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Isolation and Identification of Halophytic Algae from Salty Soil Around Salt Lake of Turkey

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Abstract: In this study, algae were isolated from salty soils around Salt Lake. The algae, which were isolated and grown in BG-11 medium, were later identified. The correlation of algae with physical and chemical properties of soil were determined. The species of genera with a very high salt tolerance were *Chroococcus, Nostoc, Phormidium, Lyngbya, Spirutina, Chiorelia, Scenedesmus* and *Nitzschia.*

Key words: Salty soil, halophytic algee, Turkey

Introduction

Algae are organisms which have very wide spread areas. Their existence and tolerance in the soil is limited with medium sources (Metting, 1992). In this study, isolating from salty soil identified algae. It is though that this study as a basis for the studies that will be done later on sally soil algae. Working area includes the northwest region of Salt Lake. The region is completely dry and randomly encounter to plats live on soil.

Materials and Methods

From the region, on July 1999 and September 1999 samples were taken once from the selected four stations. When the samples were taken, from the part between the surface of soil and distance of 20 cm, with the help of small metal pipe, soil samples were taken. The samples were brought to laboratory and put into the petri dishes with diameter of 10 cm. Soil was wetted sufficiently with pipette and covered with lamella and left under light for 24 hours for algae to do phototaxi motion. After that, algae that were taken from lamella by the help of inoculation loop; were put to the solid culture medium (BG 11) (Allen, 1968). Reproduction was observed in the tubes within fifteen days. Preperates of algae that were taken from the medium were prepared, identified and their photos were taken. For the identification the necessary resources (Prescott, 1975; Patrick and Reimer, 1966; Czarnecki and Blinn, 1978) were used. After that, by the help of micropipette again under the microscope the algae were isolated (Rippka, 1988) transferred to liquid B-11 were placed over white floresance, which gives light of 2000 lux. For the growth of algae at the room temperature without taking sunlight.

Results and Discussion

The physical and chemical analyses of sail were done in Soil and fertilizer Research Center of General Head office of Village services (Table 1). From the identification of the cultures that were produces the study, 4, 3 and 6 genus were identified belonging to Bacillariophyta, Chlorophyta and Cyanophyta respectively. These genus genus are listed as systematically alphabetic below.

Cyanophyta: *Anabaena macrospora* Kebahn. (Fig. 1a) Prescott (1975), Page 517, Plate 117, Fig. 4-6. Trichomes planktonic, straight or flexous, solitary; somewhat ellipsoid 5-6,5 μm in diameter, 6-8 μm long; heterocytes sherical 6 μm in diameter.

Chroccoccus varius A. Braun (Fig. 1b) Prescott (1975), (page 451, plate 100, Fig. 15). An irregularyl shaped colony of 2-8 spherical cells inclosed by a hyaline, forming dark- green or brownish mosses on moist aerial substrates, cell contents blue-green or olive, not granular; cells 2-4 μm in diameter.

Lyngbya taylorti Drouet and Strickland. (Fig. 1c) Prescott (1975), page 503, Plate 113, Fig. 3). Flaments straight; trichomes very slightly tapering to the apices; cells 3-5 μm in diameter, filament 19 B24 μm in lenght.

Oscillatoria angusta Koppe (Fig. 1d) Prescott (1975), page 485, Plate 109, Fig. 7). Trichomes loosely entangled to form a thin plant mass, or solitary; not tapering toward the apex; apical cell bluntly rounded; cells 1-1,3, μm diameter, 6-8 μm long.

Phormidium agustissimum W. et GS West (Fig. 1e) (Page 142, Fig. 124). Filaments forming a blue-green: with long cells. The last cells shorter and apex rarely straight, sometime becoming confluent with the mucilage of the plant mass; cells 0.6-1 μm in diameter, 2-5 μm long, cell contents finely granular.

Spirulina laxa G.M Smith (Fig. 1f) Prescott (1975), Page 479, Plate 108, Fig. 10) Trichomes loosely spiralled, forming a dark blue-green mass, 2-2, 5 μm in diameter, distance between spiralles 15-20 μm wide and spiralles 4.6 pm wide.

Chlorophyta: *Scenedesinus apolensis var. contacra* Prescott (Fig. 1g) Prescott (1975), Page 279, Plate 63, Fig. 19-20). Colony consisting of 4 naviculoid cells arranged in asingle series, spines on terminal cells either 1 or 2 at each pole, long and curved; spines on apices of inner cells short and straight; cells 6.8 μm in diameter, 20-24 μm long.

S. lelefrii Defl (Fig. 1h) Uherkovich (1966), Page 146, Plate 10, Fig. 424-427). Colony twice generally, ovate or ovate Belipsoid cells, each cells with 2 spines; cells 6-8 μm wide and 10-16 μm long.

Chlorella vulgaris Bayernick (Fig. 1i) Prescott (1975). page 237, plate 53). Cells sphaerical, scattered among other algae or sometimes occuring in almost pure growths, chloroplast a parietal cup, sometimes without a pyrenoid; cells 10-14 μm in diameter.

Fig. 1a: *Anebaena macrospore* Klebnahn

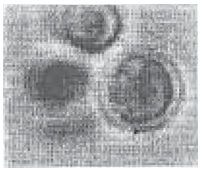

Fig. 1b: *Chroococcus varius* A. Braun

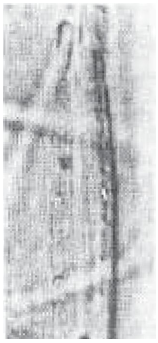

Fig. 1c: *Lyngbys taylorii* Drouet & Strickland

Fig. 1d: *Oscillatoria angust* Koppe

Fig 1e: *Phormidium sngustissimum* W. et. G. S. West

Fig. 1f: *Spirulina laxa* G. M. Smith

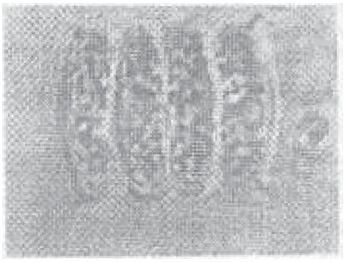

Fig. 1g: *Scenedesmus apolensis* var. contacta Prescott

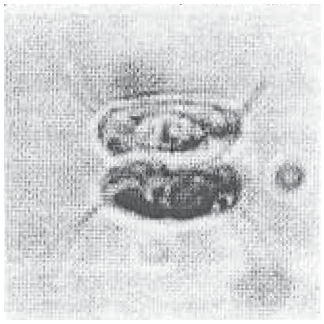

Fig. 1h: *S. lefevrii* Defl.

Fig. 1i: *Chlorella vulgaris* Bayernick

Fig. 1j: *Cymbella affinis* Kutz.

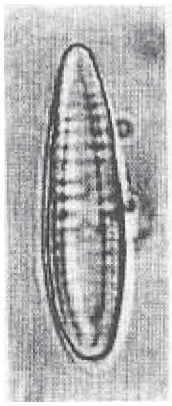

Fig. 1k: *Gomphonema Lanceolatum Bayernick*

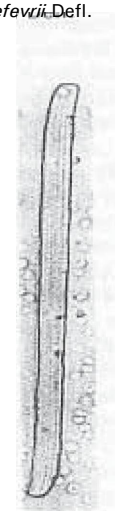

Fig. 1l: *Nitzschia Vermicularis* (Kutz.) Grun

Fig. 1m: *Synadra ulna* (Nitzs) Eha

Table 1: Some physical and chemical properties of salty soil around Salt Lake

Properties	Value	Properties	Value
Depth	0.20 cm	Mg	100,64 mg/l
$NaCO_3$	15,2%	Na	893,75 mg/l
P_2O_5	1,55 kg/d	K	11,62 mg/l
Organic Material	1,58%	CO_3^{-2}	---
Dampness	5,51%	HCO_3^-	3,41 mg/l
Satiation to water	68.81%	CL^{-2}	74,75 mg/l
pH	8,56%	SO_4	895,31 mg/l
EC	97,7ds/m	Change Capasity of Cations	15,48/l
Ca	57,46mg/l	Total Cations	1063,47 mg/l

Bacillariophyta: *Cymbella affinis* Kiitz. (Fig. 1j) (Patrick and Reimer (1966), page 614-615, plate 58 Fig.6) Valve 22-40 µm length by. 7-13 gill breadth, striae 8-10 in 10 µm. *Gomphonerna lanceolatum* Kutz. (Fig. 1k) (page 49, plate 35, Fig. 2-5) Valve 35-40 µm length by, 7-8 um breadth, striae 10-11 in 10 µm.

Nitzschia verrnicularls (Fig. 1l) (Kütz.) Grun. (page 240, plate 813) Valve 86-100 µm length by, 7-10 µm breadth, fibulea 9-10 and striae 25-26 in 10 µm. *Synedra ulna* (Nitz.) Ehr. (Fig. 1m) (Czarneckii and Blinn, 1978, page 37, plate 8, Fig. 3) Valve 140-160 µm length by, 6-8 µm breadth, striae 9-10 in 10 µm.

These identified species, especially from the point of view dissolved ions (Ca^{+2} 57,46 mg/l, Mg^{+2}: 100.64 mg/l, Na^{+2}: 893.75 mg/l and K^- 11.62 mg/l) and Cations (HCO_3: 3,41 mg/l, Cl^{-2} :74,7 mg/l and SO_4: 985.31 mg/l) shows tlerance to high values. This shows that these species are adapted to salty media. Being the species of Cyanophyta in excess and pH values light alkaline shows that individuals belonging to this divisio may *be* widespread in salty media. The individuals belonging to Bacillariophyta are less developping than other divisions in BG-11 medium which was observd (Starr, 1978).

Furtheremore, it was obserwed from the study that were done with the sample taken from kur§unlu waterfall (Gonul *et al.,* 1997) that all *Seeneciesmus* species grow in BG-11 medium and from Ceonobia.

References

Allen, M.M., 1968. Simple conditions for growth of unicellular blue-green algae on plates. J. Phycol., 4: 1-4.

Czarnecki, D.B. and D.W. Blinn, 1978. Diatoms of the colorado river in grand Canyon national park and vicinity (Diatoms of Southwestern U.S.A. II). Bibliotheca Phycologica, 38: 1-181.

Gonul, C.D., A. Ozturk and O. Obali, 1997. Isolation of some diatoms from Lake Aksehir (Konya-Turkey) and the Kursunlu Waterfall (Antalya-Turkey). Turk. J. Bot., 21: 59-61.

Metting, B.F., 1992. Soil Microbial Ecology. Marcel Dekker Inc., New York.

Patrick, R. and C.W. Reimer, 1966. The Diatoms of the United States Exclusive of Alaska and Hawaii. Academy of Natural Sciences, Philadelphia, pp: 13.

Prescott, G.W., 1975. Algae of the Western Great Lakes Area. Michigan State University, USA., pp: 99.

Rippka, R., 1988. Isolation and purification of cyanobacteria. Methods Enzymol., 167: 3-27.

Starr, R.C., 1978. The culture collection of algae at the university of texas at Austin. J. Phycol., 14: 47-100.

Uherkovich, G., 1966. Scenedesmus-Arten Ungarns. Akademi die Kiado, Budapest.