sprouting stage thereafter trend was decreased in developing corms. Ascorbic acid (2.17, 1.17, 3.35 mg/g) levels decreased as the sprouting progressed and content was high at the opposite trend at initial plant development stage. Results suggest that significant changes took place in the Reducing sugar, Non reducing sugar and Vitamin C.*

Keywords*: corms, dormancy, sprouting, plant development, sugar, ascorbic acid.*

1. INTRODUCTION

Gladiolus is one of the commercially important flower crops mainly propagated through corms. Corms suffer from dormancy for a time, which restricts the cultivation period of this crop. In general mobilization of corm reserves following sprouting is essential for the corm to complete new plant establishment. Some enzymes particularly peroxidase (POD) and polyphenol oxidase (PPO) play a role in breaking the dormancy as well as development of plants from corms in gladiolus. Thus, the investigation was carried out with four genotypes of gladiolus to examine the changes in PER and polyphenol oxidase PPO activities in corm reserve during different stages of corm development of gladiolus.

2. MATERIALS AND METHODS

The experiment was conducted at Dept. of Floriculture, Medicinal & Aromatic Plants, Uttar Banga Krishi Viswavidyalay, Pundibari, Cooch Behar, West Bengal, India during 2013-14. The experimental design was adopted by two factor complete randomised block design in which four varieties viz, Red Ginger, Sunset Jubilee, Pacifica and Little Prince for one factor and dormancy, sprouting and initial plant development as second factor. Estimation of peroxidise and poly phenol oxidase were done by Thimmaiah (2004) and Mayer *et al.,* 1965 methods. Statistical analysis of the data for studying the experiment in two factors CRD was analyzed through variance (ANOVA) using F tests. A significance level of 0.05 was used for all statistical tests.

3. RESULTS AND DISCUSSION

Peroxidase (POD) activity in gladiolus corms was decreased progressively with significant variation from dormant stage (2.53 u g^{-1} fw) to the sprouting and initial stages of plant development in regardless of the varieties (Fig. 1). This decrease in POD content was reported by Benkeblia and Selselet (1999) in his experiment of chilling effect on onion bulbs. On the other hand, during the period of dormancy and growth, the polyphenol oxidase activity in corms increased and this continued until initial plant development stage (11.16 u g^{-1} fw) when the study was terminated regardless of varieties (Fig. 2). The role of polyphenol oxidase is a good index for determination of specific stages of development. This enzyme is expressed is fully in the organs with intensive growth and development (Sangari, 1994).

4. CONCLUSION

The experimental results concluded that peroxidase activity in corm tissues of gladiolus decreased progressively wherein polyphenol oxidase increased from dormant stage to the advancement of sprouting and initial plant development.

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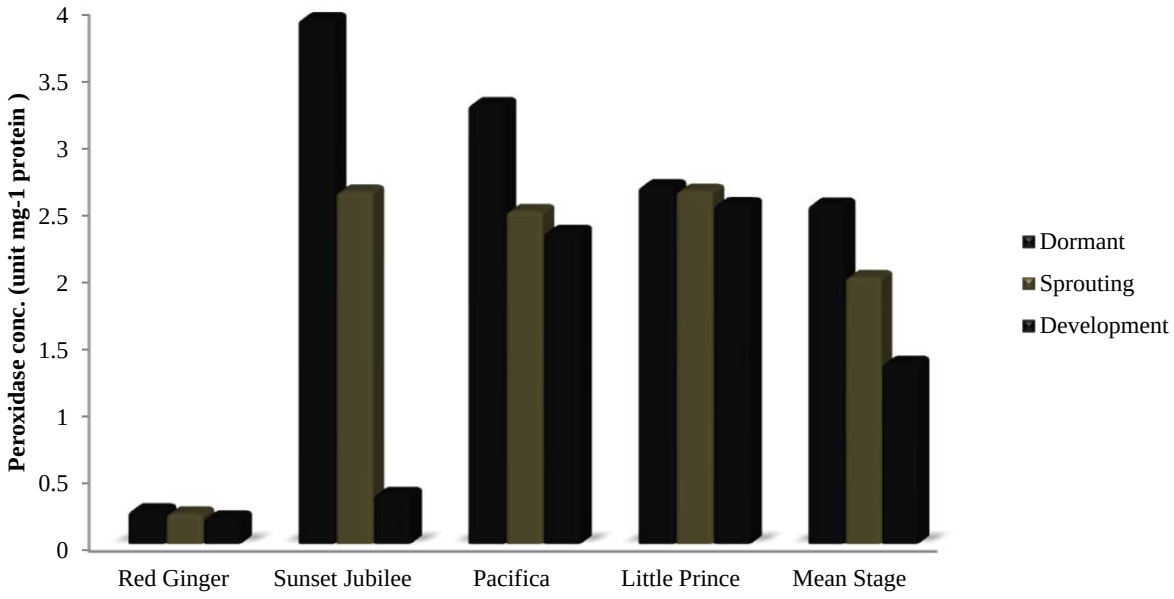

Fig 1. Changes in peroxidise activities in corms in different stages of development

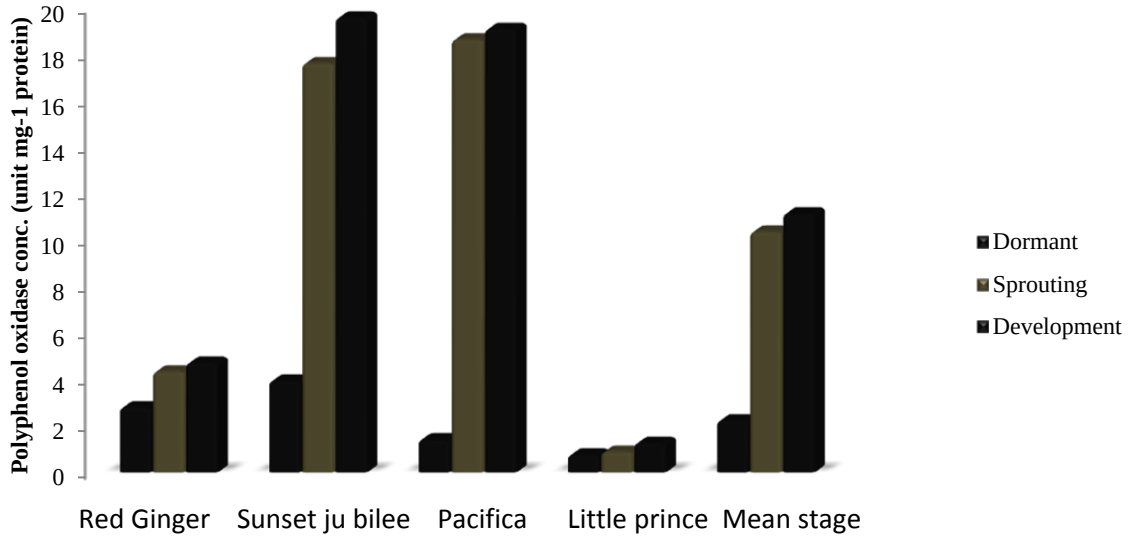

Fig 2: Changes in polyphenol oxidase activities in corms in different stages of development