Dunaliella Cultivation

A Abubakar, R Swamy, P Harvey, University of Greenwich

2012

Grant Contract: FED/2009/217066

Cultivation media

Dunaliella strains are maintained in a modified Johnson's media (Johnson et al., 1968; Borowitzka, 1988) containing the following components (per liter):

To 980 ml of distilled water add	
NaCl	As needed to obtained desired salinity
$MgCl_2$-$6H_2O$	1.5 g
$MgSO_4.7H_2O$	0.5 g
KCl	0.2 g
$CaCl_2$	0.2 g
KNO_3	1.0 g
$NaHCO_3$	0.043 g
KH_2PO_4	0.035 g
Fe-solution	10 ml
Trace-element solution	10 ml
Fe-solution (for 1 liter)	
Na_2EDTA	1.89 g
$FeC1_3.6H_2O$	2.44 g
Trace-element solution (for 1 liter)	
$ZnCl_2$	4.1 mg
H_3BO_3	61.0 mg
$CoCl_2.6H_20$	5.1 mg
$CuC1_2.2H_2O$	4.1 mg
$MnCl_2.4H_2O$	4.1 mg
$(NH4)_6Mo_7O_{24}{\cdot}4H_2O$	38.0 mg
Adjust pH to 7.5 with HCl	

Add sodium chloride to this medium to obtain the desired salinity.

Adjust the pH value to 7.5 with hydrochloric acid (HCl).

Dispense 150 ml or 100 ml Johnson's medium in 250 ml or 150 ml conical flasks respectively and sterilise the medium by autoclaving at 120°C for 15 min.

Dunaliella Cultivation

A Abubakar, R Swamy, P Harvey, University of Greenwich

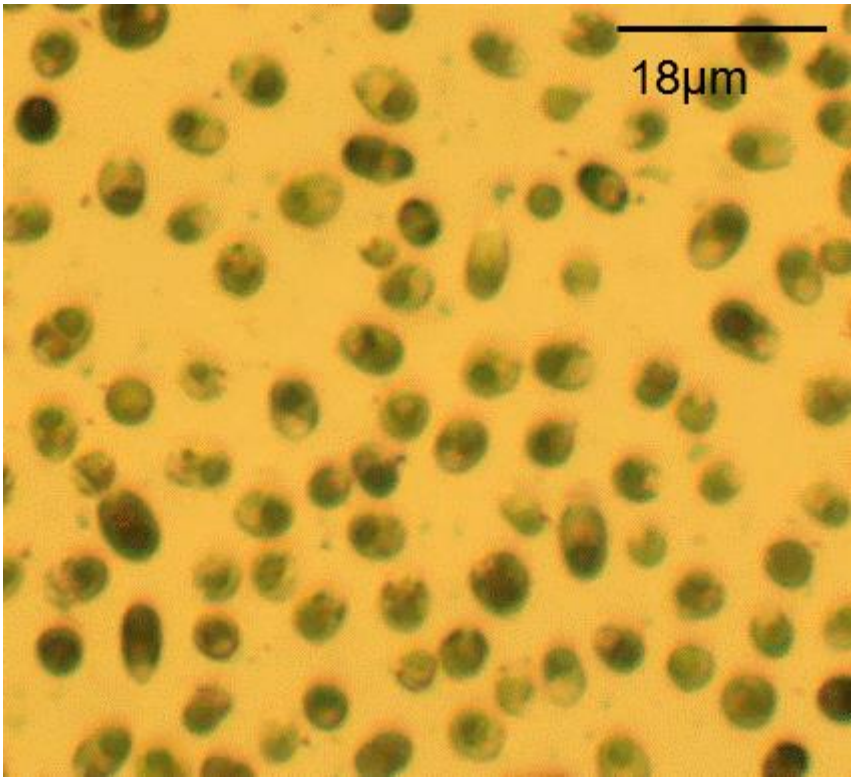
2012

Grant Contract: FED/2009/217066

Inoculation: Inoculate 1.0 ml or 1.5 ml of stock cultures (X10^6 Cells/ml) in 100 ml or 150 ml of growth medium respectively, to bring the final concentration of cells at the start of growth experiments to 10^4cells /ml.

Cultivation: Cultivate algal cultures in a temperature controlled growth chamber (23±2°C) with a light intensity of 4395 Wm2 photosynthetically active irradiation (PAR) provided by cool white fluorescent lamps, under a 12/12 h light/dark cycle.

Manually agitate the cultures once per day with the exception of the first three days of inoculation.



Cells of Dunaliella *Amin Abubakar*

References

1. Johnson, M.K., Johnson, E.J, Mac Elroy, R.D., Speer, H.L. and Bruff, B.S. (1968) Effects of salts on the halophilic alga Dunaliella viridis, J. Bacteriology 95: 1461-1468.
2. Borowitzka MA (1988) Vitamins and fine chemicals. In Borowitzka MA, Borowitzka LJ (eds), Micro-algal Biotechnology. CambridgeUniversity Press, Cambridge, 153-196.
3. Chen, H., Lao, Y.M., Jiang, J.G. (2011). Effects of salinities on the gene expression of a (NAD+)-dependent glycerol-3-phosphate dehydrogenase in Dunaliella salina. Sci.Total Environ., 409:1291–7

Grant Contract: FED/2009/217066

Other Useful References

1. Ben-Amotz A. & Avron M. 1973 The role of glycerol in the osmotic regulation of the halophilic alga Dunaliella parva. *Plant Physiol*. **51**, 875-878 (DOI: 10.1104/pp.51.5.875)
2. Avron M., Ben Amotz A. 1978 Production of glycerol from algae. *US Patent no. 4115949*
3. Avron M., Ben Amotz A. 1980 Production of glycerol, carotenes and algae meal. *US Patent no. 4199895*
4. Ben-Amotz A., Shaish M. & Avron M. 1991. The Biotechnology of Cultivating Dunaliella for Production of β-Carotene Rich Algae. *Biosource* Technol **38**, 233-235 (DOI:10.1016/0960-8524(91)90160-L)
4. Ben-Amotz A., Polle E.W. & Subba Rao D.V. 2009. (Eds) *The Alga Dunaliella: Biodiversity, Physiology, Genomics and Biotechnology*. Science Publishers, Jersey, Plymouth, 555pp
5. Ben-Amotz A., Avron M. 1990. The biotechnology of cultivating the halotolerant alga Dunaliella. *Tibtech* **8**, 121-126 (DOI:10.1016/0167-7799(90)90152-N)
6. L. J. Borowitzka, M. A. Borowitzka, T. P. Moulton (1984) Hydrobiologia 116-117, pp 115-121 The mass culture of *Dunaliella salina* for fine chemicals: From laboratory to pilot plant