INTRODUCTION AND BACKGROUND

The earth’s surface is 71% covered by water. Microalgae comprise a vast group of photosynthetic, heterotrophic organisms which have a great potential for cultivation as renewable feedstock for biodiesel production due to their rapid growth rates and are more productive than plants and microalgae. Microalgae are genetically diverse organisms that exist as unicells, colonies and extended filaments; they are distributed ubiquitously throughout the biosphere growing under the widest possible variety of conditions (Shelton et al., 1998).

The scope of this project covers the screening and characterization of selected indigenous algal strains and screening them for lipid production potential. The algae were isolated from salt- and freshwater bodies, along the Western Cape coastline of South Africa. Isolates were purified into individual isolates and screened for lipid-production. Isolate B7.4, displayed a promising lipid producing capability and fast growth rate. Key nutrients such as nitrate and silicate concentration present in the medium were identified as target handles in an attempt to boost lipid producing capability of the isolate, without, impacting negatively on the inherent growth. This optimization could prove highly beneficial when the technology is applied commercially.

MATERIAL AND METHOD

Sampling and isolation

The temporal and spatial collection strategy was adopted to cater for any succession that can occur at the sampling site (Anandraj et al., 1998). Once samples reach the laboratory, cultures are revived using protocols outlined in Figure 1. Thereafter, preliminary screening is undertaken on samples collected in order to ascertain whether the isolates demonstrated the ability to produce relevant lipid intermediates.

RESULTS AND DISCUSSION

The growth of B7.4 differed over a range of nitrogen concentrations tested in this study. Growth was absent in the 0.5x medium for the first 4 hours of cultivation (Figure 6), thereafter an increase in cell concentration was observed. The highest cell concentration (4.20 × 10^6 cells.ml^-1) was achieved when B7.4 was grown in medium containing double the original nitrate concentration (Figure 6). The 1.0x and 3.0x medium produced maximal cell concentrations of 4.1 × 10^6 cells.ml^-1 and 4.0 × 10^6 cells.ml^-1 after 7 and 8 hours of cultivation respectively (Figure 6).

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CONCLUSIONS

The application of the conceptual protocol that was used in the above statistics in the isolation of different strains was effective, easy and quick and it can be applied to the bio-prospecting of algae for biodiesel production with greater success compared to the application of only standard and traditional isolation techniques. This study makes a valuable contribution to the field of biodiesel production as it demonstrates a medium to high throughput isolation and purification protocol for potential biodiesel algal isolates.

ACKNOWLEDGMENTS

Asha Harilal for her help in preparing the manuscript and lab work.

REFERENCES


[6] Kudela and Dugdale (2000) observed that there was large variability in specific nitrate uptake rates in algae which could be directly correlated to nitrate concentrations. Kudela and Dugdale (2000) observed that there was large variability in specific nitrate uptake rates in algae which could be directly correlated to nitrate concentrations.

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