

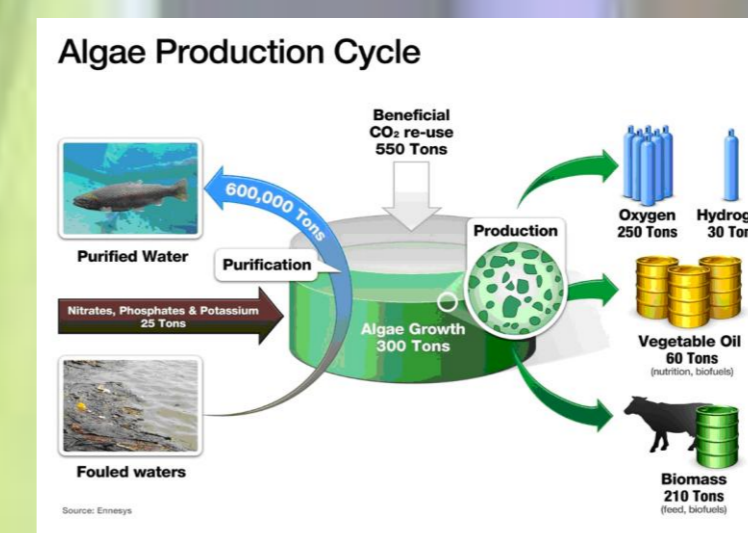
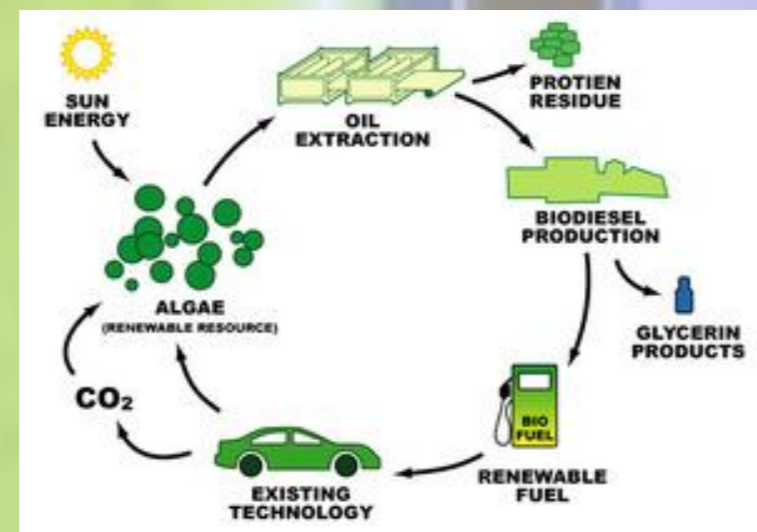
ENERGETIC POTENTIAL OF MICROALGAE FROM SWAMPS AND PONDS OF SOUTH SERBIA

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Algae offer solutions to many problems of our civilization. Biotechnological applications of algae has become a part of modern reality. As one of the many application possibilities, algae can be used as a renewable energy source. Algae can store energy in the form of oil which can be appropriate raw material for the biodiesel production. Microalgae are especially significant because of their high growth rate, high oil content and ability to grow in the unfavorable environment for agriculture. Also, the cultivation of microalgae can improve the reduction of carbon dioxide emissions. An overview of the existing studies of the possibility of using microalgae for the production of biodiesel and the results of experimental research with isolated microalgae strains from the South Serbia stagnant water are given in this paper.



Isolation of microalgae from the samples of South Serbian swamps and ponds was performed in the Laboratory for Microbiology and Food Technology of the Faculty of Technology in Leskovac, in order to study the possibility of cultivating microalgae for the production of oil as a raw material for the production of biodiesel. In addition to several isolated and identified strains, four strains of the genus *Chlorella*, *Chlorococcum*, *Scenedesmus* and *Desmodesmus* were selected for further research. The purity of the strains and the reduced possibility of contamination during cultivation were decisive in selection. Strains were grown on liquid Bold's Basal Medium (BBM) (pH at 22 °C under the constant light for 30 days at an orbital shaker (140 min⁻¹). The concentration of dry biomass was measured at the end of the process. The content of microbial oil was determined gravimetrically, after extraction by Bligh-Dayer method using chloroform and methanol (2:1 v/v).

Microalgae	Oil content, %	Oil productivity, mg/l/d
<i>Chlorococcum</i> sp.	19,3	53,7
<i>Chlorococcum</i> sp.	11	5,71
<i>Chlorococcum macrostigmatum</i>	25,1	-
<i>Chlorella</i> sp.	18,7	42,1
<i>Chlorella</i> sp.	20	-
<i>Chlorella</i> sp.	46	19,64
<i>Chlorella sorokiniana</i>	19,3	44,7
<i>Chlorella vulgaris</i>	18,4	36,9
<i>Chlorella protothecoides</i>	43-46	1400-1700
<i>Scenedesmus</i> sp.	21,1	53,9
<i>Scenedesmus</i> sp.	22-45	13,2-16,1
<i>Scenedesmus quadricauda</i>	18,4	35,1
<i>Scenedesmus obliquus</i>	17,7	15,9
<i>Botryococcus</i> sp.	5,7-25,8	3,5-46,9
<i>Desmodesmus</i> sp.	36-58	-
<i>Desmodesmus</i> sp.	34	5,7
<i>Desmodesmus elegans</i>	16,9	-
<i>Chlamydomonas</i> spp.	25,3	34
<i>Chlamydomonas pitschmanii</i>	51	25
<i>Chlamydomonas mexicana</i>	28	21
<i>Neochloris oleabundans</i>	29	26,1
<i>Monodus subterraneus</i>	16,1	30,4

CONCLUSIONS

Due to the increased demand for biofuel, the use of microalgae for the biodiesel production is an important step in replacing fossil fuels. For this purpose, continuous development of technologies and optimization of the process of cultivation and the production of biodiesel are necessary.

From various samples of standing water of South Serbia, four strains of microalgae were isolated and selected for the study. These selected strains were identified as a member of the genus *Chlorococcum*, *Chlorella*, *Desmodesmus* and *Scenedesmus*. Analyzing the content of biomass, the content and yield of oil, it has been found that the strains of *Chlorella* sp. and *Scenedesmus* sp. are most suitable for further studies in order to stimulate production of oil as well as possibility of its application in biodiesel production.



a)



b)



c)



d)

Microscopic appearance of isolated microalgae: a) *Chlorococcum* sp., b) *Chlorella* sp., c) *Desmodesmus* sp. and d) *Scenedesmus* sp. (photo Ćirić/Mikro-Lab TFL 2012., 60X)

Isolated strain	DBM g/l	Oil	
		Y _{P/X} (g/l)	%
<i>Chlorella</i> sp.	1,2	0,4	33
<i>Chlorococcum</i> sp.	1,5	0,2	16
<i>Desmodesmus</i> sp.	1,5	0,4	23
<i>Scenedesmus</i> sp.	1,0	0,3	29

ACKNOWLEDGMENT

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