

Diversity of phytohormone in Algae – a review

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Abstract

Algae are reported to produce a number of secondary compounds like lectin, phyco-biliprotiens, phyco-erythrin, phyco-cynin, allophyco-cynin, phyco-erythrin, alkaloids, flavonoids, axasanthin etc. Algae also produce phytohormone like IAA, IBA, cytokinin, gibberellin Jasmonic, Brassino sterrodes, Polyamines by various, group of algae division like, Chlorophyta- (Entaeromorha Chlorella Cladophora Protococcus Chlorella, Scendesmus, Dunaliella, Haemococcus), Caulerpa, Phaeophyta- (*Ascophyllum*, *Laminaria*, *Fucus Ascophyllum*, *Sargassum*, *Macrocystis*), Rhodophyta- (*Cyanidium*, *Gelidium*, *Grateloupia*) etc.

Keywords: lectin, phyco-biliprotiens, phyco-erythrin, phyco-cynin, allophyco-cynin, phyco-erythrin, alkaloids, flavonoids, axasanthin etc.

Introduction

Algae are diverse photosynthetic group which is found in wide variety of habitat, these are chlorophyll bearing organism which may be thalloid i.e having no roots, stem, and leaves or leaf like organism They are found in very diverse and extreme habitat. It includes both eukaryotic and prokaryotic. They may be motile, non-motile, palmelloid, dendroid, filamentous, heterotrichous and parenchymatous. Algae have great economical, medicinal, biotechnical and pharmaceutical importance.

Auxin:

It was reported between 1960- 1970. It was found in the brown alga like (*Macrocystis*, *Laminaria*), Red algae (*Botrycladia*), Cyanobacteria-(*Oscillatoria*).

Table 1: ???

Sr. No	Hormone	Algae	Division	Reference
1.	IAA	Entaeromorpha Chlorella Cladophora Caulerpa	Chlorophyta	Provasoli and Carlucci [1]
2.	Cytokinins	Protococcus Chlorella Scendesmus Chlamydomonas		Farooqi <i>et al.</i> , [2]
3.	ABA	Dunaliella Chlorella Haematococcus		Tominaga <i>et al.</i> , [3].
4.	Jasmonic acid	Dunaliella Chlorella		Sitnik <i>et al.</i> , [4].
5.	Brassinosteroids	Hydrodictyon		Yokota [5]
6.	Polyamines	Ulva Chlorella		Badini <i>et al.</i> , [6]
7.	IAA	Macrocystis, Laminaria, Fucus, Ascophyllum	Phaeophyta	Provasoli and Carlucci [1]
8.	ABA	Ascophyllum, Laminaria		Nimura and Mizuta [7]
9.	Cytokinin	Fucus, Ascophyllum, Sargassum, <i>Macrocystis</i>		Provasoli and Carlucci [1].
10.	Gibberellin	Fucus		Radley [8]
11.	IAA	Botryocladia, Porphyra	Rhodophyta	Provasoli and Carlucci [1]
12.	Cytokinins	Arthronema, Calothrix		Ördög <i>et al.</i> , [9]
13.	Jasmonic acid	Gelidium		Arnold <i>et al.</i> , [10]
14.	Polyamines	Cyanidium, Gelidium, Grateloupia		Hamana <i>et al.</i> , [11]
15.	Rhodomorphin	Griffithsia		Waland <i>et al.</i> , [12]
16.	Cytokinins	Chara		Ördög <i>et al.</i> , [9]
17.	Cytokines	Euglena	Euglenophyta	Swaminathan and Bock [13]
18.	Jasmonic acid	Euglena		Arnold and Targett [10]
19.	Polyamines	Euglena		Marián <i>et al.</i> , [14]
20.	IAA	Oscillatoria, Chlorogloea.	Cyanophyta	Provasoli and Carlucci [1]
21.	Jasmonic acid	Spirulina.		Sitnik and Musatenko [15]

In the green algae, Enteromorpha, Chlorella, Cladophora, Caulerpa paspaloides, IAA are the product of its catabolism. Dioxyindolic-3-acetic acids were detected.

Cytokinin:

It was repeatedly found in extracts in marine phytoplankton. These hormones were zeatin riboside, IPA and isopentenadenosine. This hormone was found in *Euglena gracilis*. IPA was found *Arthospora africanum*. The basic cytokinin was found in green algae. Protococcus, Chlorella, and Scendesmus. O- glucosides were detected in brown algae. *Sargassum heterophyllum*, *Macrocystis pyrifera*.

Jasmonic acid:

Oxylipin including asmonic acid and its volatile, methylester are found almost all algae like Dunallella tertiolecta, *D. salina* and *Euglena Gelidium* and Spirulina.

Polyamine:

It was reported in red algae like Cyanidium, Gelidium, and Grateloupia and brown algae like *Dictyota dichotoma*. Brassiosteroids It is like 24- epiccastasterone and 28- homocastasterene were identified in the green algae like Hydrodictyon reticulatum.

Rhodomorphin:

Rhodomorphin is a glycopeptide with a mol wt of about 14 kD. Glycoproteins of similar structure were

found in other organisms as well, in the green alga *Volvox* in particular. This regulator was first found in the red filamentous algae, *Griffithsia pacifica*.

Gibberellin:

It was found in brown algae, GA-1, and GA-3 GA-6 were isolated from *Fucus vesiculosus* and *F. spiralis*.

Conclusion

This paper reveals and summarized the diversity of phytohormones produce by different group of algae like Chlorophyta, Phaeophyta, Rodophyta, Cynophyta, Euglenophyta and Charophyta These hormones are IAA, cytokinins, gibberellins, ABA, jasmonic acid, brassinosteroids etc. they have different functions in the metabolism of algal physiology a number of experiment have been performed. Still a number of algae are remaining untouched and unexplored.

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