Apparatus for Even Illumination in Algal Growth Tests

by

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For their growth algae largely depend on a good supply of light. In laboratory tests with algae, light always plays a very important role. In our laboratory we use mainly monocellular algae for performing toxicity tests. Some of these species tend to cling to the walls of the culture bottles on the side of the light source, thus preventing the light from penetrating the whole culture. HANNAN and PATOUILLET (1972) tried to overcome these difficulties by using test bottles rotated vertically in order to obtain continuous mixing of the culture, and equal illumination of all the cells. It remains difficult to compare the results of growth tests in different bottles, because fluorescent lamps do not give an even illumination along their whole length.

To get an even illumination of a whole series of test bottles, we constructed a device which has by now acquired the name "alga mill". The idea behind this device originates from a method of storing algal cultures introduced by Fogg and described by HUECK and LA BRIJN (1966). We used the alga mill mainly for growth experiments with monocellular marine algae.

Apparatus

The alga mill consists of a vertical shaft to which circular plateaus are attached at different levels. The shaft is rotated by an electric motor at 40 revolutions per hour. The diameter of the plateaus is 50 cm. Ten fluorescent lamps of 1.5 m length (60 W) supply the light. The lamps are placed on one side of the apparatus, so that the direction of the light changes continuously for all bottles during a revolution. This proved to be sufficient to prevent the algae from clinging to one side. All bottles placed on the same plateau, at the same distance from the shaft, thus receive the same amount of light.

The alga mill is placed in a room at a constant temperature of 15 ^{o}C. Because the plateaus turn slowly, there is no need to secure the bottles. All sizes of bottles can be used, because the spacing between the plateaus can easily be adjusted.

Different growth experiments which we performed on the alga mill showed a good reproducibility.

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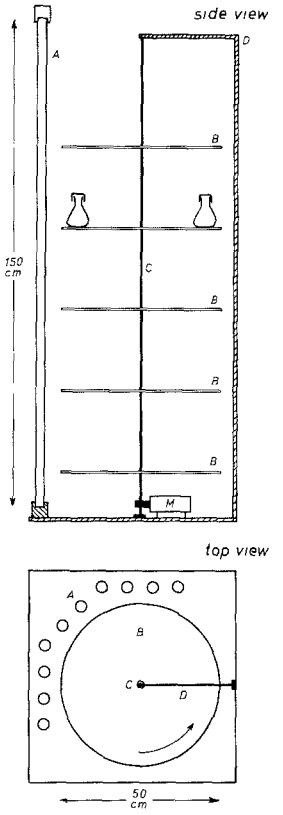
Sketch of the alga mill



Legend

A: fluorescent lamp(s)

B: plateaus

C: shaft

D: stand

M: motor for rotating the shaft

References

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