

TITLE

BIOCHEMICAL AND BIOLOGICAL STUDIES ON SALT STRESSED SPIRULINA PLATENSIS

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Cultivation of *Spirulina platensis* under salt stress conditions (0.02, 0.04 and 0.08 M NaCl) led to a remarkable decrease in dry weight, chlorophyll a content as well as certain xanthophylls (neoxanthin and violaxanthin) while β -carotene production was stimulated especially at higher salt concentrations. Biochemical analysis of salt stressed alga revealed that lipid content was slightly increased together with certain saturated and unsaturated fatty acids especially the polyunsaturated ones (Gamma linolenic acid). Electrophoretic analysis of soluble protein pointed out that certain high molecular weight protein bands were not detected comparing with the protein marker. Five new protein bands of molecular weights 190, 158, 113, 77 and 28 kDa were recorded, in addition to an increase in the intensity of 6 already existing bands .

Phosphate buffer and water extracts of the alga exhibited antiviral activities against both Hepatitis-A-virus-type-MBB (HAV-MBB strain, RNA virus) and Herpes simplex-virus-type-1 (HSV-1, DNA virus). Water extracts was found to be more effective than phosphate buffer extracts in inducing antiviral activities (98%) especially against HSV-1 virus.

Hot water extract of the salt stressed alga demonstrated higher anticoagulating activity compared with those of heparin and the positive control measured by clotting time assay.

Antioxidant activity (2, 2 diphenyl-1-picrylhydrazyl and 2,2'-azino-bis (ethylbenzthiazoline-6- sulfonic acid methods) of the algal extract revealed moderate antioxidant activity of the non-polar algal extracts (petroleum ether) which were doubled with increasing extract concentration (55.0, 60.4 and 62.3, 66.8 μ g/ml at 0.02, 0.04 M NaCl respectively) the lowest activity was recorded by the partially polar (ethyl acetate) algal extract of both concentrations at all salinity levels. While the polar extract (ethanol and water) showed higher antioxidant activities which were doubled with increasing extract concentration. Ethanolic algal extract (of 100 μ g/ ml at 0.08 M NaCl) exhibited the highest antioxidant activity (using DPPH, ABTS methods) compared with those of the synthetic antioxidant butylated hydroxy anisol (85.0, 89.9 and 86.0, 91.8% respectively).

Keywords: Antioxidant-Antivirus -Biochemical studies- -*Spirulina platensis*- Salt stress