

## SOME PHYZIOLOGICAL AND BIOCHEMICAL PROPERTIES OF MICROALGAE IN VEGETABLE SOIL

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*Chlorella* is included in a group of an autotrophic protococci alga and is occurred in ponds, wells, moist soil and on the surface of trees. It is circular in shape, 1.5-10.5µm in size and is a unicellular alga (1).

Among them, some strains of *Chlorella* genus contain 45-50% protein, 20-25% carbohydrate, 7-10% lipids, and biologically active substances such as several types of vitamins and essential amino acids, hence, other countries are widely utilizing them in food, forage, pharmaceutical and cosmetic purposes (1.7).

Other countries are searching for chances to isolate a microalgae strain from their natural resources which can synthesize biologically active substances, to determine their properties, to utilize them practically and to produce their bio-preparations by biotechnological methods (1.2.7).

Therefore, we studied the physiological and biochemical properties of the cultures that were isolated from the soil of a greenhouse in order to detect a biologically active microalgae strain.

### Materials and methods

Strains *Chlorella sp-47*, *Chlorella sp-48*, *Chlorella sp-49*, *Ch.vulgaris-50*, *Ch.vulgaris-51*, *Ch.vulgaris-52* from the algae library were used in our study. These strains have been cultivated in a luminostate under suitable ammonium nitrogen condition (2) which is enriched with 1.2gm/l bicarbonate. Their growth activities and their dry weights were determined by physiological (6) methods. Total protein, lipid and carbohydrate of their biomass were determined by common biochemical methods (6.8).

### Results and discussion

The microalgae species, which have a characteristic of accumulating its biomass under shorter period and suitable condition to produce a bio-preparation

by biotechnological methods, have been drawing an increasing attention (1.4). The *Chlorella* species are the most suitable algae in this study (1.7.9).

1. Therefore, the seven strains of *Chlorella* genus which have been isolated from vegetable soil were cultivated in solid and liquid media and they have been inoculated in the standard medium from suspensions of the same growth level. Their growth activities and their dry weights have been determined and their results are shown in table 1.

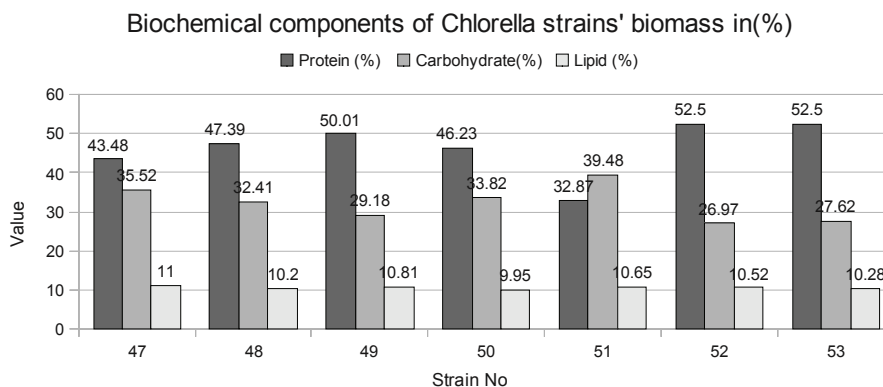
Table 1. Growth activities and dry weights of strains

Strain №	47	48	49	50	51	52	53
Growth activity (million/ml)	3.46	4.5	2.4	5.7	4.7	14.1	16.2
Dry weight (mg/ml)	0.20	0.29	0.24	0.34	0.25	0.24	0.20

If we can see from the table that the growth activities of these strains are 2.4-16.4 million/ml and their dry weights are 0.20-0.34 mg/ml. As we compare the growth activities of these strains to their dry weights, their relationship has been linear. For instance, *Chlorella sp-47* strain had 2.5million/ml cells and its dry weight was 0.20mg/ml, while *Chlorella sp-53* strain had 16.0 million/ml cells, however, its dry weight was 0.20mg/ml. This is related to the *Chlorella sp-47* strain which has larger cells than the *Chlorella sp-53* strain which has smaller cells.

2. Some biochemical components of these strains' biomass that was cultivated in the suitable 04 medium, has been determined and the results are shown in graph 2.

Graph 2



It is shown in graph 2 that the biomasses of the *Chlorella* strains have been cultivated in suitable medium, contained 32.87%-52.50% protein. The protein value was the highest in 50.01%-52.50% in the *Chlorella sp- 53*, *Ch.vulgaris- 52* and *Chlorella sp-49* strains while it was decreased in *Chlorella sp-48*, *Ch.vulgaris-50*

and *Chlorella sp-47* strains and the lowest was 32.87% in *Ch.vulgaris-51* strain.

The carbohydrate values of the *Chlorella sp-48*, *Ch.vulgaris-50*, *Chlorella sp-47* and *Ch.vulgaris -51* strains reached 32.41%-39.48% while they were decreased to 29.18%-26.97% in *Chlorella sp-49*, *Chlorella sp-53* and *Ch.vulgaris-52* strains.

The lipid values were 9.95%-11.0%. *Chlorella-sp 53* strain was predominating in its protein-carbohydrate synthesis in this study.

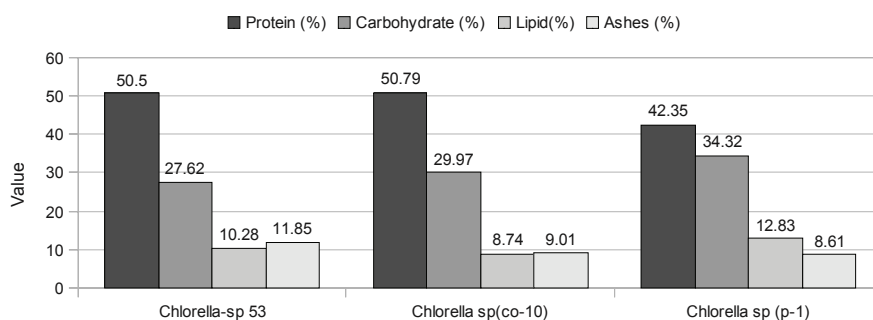
#### Comparative values of *Chlorella sp -53* strain's biomass between other researchers' results

*Chlorella-sp 53* strain had close values of protein, carbohydrate, lipid and ashes to *Chlorella sp (co-10)*, *Chlorella (p-1)* (Костина 1966) strains which could be seen in graph 3.

Graph 3

### Conclusion

#### Comparative values of *Chlorella sp-53* strain's biomass between other researchers' results



Protein, carbohydrate and lipid values have been found unequally in the biomasses of 7 unicellular algae strains of genus *Chlorella*. Among them, *Chlorella-sp 53* strain gave the growth of 16.40 million/ml under suitable condition and its biomass contained 52.50% protein, 27.62% carbohydrate and 10.28% lipid. It had higher activity than in other strains hence this strain has been chosen in our further study.

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