EPH - International Journal of Applied Science
ISSN (Online): 2208-2182
Volume 04 Issue 04-October-2018

DOI: https://doi.org/10.53555/eijas.v4i4.123

ISOLATION AND DEFINITION OF MARINE ALGAE FROM THE COAST OF SOUSA CITY IN LIBYA

Wafa Ebridan Ali[1*], Hamida EL. Elsalhin[2] and Farag. Shaieb[3]
*[*1, 2, 3]Botany Department, Faculty of Science Omar El-Mokhtar University, El -Beyda-Libya*

Corresponding Author:-

Abstract:-

Sousa is a small Libyan town located on the Mediterranean coast in the Green Mountain. The present work was mainly intended to study the marine algae of Sousa coast. The study was carried out during spring (2016). Sea water samples have been collected from the coast of the city of Sousa which were microalgae, and macro algae (seaweeds) and have been identified. A total of 22 algal species (16 genera) was recorded in the study area. Eight species of them (36.36%) were belonging to Chlorophyta (3 families), four species (18.18%) belonging to Bacillariophyta (4 families), two species (9.09%) belonging to Cyanobacteria (2 families), two species (9.09%) belonging to Phaeophyta (2 families) and six species (27.27%) belonging to Rhodophyta (3families). Obtained results showed that the most common genus of Laurencia were found three species. However, Laurencia, Sargassum and Ulva were the most dominant species in this area during the season.

Keywords: - *Isolation, identification, marine algae.*

INTRODUCTION:

Many of marine algae safely used as direct and indirect human food [1]. Macro-algae or "seaweeds" growing in salt or fresh water. They are often fast growing and can reach sizes of up to 60 m in length [2]. Marine algae is the most abundant resources in the sea water. Marine algae could be a key resource containing a rich source of functional metabolites such as polysaccharides, proteins, peptides, lipids, amino acids, polyphenols, and mineral salts [3]. There are a variety of seaweeds that have been used extensively in Asia as dishes or in foods such as soup, condiments, and salads [4]. Several edible Spanish seaweeds which are commonly used in the oriental diet are known world-wide by their Japanese names as Kombu (*Laminaria spp*.), Wakame (*Undaria pinnatifida*) and Nori (*Porphyra spp*.). They are a good source of food ingredients and new dietary fiber-rich products [5]. In Asian countries, a diet rich in seaweed has consistently been linked to a lower incidence of chronic diseases such as cancer, cardiovascular, and heart diseases [1 and 3]. Numerous polysaccharides isolated from marine algae have attracted great interest in functional foods, pharmaceuticals, and cosmetic applications. Polysaccharides are a type of bio macromolecule that exist as cell wall structural components of marine algae. Polysaccharides from marine algae are often closely linked to pharmacological activities such as anticoagulants, antioxidant, antitumor animmunomodulatory [6,7]. In this work collected and isolated the marine algae of Sousa coast to evaluate the chemical, antimicrobial, biofuel, and pharmaceutical importance in further studies.

Material and Methods:

The Study area:

Sousa coast and Sousa Harbour, its geographical location was illustrated in Fig. (1). Sousa Harbour lies Article on specific latitude/longitude Latitude 32° N and Longitude 21° Eat the eastern Libyan coast. It also had commercial, and also had commercial, fishing port and many public beaches.

Fig. 1. Maps of Libya and the study area

Harvesting of micro algae:

Bring samples to the laboratory in plastic Gallons 5 liter during 4 hours and perform deposition sampling process Sedimentation by putting it in the laboratories listed capacity of 1 liter and left for three days until the precipitate and then pull the upper part of the sample until the volume up to 50 ml, reservation samples in flasks conical for the purpose of examination and counting agriculture [8].

Isolation and Cultivation of microalgae:-

The medium used throughout the maintenance and experimental studies (MBL Medium) [9]. It consists mainly of the following: Macronutrient stock solutions (each g/L distilled water) ($CaCl_2$. $2H_2O$: 36.76, $MgSO_4$: 36.97, $NaHCO_3$: 12.60, K_2HPO_4: 8.71, $NaNO_3$: 85.01, Na_2SiO_3. $9H_2O$: 28.42). Micronutrient stock solutions (all g/L distilled water) (Na-EDTA: 4.36, $FeCl_3.6H_2O$: 3.15, $CuSO_4.5H_2O$: 0.01, $ZnSO_4.7H_2O$: 0.022, $CoCl_2.6H_2O$: 0.01, $MnCl_2.4H_2O$: 0.18, Na $MoO_4.2H_2O$: 0.006).

The nutrient medium was prepared by using one ml of each of the stock macronutrient solution and one ml of the micronutrient stock solution and making it up to one liter of distilled water. The final pH was then adjusted to 7.2. Potassium phosphate solution was autoclaved separately and then added aseptically to the sterilized medium to avoid phosphate precipitation. The Cultivation and isolation of the algae the might be persisting in the form of spores ,hormogonia ,akinetes or any other parenting stages were carried out using the moist plate method recommended by [10].

Harvesting of macroalgae:

Manual harvesting of seaweed has been practiced for centuries and it is still common for species naturally growing in coastal areas [11]. And epiphytes, impurities and salts are carefully and quickly removed in the laboratory with tap and distilled waters.

Identification of algae:

Sea weeds were examined by means of naked eye and/or a binocular microscope (Zeiss, with camera M35 W) and identified according to the following references [12,13and14].

Results and Discussion:

The results showed that the algae that have been isolated and identified from the waters of the coast of Sousse belonged to the following sections Bacillariophyta, cyanobacteria. Four species of Bacillariophyta and two cyanobacteria were isolated and identified, and however, three algal groups, macro algae were Chlorophyta, Rhodophyta, Phaeophyta.. A total of 22 marine algal species (16 genera) was recorded from along the coasts and Harbour of the Sousa city to cover the study area (Table 1).

Table 1: List of marine algae at Sousa coasts.

Division	Family	Algae
Chlorophyta (3 Families & 8 species)	Codiaceae	*Codium bursa* *Codium coralloides*
	Cladophoraceae	*Cladophora prolifera* *Cladophora sericea*
	Ulvaceae	*Ulva Lactuca* *Ulva rigida* *Enteromorpha Clathrata* *Enteromorpha intestinalis*
Rhodophyta (3 Families & 6 species)	Rhodomelaceae	*Laurencia 0btusa* *Laurencia nidifica* *Laurencia papillosa* *Acathophora spicifera*
	Cystocloniaceae	*Hypnea esperi*
	Corallinaceae	*Corallina granifera*
Bacillariophyta (4 families & 4 species)	Naviculaceae	*Navicula*
	Fragilariaceae	*Diatoma*
	Bacillariaceae	*Nitzschia*
	Skeletonemataceae	*Skeletonema*
Phaeophyta (2 Families & 2 species)	Cystereiraceae	*Padina pavonica*
	Sargassaceae	*Sargassum fluitans*
Cyanobacteria (2 Families & 2 species)	Oscillatoriaceae	*Oscillatoria*
	Phormidiaceae	*Phormidium*
Total	14 families	22 algal species

The percentage of algal groups calculated as number of species to spring season were represented by Chlorophyta, Rhodophyta and Bacillariophyta, followed by Cyanobacteria and Phaeophyta were less respective species. Sixteen genera (22 species) of algae were identified from the whole period of study at Sousa coasts; eight species of them (36.36%) were belonging to Chlorophyta (3 families), four species (18.18%) belonging to Bacillariophyta (4 families), two species

(9.09%) belonging to Cyanobacteria (2 families), two species (9.09%) belonging to Phaeophyta (2 families) and six species (27.27%) belonging to Rhodophyta (3 families). In previous studies, [15, 16, 17, 18 and 19] and [20] recorded many new species of marine algae on the east Libyan coast. It had 168 species belonging to Chlorophyta, Phaeophyta and Rhodophyta [21,22and 23]. Benghazi coasts were richer than the nearest eastern coasts of Libya like Derna and Tolmeta which had just 14 brown algal species of each [24]. Whereas Tukra coasts also had only 7 brown algal species [25]. This demonstrated that the nitrate content of the seawater may temporarily control the amplitude of growth rate, just as favorable or adverse temperatures or light intensities as done by other primary ecological factors. The relative decline in green species may be due to the spring season, these algae found in three groups, green algae, red and diatoms, while brown algae and blue bacteria were less species of isolated algae from Sousa coast this season. The result is some concentration of pollution and human disturbance that leads to a steady increased increase of the algal flora especially genus *Ulva*.

Table (1) illustrated 2 identified brown algal species (2genera) of the present study area of Sousa coasts with dominancy of *Sargassum fluitans* and *Padina pavonica* species. Some of the Sea grass has been described as excellent bioindicators [26]. Generally, Sousa coasts were also lower in Phaeophyceae than the eastern coasts of Libya like Derna and Tolmeta which had 14 brown algal species of each [24] and Tobruk coasts which had 11 and brown algal species [27] . The study area was less to Tukra coasts which had 7 brown algal species [25]. While it was richer than Ain-Ghazala coasts which had just one brown species. A total of six species of red marine algae (27.27%) was recorded in the current Sosa coastal area and were tabulated in (Table 1) with a special reference to the families of the Corallinaceae and Rhodomelaceae. The registered red algae species were quite different from the western Libyan coasts such as the coast of Tokra (38 species) and the Tolmeta coasts (13 species) recorded by [25] and [28], respectively. But more than those recorded in Darna (5 species) by [24] and those of the Tobruk coast (16 species) recorded by [27]. Although some good indicators algae was recorded, one could conclude that the study area is relatively poor of marine algae and polluted according to [29]. Who reported that, the decrease in the number of species and increase in number of individuals is a characteristic feature of polluted water?

References:

[1].**Dawes, C. J., (1998)**: Marine Botany. John Wiley and Sons, New York.

[2].**McHugh DJ (2003**) A guide to the seaweed industry. Rome, FAO. FAO Fisheries Technical Paper No. 441.

[3].**Brown E.S., Allsopp P.J., Magee P.J., Gill C.I.R., Nitecki S., Strain C.R., McSorley E.M. Seaweed and human health. Nutr. Rev. 2014; 72:205**–216. doi: 10.1111/nure.12091.

[4].**Rioux L.-E., Beaulieu L., Turgeon S.L. Seaweeds: A traditional ingredients for new gastronomic sensation. Food Hydrocoll. 2017; 68:255**–265. doi: 10.1016/j.foodhyd.2017.02.005.

[5].**Rupe'rez, P. and Saura-Calxto, F. (2001):** Dietary fibre and physicochemical properties of edible Spanish seaweeds. Europe. J. of Food Res. and Tech., **212:**349-354.

[6].**de Jesus Raposo M.F., de Morais A.M., de Morais R.M.S.C. Marine polysaccharides from algae with potential biomedical applications. Mar. Drugs. 2015; 13:2967**–3028. doi: 10.3390/md13052967.[PMC free article] [PubMed] [Cross Ref]

[7].**Hamed I., Özogul F., Özogul Y., Regenstein J.M. Marine bioactive compounds and their health benefits: A review. Compr. Rev. Food Sci. Food Saf. 2015; 14:446**–465. doi: 10.1111/1541-4337.12136. [Cross Ref].

[8].**Vantkatarman, G.S. (1969):** The Cultivation of Algae.The Indian Couucil of Agricultural Research, New-Delhi, India.

[9].**Nichols, H. W. (1973)**: in Handbook of Phycological Methods, Ed. J. R. Stein, pp. 16-17. Camb. Univ. Press. (R. R. L. Guillard, personal communication).

[10]. **Jurgensen, M.F.and Davey, C.B (1968):** Nitrogen fixating blue-green algae in acid forest and nursery soils. Can .J.Microbiol.**14:**1179.

[11]. **Van den Burg, S..& Swierstra, T.(Fds.). (2013)**. Ethics on the Laboratory Palgrave Macmil-lan. Doi: 10.1057/978113700293

[12]. **Aleem, A. (1993):** Marine algae of Alexandria. University of Alexandria publications, Egypt, pp.154–55 plate.

[13]. **Bellinger, E. G. and Sigee, D. C. (2010):** Freshwater Algae: Identification and Use as Bioindicators, John Wiley & Sons, Ltd, Chichester, UK.

[14]. **Demirbas, A. (2010):** Use of Algae as Biofuel Sources. Energy Conversion.

[15]. **Nizamuddin, M. and Godeh, M. M. (1989):** Stypopordium tubruqense (Phaeophyta, Dictyotales), a new species from the Mediterranean Sea. Willdenowia**, 18:** 603-608.

[16]. **Nizamuddin, M. and Godeh, M. M. (1990a):** A first record of the genus Cottoniella Børgesen (Ceramiales, Rhodophyta) from Libya. Pak. J. Bot., **25(1):** 24-35.

[17]. **Nizamuddin, M. and Godeh, M. M. (1990b):** Studies on the new species of Cottoniella from the coast of Libya. Pak. Jour. Bot., **22:** 24035.

[18]. **Nizamuddin, M. and Godeh, M. M. (1990c):** Studies on the genera Chaetomorpha Kütz. And Rhizoclonium Kütz. (Cldophorales-Cladophoraceae) from the Libyan coast. National Herbarium Uni. Al-Fateh, Tripoli. Bull. ULT, **2:** 11-37.

[19]. **Nizamuddin, M. and Godeh, M. M. (1993):** Observations on Taonia atomaria F. ciliate (Lamour.) Nizamuddin. Pak. J. Bot., **25(2):** 199-207.

[20]. **Nizamuddin, M. and El-Menifi, F. (1993):** A new species of the genus Codium (ChlorophytaCodiales) from the eastern coast of Libya. Pak. J. Bot., **25(2):** 208-214.

[21]. **Godeh, M.; Nizamuddin, M. and El-Menifi F. (1992):** Marine algae from eastern coast of Libya (Cyrenaica). Pak. J. Bot., **24(1):** 11-21.
[22]. **El-Gahmy, Hend A. (2007):** Study of the effective of some green algal species extractions (order: Ulvales) against pathogenic bacteria and fungi. M. Sc. Thesis, Botany Department, Faculty of Science, Garyounis University, Libya. (in Arabic).
[23]. **El-Fatemi, Aesha S. (2008):** Study of the effective of some brown algal species extractions (order: Dictyotales) against pathogenic fungi. M. Sc. Thesis, Botany Department, Faculty of Science, Garyounis University, Libya. (in Arabic).
[24]. **Said, A., Godeh, M. and El-Menifi, F. (2010):** Marine algae of Derna, Susa and Tolmeta coasts, Libya. The Second International Conference on Phycology, Limnology and Aquatic Sciences. 14-15 February **(2010)** Port Said, Egypt
[25]. **Said, A. and Godeh, M. (2008)** Marine algae of Tukra and Tolmeta coasts, Libya. Egyptian J. of Phycol. Vol. 9, **2008**. 167-179.
[26]. **Pergent-Martini, C.; Leoni, V.; Pasqualini, V.; Ardizzone, G. D.; Bedini, R.; Belluscio, A.; Belsher, T.; Borg, J.; Boudouresque, C. F.; Boumaza, S.; BouquegneauJ. M.; Bula, M. C.; Calvo, S.; Cebrian, J.; Charbonnel, E.; Cinelli, F.; Cossu, A.; Di Maida, G.; Dural, B.; Francour, P.; Gobert, S.; Meinesz, A.; Molenaar, H.; Mansour, H. M.; Panayotidis, P.; Pergent, G.; Piazzi, L.; Pirrotta, M.; Relini, G.; Romero, J.; Sanchez-lizaso, J. L.; Semround, R.; Shembri, P. Shili, A.; Tomasello, A. and Velimirov, B. (2005)**: Descriptors of Posidonia oceanica meadws: Use and Application. Ecological Indicators, **5:** 213-230.
[27]. **Godeh, M.; El-Menifi F. and Said, A. (2009):** Marine algae of Tobruk and Ain Ghazala coasts, Libya. Garyounis University Press. Journal of Science and Its Applications. Vol. 3, No. 1, pp 42- 55, April 2009.
[28]. **Said, A., Godeh, M. and El-Menifi, F. (2010):** Marine algae of Derna, Susa and Tolmeta coasts, Libya. The Second International Conference on Phycology, Limnology and Aquatic Sciences. 14-15 February **(2010)** Port Said, Egypt
[29]. **Wilhm, J. L. (1975)** Biological indicators of pollution- In: Whitton, B. A. (ed.), River ecology. - Blackwell. Oxford: pp. 375-400.