



Accumulation of Free Amino Acids in *Pentatropis nivalis* (J.F. Gmel.) Field & Wood Growing on Secondary Salinized Soils of Baramati Tehasil (M.S.) India

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The present investigation was made to understand change in concentration of free amino acids in *Pentatropis nivalis* (J.F. Gmel.) Field & Wood, growing in secondary salinized soils from six sites of Baramati Tehasil (M.S.) India

INTRODUCTION

Pentatropis nivalis (J.F. Gmel.) Field & Wood liana belongs to Family Asclepiadaceae growing in association with *Prosopis julifera* L. The species is able to grow in secondary salinized soil. Although there are some information about the halophytes vegetation of secondary saline soils, there are not enough scientific information about the salt tolerant mechanism of this halophyte. The purpose of this present investigation was to investigate the free amino acids role and seasonal variations in the adaptation mechanism of *Pentatropis nivalis*.

MATERIAL AND METHODS

The plant material (*Pentatropis nivalis* J.F. Gmel) used in the present investigation was collected seasonally from the secondary six man-made salinized habitats such as Baramati, Barhanpur, Medad, Mekhali, Khandaj and Songaon located in Baramati Tehasil (M.S.) India during the year 2013 to 2014. Collected plant material was separated into the vegetative parts like leaves, stems and roots. Then washed thoroughly first with fresh water and followed by washing with distilled water then blotted to dry. Furthermore, sun dried leaves, stems and roots were oven dried and powdered separately and analysed for free amino acid.

RESULTS

The free amino acid content in leaves, stems and roots of *P. nivalis* collected during three seasons (Table 1) showed that amount of amino acids in leaves varied between 0.16 to 1.06 per cent, in stems between 0.07 to 1.61 per cent and in roots between 0.05 to 1.68 per cent. These findings further

showed that accumulation of free amino acids was maximum in leaves as compared to stems and roots with few exceptions. Seasonal changes showed that accumulation of free amino acids is lesser in vegetative parts collected during monsoon and summer season.

DISCUSSION

Plants subjected to salt stress conditions gives complex molecular responses by synthesizing proteins and other osmoregulatory substances (Zhu *et al.*, 1997) for maintaining informal water potential below than that of outside (soil) and help to maintain turgidity for absorbing water through roots for growth of plant (Tester and Devenport, 2003). Many researchers concluded that synthesis of metabolic solutes or uptake of soil solutes with the help of roots endowed to tolerate salinity in growth media. Furthermore, it is universally accepted that low molecular weight organic compounds such as proline, glycine-betain and other quaternary ammonium compounds, acyclic and cyclic playing key role in osmo-regulation between vacuoles and cytoplasm in halophytic plants (Popp and Albert, 1995) because they interfere normal functioning of cell (Zhifang and Loesher, 2003).

According to Yokoi *et al.*, (2002) the process of accumulation of osmolytes as a response to osmotic stress is an essential process occurring as diverse as bacteria to plants and animals. However, osmolytes that varies with the organs and even between plant species. Similar results have been observed in case of accumulation of free amino acids in leaves, stems and roots of *Pentatropis nivalis*. Accumulation of free amino acids observed highest in leaves as compared to roots and stems.

Table 1 : Seasonal variation of amino acids in *Pentatropis nivalis*.

Seasons	Leaves (%)	Stems (%)	Roots (%)
Monsoon	1.04 ± 0.003	0.70 ± 0.4	0.44 ± 0.3
Winter	0.25 ± 0.3	0.12 ± 0.1	0.11 ± 0.1
Summer	0.59 ± 0.1	0.92 ± 0.4	0.55 ± 0.3

*Each value represents Mean ± SEM of six replications.

Greater content of principle amino acids in halophytes *Salvadora persica* (Krishnakumar, 1986), *Atriplex griffithii* (Anjaiah, 1987) and *Prosopis julifera* (Hinglajia, 1997). *S. fruticosa* and *H. mucronatum* were noted in dry season (Khot, 2003).

Present investigations clearly showed that accumulation of free amino acid was lesser in vegetative parts of *Pentatropis nivalis* during winter season as compared to plant parts harvested during summer season. Joshi and Hinglajia (2000) also reported that accumulation of aspaergins, glutamic acid, methionine, phenylalanine and proline in young mature leaves and stems of *Prosopis julifera* significantly different during monsoon, winter and summer. According to Vyas *et al.*, (2014) maximum and minimum accumulation of amino acids in *S. persica* was observed in different seasons, inconsistent trend was observed from minimum accumulation of amino acids.

CONCLUSION

At present no data is available to our knowledge for comparative study of seasonal variations in accumulation of free amino acids in same species growing at six different secondary salinized sties. Furthermore investigations in this study would reveal whether accumulation of free amino acids in *Pentatropis nivalis* is affected by different habitats.

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