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Effect of salt stress on lipid peroxidation activity in *Amaranthus gangeticus* L.

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Abstract

Salinity stress is one of the most vital abiotic stresses which results in significant damages in plant growth and productivity. Plant growth regulators are widely used to overcome a biotic stresses including salinity stress in plants. The exogenous applications of plant growth regulators like Putrescine, S.A., GABA, and Biotonic under the NaCl salinity stress (50, 100 mM) on the lipid peroxidation of A. gangaticus was studied. lipid peroxidation is decreased at 50 and 100 mM NaCl salinity stress as compared to unstressed control plants. It is also noticed that the lipid peroxidation is reduced due the foliar applications of Putrescine, GABA, SA and Biotonics formulation under salt stressed condition as well as stressed and unstressed condition and this reduction is significantly higher than the unsprayed control. While in stem tissue the lipid peroxidation showed similar pattern except in plant treated with 50 mM NaCl treated plant sprayed with Putrescine, GABA, SA and Biotonics formulation. This decrease in lipid peroxidation might be associated with their membrane stabilization or this might be to due to accumulation of the quaternary ammonium compound glycinebetain which helps to reduce the generation of free radicals followed by reduction in lipid peroxidation.

Keywords:- Salinity, lipid peroxidation ,GABA, Biotonics putrescine, SA.

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1. Introduction:

lipid peroxidation is an indicator of extend of oxidative damage under salinity stress (Bor et al. 2003). Increase in MDA content was due to an accumulation of OH- ion which oxidized membrane lipids and leads to leaky membrane (Katsuhara et al., 2005). Lipid peroxidation is caused by hydroxyl ion (OH-) which damage to organelles and cell integrity and leads to an accumulation of degradation compounds which is in the form of malondialdehyde (MDA (Gill and Tuteja, 2010).

Amaranthus is a sturdy double duty crop with its edible leaves, stem and grain which provide the critically essential amino acids, lysine and methionine, also it is a rich source of omega 3 fatty acids. *A. gangeticus* is originated from tropical Asia. The domestication of *A. gangeticus* took place in prehistoric times. It is rare exotic vegetable in several countries. It is introduced by Indian immigrant and occasionally cultivated in big cities of east and southern Africa. In Asian countries *A. gangeticus* is eaten raw in salads, in India its soft stems are eaten like moringa fruits.

In this study, we hypothesized that this decrease in lipid peroxidation might be associated with their membrane stabilization or this might be to due to accumulation of the quaternary ammonium compound glycinebetain which helps to reduce the generation of free radicals followed by reduction in lipid peroxidation.

	50	0.58	0.34 (-41.38)	0.86 (+48.28)	0.62 (+6.90)	0.64 (+10.34)
	100	1.34	0.78 (-41.79)	0.94 (-29.85)	0.72 (-46.27)	0.84 (-37.31)

Each value is mean of three determinations.

Each value is expressed as μ mole MDA g^{-1} fresh tissue.

Values in parenthesis indicate percent increase (+) or decrease (-) over the control.

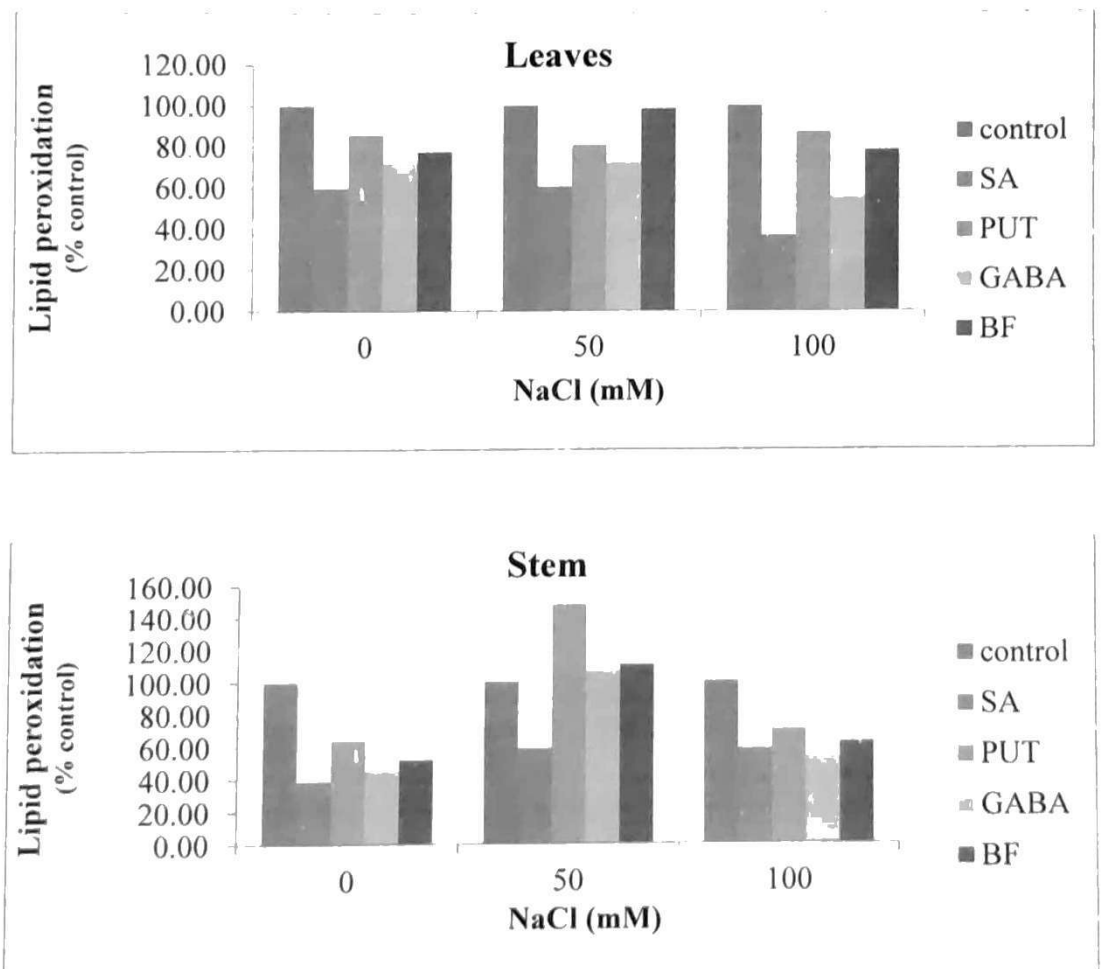

Fig 1. Effect of foliar application of plant growth regulators on Lipid peroxidation in the leaves and stem of *A. gangeticus* L. grown under NaCl salinity stress.

3. RESULT AND DISCUSSION:

Effect of foliar application of SA, Putrescine, GABA and Biotonic formulation on lipid peroxidation content of the leaf and stem tissue of *A. gangeticus* grown under saline condition is

shown in Figure 1. It is evident from the results that the content of lipid peroxidation is decreased at 50 and 100 mM NaCl salinity stress as compared to unstressed control plants. It is also noticed that the lipid peroxidation is reduced due the foliar applications of Putrescine, GABA, SA and Biotonics formulation under salt stressed condition as well as stressed and unstressed condition and this reduction is significantly higher than the unsprayed control. While in stem tissue the lipid peroxidation showed similar pattern except in plant treated with 50 mM NaCl treated plant sprayed with Putrescine, GABA, SA and Biotonics formulation.

Salinity stress did not causes any change in malondialdehyde indicating the membrane integrity even under high level of salinity (Mishra and Das 2004). In Crithmum maritimum rate of lipid peroxidation was low in both leaves and stem tissue under 50 mM NaCl (Ben-Amor et al. 2005). In halophyte H_2O_2 content and lipid peroxidation decreased under salinity stress which is responsible for protection from oxidative stress induced by salinity (Pang et al. 2005).

In the present study the reduction in lipid peroxidation under stressed condition as well as due to the application of PGR`s was noticed in leaf and stem tissue of *A. gangeticus.* This decrease in lipid peroxidation might be associated with their membrane stabilization or due to accumulation of the quaternary ammonium compound glycinebetain which helps to reduce the generation of free radicals followed by reduction in lipid peroxidation.

4. Conclusion :

The reduction in lipid peroxidation under stressed condition as well as due to the application of PGR`s was noticed in leaf and stem tissue of *A. gangeticus.* This decrease in lipid peroxidation might be associated with their membrane stabilization or this might be to due to accumulation of the quaternary ammonium compound glycinebetain which helps to reduce the generation of free radicals followed by reduction in lipid peroxidation.

Reference:

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