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Physiological role of glycine betaine on sunflower (*Helianthus annuus* L.) plants grown under salinity stress

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Abstract: A pot experiment was carried out at the wire house of the National Research Centre, Dokki, Cairo, Egypt to elucidate the physiological effect of Glycine betaine (0, 2.5, 5 and 7.5 mM) as GB0, GB1, GB2 & GB3 on alleviation the adverse effects of diluted sea water at 3.85 and 7.69 dS/m levels (S1 & S2) on two cultivars of sunflower plants. Low concentration of sea water (3.85 dS/m) increased the studied growth parameters, meanwhile, high concentration (7.69 dS/m) decreased them. Meanwhile, the two levels of diluted sea water decreased photosynthetic pigments, yield, yield components, oil% and protein % of the yielded seeds of sunflower two cultivars compared with plants irrigated with tap water. In contrast, increasing sea water levels led to increases in total phenolics, free amino acids, proline and total soluble sugars contents. Special attention was paid to the effect of GB treatments on salt stressed sunflower that stimulates plant salt tolerance via improving growth parameters, photosynthetic pigments, free amino acids, proline, phenolic and total soluble carbohydrate contents relative to their corresponding salinity controls, thus increasing yield and yield components. From these results, pre-sowing sunflower seeds with glycine betaine seem to enhance sunflower salt tolerance by improvement of photosynthetic pigments, osmoprotectants of vegetative organs, hence improved plant growth and consequently improved yield quantity and quality. Fatty acid profile of sunflower oil show some changes under the effect of salinity and GB treatments.
Key words: fatty acid, glycine betaine, *Helianthus annuus* L., oil, osmoprotectant, proline, salinity stress.

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