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Detection of Active Compounds in *Ulothrix* sp. Algae

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Abstract

The study included the identification of some active chemical compounds from blue-green algae Ulothrix and the production of many active compounds using algae extract. Algae are a talented cause of defiant corpulence mediators, as plump positions are an international hazard to human wellbeing. It is also linked to metabolic syndrome, type 2 diabetes, heart disease and blood vessels, anti-obesity agents from algae are represented by four main compounds with (Phlorotannins, Fucoidans, Alginates, Fucoxanthin), therapeutic discipline has a notorious quantity of composite celluloses with exceptional chemical possessions. For example, certain algal cuttings have antiviral and anti-lump belongings. The extraordinary integrity gratified of red algae earnings is also beneficial in refining absorption. Red algae are regularly occupied as a nutritional addition, though its rank as a "super-nourishment" is indeterminate subsequently it has not been exposed to improve standard purpose. Blue-green algae are castoff as a foundation of dietary protein, B-vitamins, and iron. Health discipline has recognized a quantity of complex sugars with exceptional chemical possessions. For instance, convinced algal cuttings have antiviral and anti-growth assets. The extraordinary backbone pleased of inflamed algae resources; it is also expedient in educating absorption. Red algae are normally engaged as a nutritive appendage, yet its position as a "super-food" is uncertain since it has not been revealed to advance standard occupation. Cerulean-lime algae are secondhand as a foundation of dietary protein, B-vitamins, and iron. The active chemical compounds were extracted from the moss using ethanol and using an L device, the compounds with the highest percentage of Ulothrix were identified and the active compounds in Soxhlet moss were identified acetic acid, which has a molecular weight of 282.34%, was among other identified compounds, which appeared with a detention time of (7.725) minutes and an occupancy rate of 3.01%, but less $C_{14}H_{25}F$ and its partial formula is 302. The molecular weight of the identified compounds was 266.513 and the molecular formula of the nonacosane compounds was 10%, which appeared with a detention time of 9.94 minutes and occupied a percentage of 34.156 $C_{29}H_6O$

Keywords: Algae, nonacosane, *Ulothrix*, extract, $C_{29}H_6O$, xanthophylls

INTRODUCTION

Algae are a group of simple plants that do not have roots, stems, or leaves, in addition to not having flowers, are autotrophs because they contain photosynthetic pigments. The rudimentary tincture in the progression of light fusion. Algae also have chlorophyll A, so after chlorophyll, in addition to carotenoid pigments (EDC), there are many auxiliary pigments represented by chlorophylls and xanthophylls and plerotins. The size of algae ranges from very small (1 µm) to very large ones, which are known as weeds and *Macrocystis*, which reaches lengths of more than 200 feet, like seaweeds (Lee, 2008), [1]. Algae is an indispensable nutrition matter not solitary for individuals than also for other creatures (Hoppe 1979) [2, 3]. There is a type of blue-green algae

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called *Ulothirx* algae. It is found in lakes, rivers, and seawater. This type of algae has been widely studied because of its medicinal properties. It also contains *Ulothrix* sp. A variety of biologically active compounds. It also contains (Anand, 2019) [4, 5]. Algae have developed mechanisms to protect the algal cell from the breakdown of oxygen by producing various compounds. This is due to its effective ability to act as natural antioxidants (Lee et al., 2011) [6, 7].

Donating a hydrogen atom or an electron, thus making it an electron donor to free radicals (Rajashekhar, 2015) [8] moss contains many compounds: *Cladophora glomerata* which is used as a treatment to regulate the heart rhythm, including Decahydroquinolin, an alkaloid compound (Bagwell et al., 1973) [9, 10]. Algae are a gifted foundation of defiant-corpulence representatives, as corpulence postures an inclusive hazard to anthropological fitness. It is also linked to metabolic syndrome, type 2 diabetes, heart disease and blood vessels, anti-obesity agents from algae are represented by four main compounds with (Phlorotannins, Fucoidans, Alginates, Fucoxanthin).

METHODS AND MATERIALS

Preparation of Alcoholic Extract of *Ulothrix* sp.

To extract the active substances of the studied algae, the method described by (Taskin et al., 2007) [11, 12] was followed.

1. *Weight:* 8.2 g of powder *Ulothrix* sp. It was placed in a cylindrical container made of porous paper material thimble is called thimble extraction.
2. Put thimble in the designated place in the Soxhlet device, add 70 ml of ethanol 95% to it. The sample was left for 6–7 minutes without extraction so that the powder was saturated with the solvent.
3. The extraction process was then carried out in the extraction device Soxhlet until it happens on a green filtrate.
4. Dry the filtration using an electric oven at a temperature not exceeding 40°C.

DS of Isolation and Characterization of the Active Compound

The Alcoholic Extract Using an Apparatus Gas Chromatography Mass

Characterize the ethanolic extract of algae *Ulothrix sp.* chemistry using gas chromatography technique mass-spectrometry. Mass-gas chromatography according to the following circumstances:

1. Using helium gas with a purity of 99.99% as a carrier for the active ingredients.
2. Agilent technologies 7820.
3. column type optima 5 ms medium non-polar.
4. inject the device with 1 ml of ethanolic algae extract *Ulothrix* sp.
5. the pressure = 933.11 psi.
6. injection temperature = 280°C, interface temperature = 280°C, ion source temperature = 200°C, and injection temperature 280°C.
7. The oven temperature is programmed from 80°C to 180°C, at a rate of 8°C/min, from 180°C to 280°C, at a rate of 8°C/min. Minute, and from 280 m to 300 m/min by 3 m/min.
8. The total time spent analyzing the sample was 42 minutes.

RESULT AND DISCUSSION

Diagnosis by Gas Chromatography-Mass Spectrometer of Alcoholic Extract of *Ulothrix*

The results of detecting chemical compounds using gas chromatography-mass spectrometry showed the presence of 30 compounds in the ethanolic extract of *Ulothrix* algae as shown in Figure 1.

The identified vehicle areas were composite acetic acid when is its molecular weight 282.34 and its partial form $C_{14}H_{25}F_{302}$, which appeared with a detention time of (7.725) minutes and occupied a percentage of 3.01% of the total followed by the compound Furfural whose molecular weight is 236.222 and its partial form C_5H_4O, which appeared during a detention period 41.011 minute. Its occupancy ratio is 3.09 from the total of the diagnosed compounds, then the compound H $C_6H_8O_{4-4}$, which partial formula pyran-4-one diagnostic vehicles compound acetic acid (Table 1).

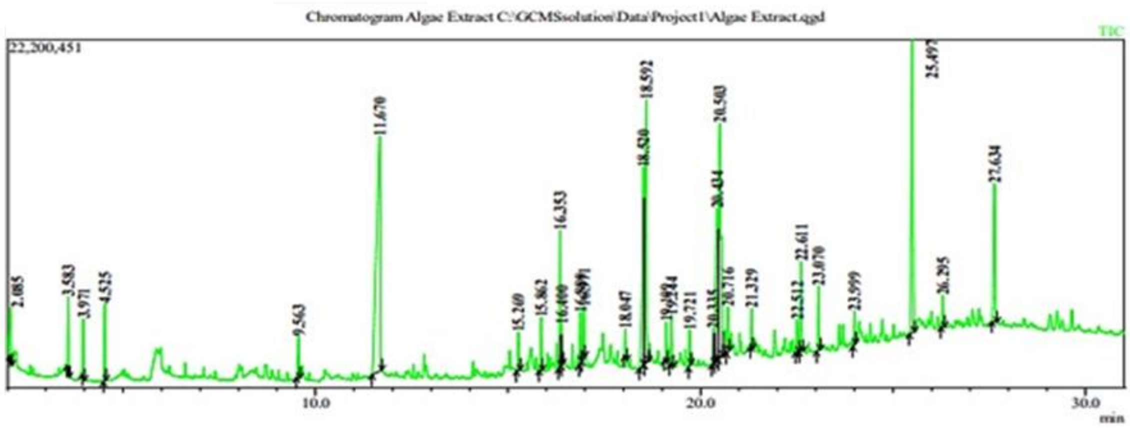

Figure 1. Mass spectrum of alcoholic extract of *Ulothrix sp*. algae.

Table 1. Shows chemical compounds identified by gas chromatography mass spectrum – a total of (30) compounds, and among the compounds that had the largest percentage of the total.

Area (%)	**Time Detention (min)**	**Molecular Weight (g/mol)**	**Molecular Formula**	**Name of the Chemical Compound**
3.01	2.725	282.34	$C_{14}H_{25}F_{302}$	Acetic acid
1.00	28.606	2254.50	$C_{18}H_{38}$	Ethyl orthoformate
0.13	37.250	108.52	$CH_3C1COOH$	Propanoic acid
3.09	41.011	236.222	$C_{15}H_8$	Furfural
			$C_5H_4O_2$	4H-Pyran-4-one
1.12	48.118	577.233	$C_6H_6O_3$	Hydroxymethylfurfural
1.57	31.082	268.485	$C_{14}H_{300}$	Tetradecanol-1
			$CH_3(CH_2)_{12}OH$	Ethanol
5.31	29.805	284.520	C_2H_{36}	Neophytadine
0.54	30.859	124.362	$C_{14}H_{28}O_2$	Tetradecanoic acid
0.66	31.188	268.485	$C_{18}H_{36}$	Pentadecanone, 6, 10, 14_trimethyl-2
0.24	32.37	258.4400	$C_1H_{30}O_2$	Ethanol, 2-(dodecyloxy)
1.33	35.897	256.43	$C_{16}H_{32}O_2$	n-Hexadecanoic- acid:acid
1.94	33.818	282.468	$C_{18}H_{34}O_2$	Hexadecanoic acid
5.31	29.805	284.520	C_2H_{36}	Neophytadine
0.24	32.37	258.4400	$C_{16}H_{34}O_2$	Diethylene glycol monododecyl ether
4.22	40.828	234.34	$C_{14}H_{22}N_2O$	Lidocaine
0.87	31.449	296.531	$C_{20}H_{40}$	O Phytol
10.73	37.452	280.452	$C_{18}H_{32}O_2$	Ethyl oleate
0.54	30.859	194.362	$C_{14}H_{24}O$	Tetradecahydrocyclododeca furan
0.05	40.199	282.4614	$C_{18}H_{36}O_2$	Octadecnoic acid
10.73	37.453	280.452	$C_{18}H_{30}O_2$	Octadecatrienoic acid-‹12‹159
11.12	28.029	296.5	$C_{18}H_{32}O_7$	Butyl citrate
10.02	27.596	292.5	$C_{23}H_{44}O_2$	Trans-9-octadecenoic acid
10.73	37.453	280.452	$C_{23}H_{42}O_2$	Pentyl linoleate
2.30	33.828	292.370	$C_{17}H_{24}O_3$	Hydroxy-3–4(-1)methoxyphenyl
7.25	27.504	422.826	$C_{40}H_{82}$	Teracontane
1.94	33.818	282.468	$C_{36}H_{74}$	Hexatriacontane
0.27	29.862	394.772	$C_{21}H_{32}O_3$	Hydroxy-3–4(-1) methoxyphenyl

This compound has an antioxidant and anti-inflammatory role, and this may be due to its effectiveness. Its vitality is that it occupies the largest portion of the total percentage. The results of current studies have shown the presence of a number of effective compounds, in ethanolic extract of algae of *Ulothrix* sp. algae. Among those vehicles that occupied the largest percentage of the total neophytadiene for proportions of compounds a compound is used as an anti-inflammatory as well as antimicrobial agent and receptor antagonist plant and algal future. Also, a compound tetradecanoic acid that goes into making it cosmetics and is used in the production of soap and fatty alcohols and then compound pentadecanone-2, which is used in the food industry as well as in the manufacture of perfumes and flavors. It uses a compound ethanol-2dodecyloxy. It is used to produce bioenergy in algae and is also used to dilute the rising amounts of toxic gas, and then a compound n-hexadecanoic acid, which is used as an antioxidant and vitamin A compound, added to low-fat milk [13]. To compensate for the lack of vitamins as a result of removing the lack of fat in milk, it uses a compound called hexadecanoic acid, which works as an antioxidant, it also works to make vitamin A stable in milk, and then synthesized neophytadine, which is used as an anti-inflammatory and antimicrobial agent. It uses a compound monododecyl ether ethylene glycol that is used in the manufacture of some synthetic toothpastes and is also used as an antifreeze, in terms of compound lidocaine, which is used to anesthetize tissues in a specific area and treat tachycardia, and it also uses a compound phytol is used in the biosynthesis of chlorophyll and harvesting light, and subsequently synthesize ethyl oleate, which is used in German isolation and then compound tetradecahydrocyclododeca, which leads to cancer in the body and then the chemical compound octadecenoic acid, which is resistant to cancer. It also protects the heart from some diseases. And then compound acid Octadecatrirtenoic. This acid is used in the body for biosynthesis and is used as a compound butyl citrate. In the creation of tints, scrubbing supplies, toners, and pastes. And longer trans-9-octadecenoic acid, which is used as a treatment for cancer and metabolic syndrome. It uses a compound pentyl linoleate as an antioxidant for inflammation.

CONCLUSIONS

- The current study has proven that algae contain many biologically active compounds, including vitamins, fats, and acids.
- Proven acid technology (GC-MS) shows the presence of many valuable effective compounds in *Ulothrix sp*. algae.

Recommendations

1. Go to the use of algae extracts, which have the ability to reduce the growth of bacteria and fungi due to their high-bacterial resistance to antibiotics.
2. Moving towards studying other types of local algae and detecting their bioactive compounds on a broader scale.
3. Isolation and identification of other chemical compounds such as alkaloids, phenols, and terpenes from isolated algae and from other kinds.

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