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Potential of Chara grovesii, Cladophora callicoma and Hydrodiction reticulatum as a sustainable source of antimicrobial compounds

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Abstract

Algae are considered a natural rich source of bioactive metabolites; it has natural antifungal properties which can limit the chemical fungicide. Algae contain a variety of bioactive substances, such as gibberellin, auxin, cytokinin, ethylene, abscisic acid, and jasminec acid, which are significant regulators of plant growth. Present study deals with the analyzing the antifungal properties of selected algae *Chara grovesii, Cladophora callicoma* and *Hydrodiction reticulatum* it revealed that maximum algae indicated positive results.

Key words: Algae, bioactive, mycelium

Introduction

Nowadays focus is shifting from artificial to natural mode with this context algae are known to produce large amounts of food producer on the earth, also it has verities of beneficial components, with this it has secondary metabolite which work against various kinds of pathogenic microbes.

Algae have multiple components viz. Agar-agar, protein, vitamins, minerals, and other substances are also found in algae, however the specific research pertaining to antifungal action is not done.

Numerous research has focused on the antimycotic action because of its significance for both human and animal health as well as the production of agricultural products. J.C.F. Peres et al. (2012). In addition to other biological activities, green, brown, and red algae exhibit antimycotic activity Bhakunil, D.S et al., (2005), which may make them useful in agricultural applications. According to Stadnik M.j.et al (2004), Ulva fasciata extract can successfully lower the number of colonies in bean fungal powdery mildew. Brown seaweeds (Sargassum tenerrimum, Padina gymnospora, and Turbinaria conoides) showed notable antifungal properties. Manivannan K. et al (2011).

Three different algae *Chara grovesii, Cladophora callicoma* and *Hydrodiction reticulatum* were collected from different fresh water reservoirs of Marathwada. It's fine powder was prepared and used for further investigation.

Materials and method

The fine algal powder was prepared from the algae which were collected from different sits. They had kept in air tight specimen bottle until use, extraction of algae was made in acetone. Antifungal activity of such algal samples was determined by using plant pathogens like *Alternaria alternata, Aspergillus flavus, Fusarium roseum, Trichoderma harzianum* and *Curvularia lunata*, Bioassay was done in glucose nitrate (GN) medium. In GN medium algal extract along with 1ml fungal spore suspension was added and kept for seven days after seven days of inoculation the mycelium was harvested and results are noted.

Name of Algae	***Alternaria alternate***	***Aspergillus flavus***	***Curvularia lunata***	***Fusarium roseum***	***Trichoderma harzianum***
Chara grovesii	0.046	0.042	0.025	0.034	0.030
Cladophora callicoma	0.040	0.045	0.030	0.035	0.032
Hydrodiction reticulatum	0.050	0.049	0.042	0.041	0.052
Control	0.050	0.045	0.038	0.040	0.047

The values in numbers indicate the mycelium weight in grams.

Results and discussion

It is observed from above table growth of *Curvularia lunata* is inhibited in the extract of *Chara grovesii* followed by *Cladophora callicoma* . The fungal growth of *Trichoderma harzianum* is also inhibited with the extract of *Chara grovesii.*

It is also observed that growth of *Trichoderma harzianum* and *Fusarium roseum* is stimulated with the extract of *Hydrodiction reticulatum.* In the observation of above result it is clear that maximum algal species have inhibitory properties against all plant pathogenic fungi.

Bernard et al (1989) showed antibacterial and antifungal activity of extract prepared from the rhizomen to Mediterranean seagrass posidonia, also Composed et al (1988) noted antimicrobial activity of marine algae from Brazilian northern. Coast Prashantkumar et al (2006) recorded antimicrobial activity of blue green and green algae, Kulkarni (1993) studied seven algae for its antimicrobial activity against *Aspergillus flavus, Aspergillus niger* and *Alternaria brasica.*

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