

## View Point

# Algal Database—Bioprospecting indigenous algae for industrial application

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Data management has become a prerequisite mandate in the era of inter-disciplinary sciences, where timeless large size of data from all basic sciences has to be interlinked and managed for its understanding and application in the field of research. Biological databases serve to be a relevant measure to share and express the raw data in a simplified, systematic manner. 'Algal Database', available at the site: <http://algaedb.dpu.edu.in>, is a type of biological database that enables a researcher to locate the diversity of algae in a specific region. It is designed based on the survey studies of freshwater algal collection, isolation and identification from western zones of Maharashtra. It covers the availability of fresh water microalgae in two districts, namely, Pune District (Mulsi Taluka and Maval Taluka) and Raigad District (Alibagh Taluka). A total of 40 species belonging to 5 different divisions, 9 classes and 24 families are being currently listed in the database. It highlights the occurrence of varied algal species in different seasons at numerous ecological habitats (Fig. 1).

### Database Features

Algal database includes "Home Page" that provides information to search algae based on its species name, pH and location. "Gallery" provides images of the entire studied algal genus. "Google Map" marks the site of geographical distribution of algae in the surveyed regions. Home gives the general introduction about algae and provides access to search algae based on its name and the pH of occurrence. A "Site Page" provides the access to images of sampling sites. "Useful" links provide links to other sites and web pages to provide more information related to particular algae (Fig. 2).

Ecological parameters in correlation with the physiochemical characteristics of a sampling site influence the morphophytic diversity of algae to a great extent. Ecological details of occurrence of microalgae like location (the site of collection); flourishing and collecting season, pH and conductivity of the water body; type of water reservoir whether deep, wide, shallow, narrow; intensity of algal growth as algal bloom; soil type of the habitat whether red soil or black soil; mode of reproduction of algae and its association with other algal species, favourable temperature, annual rainfall, latitude and longitude of each habitat is being incorporated in the form of information in the database.

Over 40, 000 algal species around the world are already identified and with many more yet to be discovered, thus creating manifolds probability of

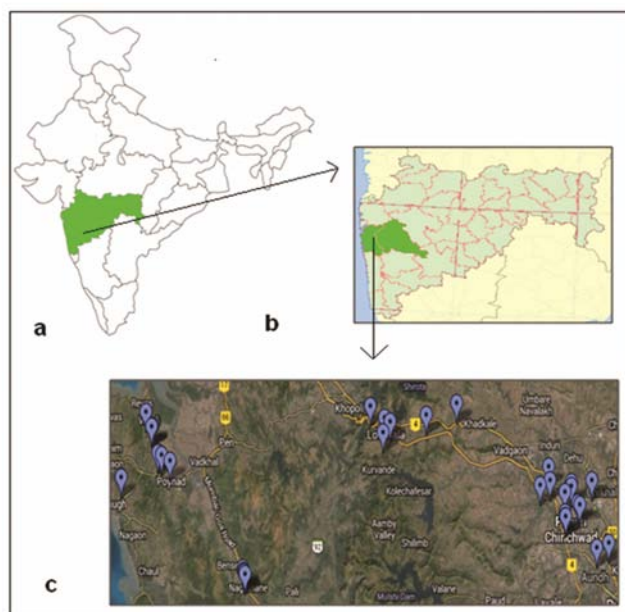


Fig. 1—Map of the studied areas with 36 sampling locations in Pune and Raigad district of Maharashtra, India. a) Map of India, b) Map of Maharashtra c) Sampling sites in Pune and Raigad zones.

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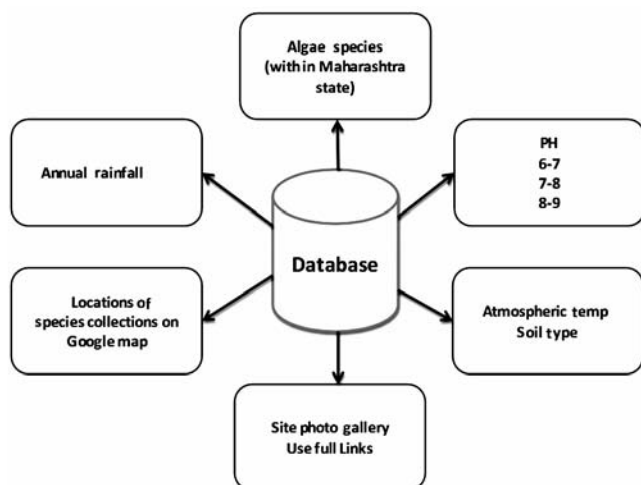


Fig. 2—Functional diagram of Algae Database.

discovering novel algal strains. Microalgae, due to its versatility, have enormous potential applications and thus Microalgal Biotechnology is gaining more and more insight in fields like food, animal feed, cosmetics, pharmaceuticals, protein source, fatty acid source<sup>6</sup>, antioxidant, antibacterial, antialgal and bioprotective agents, and in production of biofuels, namely, bioethanol, biodiesel, methane, hydrogen, biochar, etc. They are also used for carbon sequestration and thus help in its reduction, and contribute to green and clean mode of energy. The reduction in Green House gases would eventually help in lowering Global Warming and readily help microalgal based firms to gain the profit of carbon credits. Other spheres where algae find its application are biosorption of heavy metals and waste water treatment, also known as Phycoremediation.

### Significance of Bioprospecting Indigenous Algae

India is a potential source for rich algal biodiversity, which accounts for its vast water reservoirs, abundant sunlight and its unique climatic

zones. Regions of Maharashtra (the Western Ghat regions of Sahyadris) evidence the surplus algal flora that needs to be explored for application of microalgae in environmental and industrial sector.

The Algal Database is the outcome of a study where an attempt was made to collect, isolate and identify the algal strains. The study generated data that can primarily help a researcher to screen and collect the algae of interest. At the same time, the available ecological parameters of the strain provided in the database can help to adapt the right culture techniques for cultivation of the concerned algae. The identified strains known to produce tremendous amounts of lipids can be selected as an ideal strain for biodiesel production. And the one with high carbohydrate content can be turned to produce bioethanol, with further application for protein, vitamin, pigment production, etc, which can be used in the field of pharmaceuticals and nutraceuticals.

As the study progresses, more and more regions of the country would be surveyed to screen for new strains to be discovered and a comprehensive repository would be created. The biodiversity prospecting of microalgae would serve as a bioresource to aid in developing technologies for commercial and sustainable production of algae based products. Development of such algal databases and then their integration on a common platform or contribution to the existing databases is desirable to be implemented in future algological studies to commercialize and economize algal based technologies. Algal Database will also serve as a tool for enabling scientists to relate to algal ecology, physiology, interaction, association and evolutionary studies.

### References

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