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Analysis of the Chemical Composition of macro Alga from area of Syrian coast

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□ ABSTRACT □

Two spaces of algae p. capillacea and Ulvafasciatawere collected fromJablah coast south of Lattakia coast.

The results are revealing that all study samples contain a significant amount of hydrocarbons and carboxyl Acids and alcohols compounds.

The hydrocarbons were more preferential in p. capillacea but kytons and alcohols were more preferential in Ulvafasciata, and aldehydes was preferential too in this space especially the compound 16- Heptadecanal . 1-(+)-ascorbic acid2- 6dihexadecanoate is the preferential in the two spaces as carboxylic acid derivatives, and cholesterol is the specific compound in alcohols of Ulvafasciata.

Key words: Algae , hydrocarbons, carboxyl Acids, alcohols, GC/MS

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تحليل التركيب الكيميائي لبعض طحالب الماكرو من مناطق في الشاطئ السوري

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□ ملخّص □

تم دراسة التركيب الكيميائي لنوعين من الطحالب و هما p. capillacea و Ulvafasciataاللذين تم جمعهما من شاطئ مدينة جبلة جنوب اللاذقية ، لقد أشارت النتائج إلى أن العينات المدروسة تحتوي على تراكيز مهمة من الفحوم الهيدروجينية و الأحماض الكربوكسيلية و الكحولات حيث كانت الفحوم الهيدروجينية مميزة عند النوع p. capillacea بينما الكيتونات و الكحولات كانت مميزة عند النوع Ulvafasciata كذلك الأمر بالنسبة للأدهيدات أيضاً في هذا النوع وبصورة خاصة المركب Heptadecanal –16 .

كان المركب 1–(+)–ascorbic acid2– 6dihexadecanoate المركب المميز في كلا النوعين من مشتقات الأحماض الكربوكسيلية و cholesterol كان المركب المميز من الكحولات في النوع .Ulvafasciata

الكلمات المفتاحية: الطحالب، الأحماض الكربوكسيلية، الكحولات، GC/MS

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Introduction

Recent trends in drug research from natural sources suggest that alga are a promising group to furnish novel biochemically active substances (Bazeset al., 2006; Chew et al., 2007; Mayer et al.,2007) because themarine algae are one of the most important organisms for producing antibiotic because of their broad spectrum of biological activities such as antimicrobial (Bouhlalet al.2010, Chihebet al. 2009) antiviral(Bouhlalet al.2010, Bouhlalet al.2011, Kim and Karadeniz2011,Bansemiret al., 2006), antifungal (de Felicioet al., 2010,Bhaduryet al 2004),antioxidant activities (Devi et al., 2011), and anticancer (Kim et al., 2011).

Therefore, research activities concerning the investigating of products of these organism, not only for a better understanding of nature and it economic important (Myahoob, 1991, Myahoobet al.,1992), but also to discover metabolites of possible use for human in different fields of interest.

The antimicrobial potential of macro alga from Syrian coast remains unexplored, Many chemically compounds of marine alga with antimicrobial activity have been isolated and have new pharmaceuticals such as phenols compounds , sterols, acidic compounds ,terpenes, heterocyclic carbons ets.(Bhacuniet al. 2005; Li et al., 2007; Bouhlalet al.,2011; Priyadharshiniet al., 2011,).The present study was undertaken toanalysis and detect thecompoundsof extracts oftwo species of marine benthic algae in Syrian coast.

Material and Methods:

Two spaces of algae p. capillacea and Ulvafsciatawere collected fromJablah coast south of Lattakia coastbetween 1 and 4 m of depthandwere rinsed with sterile seawater to remove all extraneous matter and dried shadow and on air ambient until complete dry (Lima-Filhoet al., 2002;Ibtissamet al., 2009).

Chemical extraction and analysis

The dried seaweeds were crushed by an electric grinder and the obtained powder was then stored at -18 °C until the extraction step. The powder of dried seaweeds (50g)(desired solvent [hexane, chloroform, methanol and petroleum ether] in cold maceration method for 48 hoursusing aspirated bottle and the extracts were concentrated under vacuum using a rotary evaporator. The residues were then diluted in 2 ml of pure dichloromethaneAnd analysis by GC/MS the analysis was performed with a Heweltt-Packard Gas Chromatograph 6890 series linked to a Heweltt-Packard 7683B series mass spectrometer system equipped with a HP-5 capillary column (30m x 0.25mm, film thickness 0.25µm) the temperature was programmed from 50ºc to 280ºc at a rate of 5ºc/min the ion source was set at 250ºc and ionization voltageAt 70 ev. Helium was used as carrier gas .The GC/MS. identification was based on the interpretation of the spectral fragmentation followed by comparison of the spectra obtained with those of authentic samples.Searches in HP Mass spectral library NIST.

Wiley were also applied

RESULTS AND DISCUSSION:

The study ofextracts of the two algale species p. capillacea and Ulvafasciata are used as antimicrobial activity against a spectrum of pathogenic Gram-positive and negative bacteria. One fungus (Candidaalbicans) with disc diffusion method has been used (Asmahan. et al. **2011**,Kara Ali, et al. 2012).

The results revealed that all studied samples contain a significant amount of hydrocarbons and carboxyl Acids and alcohols compounds(Tables 1, 2)

The results of p. capillacea(Table1) summarized the compounds that were identified. There are complex compounds that were determined in this kind of alga (Figure 1) contain hydrocarbons and carboxyl acids, kyton, esters, etc…

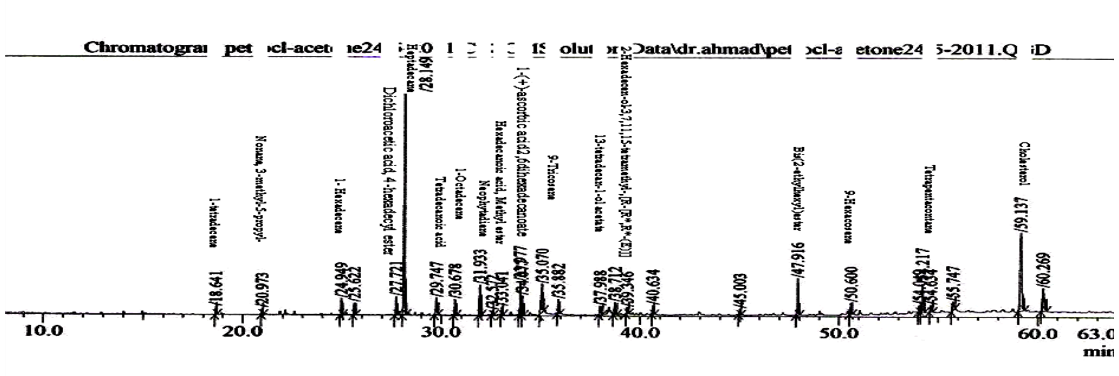

Figure (1):Chromatogram of compounds from p. capillacea

The hydrocarbons are 32.6%, carboxylic acids are 26% but thepercentage of anther compounds were lower than 10 % (like esters, alcohols, andkytons). The main compound in the mixture is 1-(+)-ascorbic acid2, 6dihexadecanoate. This is the most important compound as antioxidant

Table1. Compounds from p. capillacea

Compounds	Percent of compounds
hydrocarbons	32.6
Carboxyl acids	26.00
Esters	5.91
Amids	1.70
Kyton	2.46
Alcohols	3.61
Other compounds	1.45

In addition, the results ofUlvafasciata (Table 2) summarize the compounds that were identified. There are complex compounds in this species of algae that contain hydrocarbons and carboxyl acids(Figure 2).

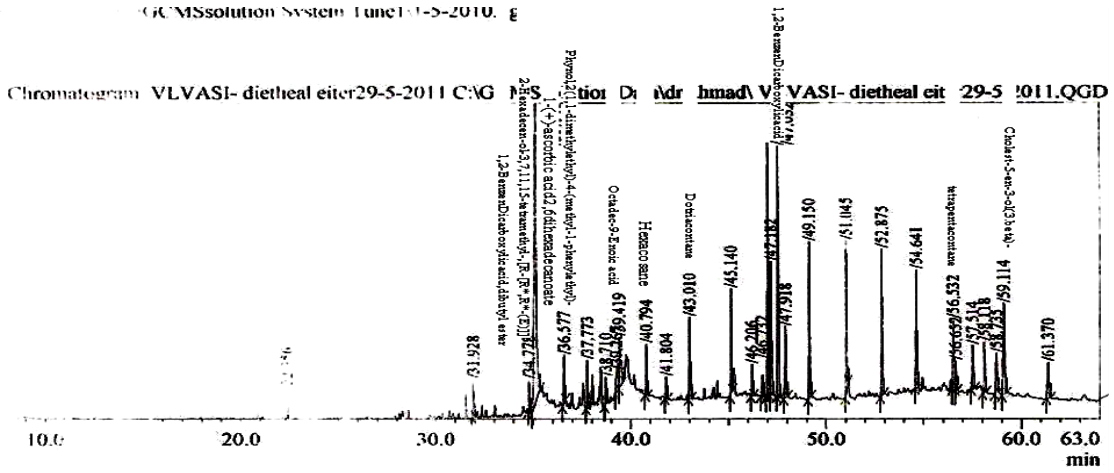

Figure (2):Chromatogram of compounds from Ulvafasciata

Alcohols compounds were the maximum percentage in this species (26.39%). The other percentages were: 25.08% for carboxylic acids, 19.1% for kytons and 10.88% for hydrocarbons. But other compounds were lower than 10%

Table2. Compounds from Ulvafasciata

Compounds	Percent of compounds
hydrocarbons	10.88
Carboxyl acids	25.08
Esters	4.48
Amids	0.72
Kyton	19.1
Aldehydes	0.7
Alcohols	26.39
Other compounds	5.03

CONCLUSION

From these results, we can conclude that macro algae from Syrian coasts contain complex compounds interesting for biochemical activities.Hydrocarbons and carboxylic acids and alcohols were the main compounds in these two species.

The hydrocarbons was more preferential in p. capillacea but kytons and alcohols were more preferential in Ulvafasciata. Aldehydes werepreferential in the laterspecies, especially the compound 16- Heptadecanal. 1-(+)-ascorbic acid2, 6dihexadecanoate is preferential in the two above mentioned species as carboxylic acid derivatives, and cholesterol is the specific compound in alcohols ofUlvafasciata.

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REFERENCES:

Asmahan, Z., Abass, A., Kara Ali, A., "Antimicrobial activity of some Syrian marine algae Extracts against some pathogenic microorganisms" TishreenUnev. Magazine , In Press 2011.

BANSEMIR, A.; BLUME, M.; SCHRODER, S. and LINDEQUIST, U.Screening of cultivated seaweeds for antibacterial activity against fish pathogenic bacteria. Aquaculture, 252, 2006, 79-84.

BAZES, A. – SILKINA, A – DEFER, D. – BERNÈDE-BAUDUIN, C. – QUÉMÉNER, E. – BRAUD,J.P. – BOURGOUGNON, N. 2006. Active substances from Ceramiumbotryocarpum used as antifouling products in aquaculture. In Aquaculture, vol. 258, 2006, p.664–674.

BHACUNI, D.S, – RAWAT, D.S. 2005.Bioactive Marine Natural Products. Springer/Anamaya Publishers. 2005. 400 p. ISBN: 978-1402034725.

BHADURY, P. – WRIGHT, C.P. 2004. Exploitation of marine algae: biogenic compounds for potential antifouling application. In Planta, vol. 219, 2004, p. 561–578.

BOUHLAL, R. – RIADI, H. BOURGOUGNON N. 2010.Antiviral activity of the extracts of Rhodophyceae from Morocco. In African Journal of Biotechnology, vol. 9, 2010, p. 7968–7975

BOUHLAL, R. – HASLIN, C. – CHERMANN, J.C. – COLLIEC-JOUAULT, S. – SINQUIN, C. – SIMON, G. – CERANTOLA, S. – RIADI, H. – BOURGOUGNON, N. 2011.Antiviral activities of sulfated polysaccharides isolated from Sphaerococcuscoronopifolius(Rhodophytha, Gigartinales) and Boergeseniellathuyoides (Rhodophyta, Ceramiales). In Marine Drugs, vol. 9, 2011, p. 1187–1209

CHEW, Y.L. – LIM, Y.Y. – OMAR, M. – KHOO, KS. 2007. Antioxidant activity of threeedible seaweeds from two areas in South East Asia. In Food Science and Technology, vol. 41,2007, p. 1067–1072.

CHIHEB, I. – RIADI, H. – MARTINEZ-LOPEZ, J. – DOMINGUEZ-SEGLAR, J.F. – GOMEZ-VIDAL, J.A. – BOUZIANE, H. – KADIRI, M. 2009.Screening of antibacterialactivity in marine green and brown macroalgae from the coast of Morocco. In African Journalof Biotechnology, vol. 8, 2009, p. 1258–1562

DE FELÍCIO, R – DE ALBUQUERQUE, S. – YOUNG, M.C.M. – YOKOYA, N.S. – DEBONSI, H.M. 2010. Trypanocidal, leishmanicidal and antifungal potential from marinered alga Bostrychiatenella J. Agardh (Rhodomelaceae, Ceramiales).In Journal ofPharmaceutical and Biomedical Analysis, vol. 52, 2010, p. 763–769.

DEVI, G.K. – MANIVANNAN, K. – THIRUMARAN, G. – RAJATHI, F.A.A. – ANANTHARAMAN, P. 2011. In vitro antioxidant activities of selected seaweeds from Southeast coast of India. In Asian Pacific Journal of Tropical Medicine, vol. 4, 2011, p. 205–211.

Ibtissam C., Hassane R., José M-L., Francisco D. S. J. F., Antonio G. V. J., Hassan B. and Mohamed K.,

2009: Screening of antibacterial activity in marine green and over a 3-Year Period. APPLIED AND

ENVIRONMENTAL MICROBIOLOGY, Vol. 73, No. 15, p. 4813–4823.

Kara Ali, A. Asmahan,Z., Abass, A." Study of effect some extracts of marine algae on bacteria and

comparative with antibiotics" Report On the research support offered the Higher Commission for

scientific Research – Syria, 2012.

KIM, S.K. – THOMAS, N.V. – LI, X. 2011. Anticancer compounds from marine macro algae and their

application as medicinal foods. Advanced Food and Nutrition Research, vol. 64,2011, p. 213–224.

KIM, S.K. – KARADENIZ, F. 2011. Anti-HIV Activity of extracts and compounds from marine algae. In

Advanced Food and Nutrition Research, vol .64, 2011, p. 255–265.

LI, K. – XIAO-MING, L. – NAI-YUN, J. – BIN-GUI, W. 2007. Natural bromophenols from the marine

red alga Polysiphoniaurceolata (Rhodomelaceae): Structural elucidation and DPPH radical-scavenging

activity. In Bioorganic and Medical Chemistry, vol. 15, 2007, p.6627–6631.

LIMA-FILHO, J.V.M. – CARVALHO, A.F.F.U. – FREITAS, S.M. – MELO, V.M.M. 2002. Antibacterial activity of extracts of six macroalgae from the northeastern Brasilian coast. In Brazilian Journal of Microbiology, vol. 33, 2002, p. 311–314.

Myahoob, H. " Economic and médicinal importance of the Alga in SyriaRed Alga" TishreenUnev. Magazine No.3, 1991, pp. 85-103.

Myahoob, H. and Abbas, A. " Economic and medicinal importance of the Alga in Syria Brown Alga and green Alga" DamascouseUnev. Magazine No.8, 1992, pp. 51-72

MAYER, A.M.S.M. – RODRÍGUEZ, A.D. – BERLINCK, R.G.S. – HAMANN, M.T. 2007.Marine pharmacology in 2003–4: Marine compounds with anthelmintic antibacterial,anticoagulant, antifungal, anti-inflammatory, ant malarial, ant platelet, antprotozoal,anttuberculosis, and antiviral activities; affecting the cardiovascular, immune and nervoussystems, and other miscellaneous

mechanisms of action. In Comparative Biochemistry andPhysiology, vol. 145, 2007, p. 553–581.

PRIYADHARSHINI, S. – BRAGADEESWARAN, S. – PRABHU, K. – RAN, S.S. 2011.Antimicrobial

and hemolytic activity of seaweed extracts Ulvafasciata (Delile 1813) from Mandapam, Southeast

coast of India. In Asian Pacific Journal of Tropical Biomedicine, vol.1, 2011, p. S38–S39.