

# Invitro Antioxidant And Anticancer Activity of Marine Macroalgae

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**Abstract-** This study investigates a jania species for its antiproliferative potential in order to treat cancer. In this dilemmic world preventing diseases is not an easier one. Specifically curing cancer like diseases faces a lot of obstacles in the human life. Cancer is a disease where cells grow out of control that invade, erode and destroy normal tissues. Next to heart disease cancer is a leading disease that causes about 65 % of the world's death. To overcome this, we are in research that bioactive peptide from microbial population has the potential against cancer cells. Red seaweed "Rhodophyta" are an important group of macro algae that include approximately 7000 species. They are a rich source of structurally diverse bioactive constituents, including protein, sulfated polysaccharides, pigments, polyunsaturated fatty acid, vitamin, minerals, and phenolic compounds with nutritional, medical, and industrial importance. The polysaccharides of the red marine algae *J. rubens* could be a potential candidate for the natural compounds as antioxidant and anticancer therapy.

**Keywords-** red algae, aqueous extract, breast cancer, seaweed; Rhodophyta, antioxidant activity and anticancer activity (MCF7) cell line.

## I. INTRODUCTION

Macroalgae are macroscopic benthic marine algae (seaweed) living in the intertidal zone. They are characterized by autotrophic nutrition and fast-growth; they do not need land for cultivation and their growth rate is faster than terrestrial plants [1]. They are categorized into three different groups Chlorophyta; Phaeophyta, and Rhodophyta, based on their pigment composition and storage food. Marine organisms especially marine algae can be confidently as a new source in term of Traditional medicine field, where the extract of marine algae can be source of novel bioactive compound which used in treatment of many diseases such as anticoagulant. Antiviral, antioxidant, anticancer, anti-inflammatory, Human breast carcinoma (MCF-7) and human hepatocellular carcinoma cancer cell lines.

RED Algae *Jania rubens* the focused on Heterotrophic aerobic bacteria species associate with coralline red algae *Jania rubens*. Red seaweed is the critical source of

numerous bioactive compounds, in contrast with the other two groups of green and brown seaweed. The protein content in red seaweed varied between 10-50% of the dry weight and being higher than macroalgal groups and some foods. In addition, they contain the essential amino acid, about 25-50% of the total amino acids. Red and seaweed contain the largest number of phenolic compounds like flavonoids, phenolics acids, and bromophenols, which had different medical applications, due to the reaction of these components with proteins.

The red algae *Jania Rubens* is characterized by marine macro algae it includes about 6,000 species mostly rich in galactan, which makes them ideal for their use as natural therapy for the treatment of cancer disease. Some of these red macro algae has exhibited cytotoxicity against number of cancer cell lines. This study aimed to characterize and identify the achieve constituents of the red algae *Jania Rubens* species.

Breast cancer is the leading cause of death in woman globally. Cancerous breast cell express survival factors that inhibit apoptotic cell death Employing natural or synthetic agents to prevent or suppress the progression of invasive cancers has been recognize has approach with enormous potential. Studies have shown that seaweeds extracts could be powerful anticancer agents, apoptosis was detected in breast cancer cells that were treated by seaweed extract could protect against breast cancer with the ever-increasing rate of breast cancer incident, and there is a need to look for natural more effective cancer treatment that is not toxic to the normal cells.

## II. IDENTIFY RESEARCH AND COLLECT DATA

1. In vitro Anti cancer Activity Of Polysaccharide Extracted From Red Algae *Jania Rubens* Against Breast And Colon Cancer Cell Lines

Cancer causes the highest mortality around worldwide, particularly in undeveloped countries. Chemotherapy drugs are still standard cancer treatments in spite its toxicity against normal cells and tissues. In contrast, natural products for cancer treatments have relatively few side effects on normal cells and tissues. Marine macroalgae

(seaweeds) have significant contents of bioactive compounds which work as anti-inflammatory, antimicrobial, antiviral and antitumor drugs. In vitro, the antioxidant activities of the polysaccharides substances extracted from seaweeds inhibit the proliferation of cancer cells. In vivo, the action of polysaccharide substances of seaweeds decrease tumor growth. The seaweed polysaccharides decrease tumor growth through restraining the expansion of cancer cells by apoptosis. This occurs through the stimulation of cytotoxic cytokines on gene expression, by stopping the development of tumors essential to the blood supply or by cellular differentiation. Seaweed sampling was carried out in June 2013, from Abo-Qir bay Alexandria [Ulvalactuca (Chlorophyceae), Padina pavonica, Sargassum vulgare (Pheophyceae), and from Ras Sadr, Sinai [Cystocira compressa and Sargassum latifolium (Pheophyceae)]. The marine macroalgae after being collected were kept in plastic bags containing sweater and transferred immediately to the laboratory to prevent evaporation. Seaweeds were washed twice with fresh water to remove epiphytes, debris and surface salts. A portion of the seaweed samples were prepared as herbarium example gathering, for taxonomical distinguishing proof and the other part was air-dried in the unmindful at room temperature (25–30 °C) on absorbent paper. The dried examples were crushed to fine powder and stock up at –20 °C until utilize.

## 2. Antioxidant Antibacterial And Anticancer Activity From Marine Red Algae Gracillaria Edulis

Marine environment plays an inevitable for their chemical and biological diversity, and therefore it is considered as an extraordinary resource for the discovery of new anticancer drugs. Recent developments in the elucidation of therapeutic action of natural products help us to evaluate for their various potential activity [1]. Seaweeds offer a rich source of bioactive molecules [2]. The seaweed is a diverse and large group of macroalgae. Based on the presence of photosynthetic pigments the aquatic macroalgae organisms which are broadly classified into various types, that is, rhodophyta (red algae), chlorophyta (green algae), and phaeophyta (brown algae). They are grouped according to their unique photosynthetic pigments, which give them their characteristics color and unique properties [3]. Marine environment plays an inevitable for their chemical and biological diversity, and therefore it is considered as an extraordinary resource for the discovery of new anticancer drugs. Recent developments in the elucidation of therapeutic action of natural products help us to evaluate for their various potential activity [1]. Seaweeds offer a rich source of bioactive molecules [2]. The seaweed is a diverse and large group of macroalgae. Based on the presence

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with the help of light and oxidizing agent that leads to the formation of free radical and other strong oxidizing agents. Seaweeds are considered as an essential source in the form of bioactive metabolites, in which constituents from the *Gracilaria* species can be used to treat life-threatening diseases such as acquired immunodeficiency syndrome and cancer.

### III. WRITE DOWN YOUR STUDIES AND FINDINGS

#### 1. Macro Algae

Seaweed, or macroalgae, refers to thousands of species of macroscopic, multicellular, marine algae. The term includes some types of Rhodophyta (red), Phaeophyta (brown) and Chlorophyta (green) macroalgae. Seaweed species such as kelps provide essential nursery habitat for fisheries and other marine species and thus protect food sources; other species, such as planktonic algae, play a vital role in capturing carbon, producing at least 50% of Earth's oxygen.

#### 2. *Jania Rubens*

It is a calcified slender beaded coral weed grows 15 to 40 mm high with rose-red colour tingeness belongs to corollinaceae family. It grows in meridian coast, sub tidal rocky surface from 8 to 10m deep in sandy sea floors. This algae is heavily infused with biochemically precipitated calcium carbonate as calcide form by the process of biomineralization. It is widely used in skin whitening and hydrating products. *Jania Rubens* is abundantly rich in several bioactive compounds like flavonoids, vitamins and fatty acids.

#### 3. Antioxidant Activity

Antioxidants substances from seaweed have attracted the principal interest in pharmaceutical manufacturing, since these compounds effectively prevent or retard the adverse impacts caused by free radicals. There are two groups of antioxidants the reaction breaking antioxidants and preventive antioxidant. They demonstrate the main roles in the prohibition of many maladies such as a tumor, inflammatory disorders, coronary heart, neurological degeneration, and aging. The present of antioxidant substance such as alkaloids, flavonoids, phenols, tannis, phlorotannin, terpenoids, pigments, glucosides Steroids in algae was thought to act as defence mechanism. The presence of antioxidant in macroalgae protected the species structure, Components from environmental damage.

### IV. RELATED WORK

#### 1. Phytochemical Analysis

It refers to the extraction, screening and identification of the medicinally active substances found in algae. Some of the bioactive substances that can be derived from algae are flavonoids, alkaloids, carbohydrates, glycosides, terpenoids, saponins, proteins and phenolic compounds. The color intensity or the precipitate formation was used as analytical responses to these tests. Phytochemical is a natural bioactive compound found in algae, to act as a defense system against diseases or more accurately, to protect against disease.

#### 2. Anticancer Activity

Cancer is a noteworthy medical issue worldwide and until now, lackfully effective medicine. Macroalgae have cancer fighting agents that may demonstrate valuable in reliving tumors and other cancer condition like breast, colon cancer and leukemia. In the 1960s, the first anticancer medicine was produced from red seaweed *Jania Rubens*. Treatment of triple –breast carcinoma (TNBC) remains an unmet medical need with no targeted therapy available to date.

#### 3. Cytotoxic Effect

The cytotoxic effect of the sample was tested against Vero and MDA-MB-231 cell lines by MTT (3-(4, 5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide assay (Mossman, 1983). The cells were seeded in 96-well microplates (1 x 106 0.00 20.00 40.00 60.00 80.00 100.00 120.00 1 2 3 4 5 6 Series1 52 cells/well) and incubated at 37°C for 48 h in 5% CO<sub>2</sub> incubator and allowed to grow 70-80% confluence. Then the medium was replaced and the cells were treated with different concentrations of (control) and the treated cells were observed under digital inverted microscope (20X magnification) after 24 h and photographed. The cells were then washed with phosphate-buffer saline (PBS, pH7.4) and 20 µL of (MTT) solution (5 mg/mL in PBS) was added to each well. The plates were then stand at 37°C in the dark for 2 h. The formazan crystals were dissolved in 100 µL DMSO and the absorbance was read spectrometrically at 570 nm.

### V. OBSERVATION

Invitro Antioxidant And Anticancer Activity Of *Ulva Lactuca* L. Using Molt-3 Cell Line

The present study was to investigate the antioxidant and anticancer activity of *U. lactuca* L. The extract of *U.*

lactuca L. was extracted by ethanol and subject to analysis. An in vitro antioxidant activity of the ethanol extract of U. lactuca L. was performed by 1, 1-diphenyl-2-picrylhydrazyl free radical scavenging assay. Simultaneously anticancer activity was also performed using blood cancer (MOLT-3) cell line, and the species showed a strong selective cell proliferation inhibition of the cancer cell line. Results: The scavenging activity was measured and determined to be 78.5%. This might be due to high polyphenolic compounds and flavonoid contents of the extract, which showed maximum growth inhibition of 74.4%. Conclusion: Thus, the study concludes that the constituents of seaweeds can act as potent in treating various diseases and can be used as an alternative for therapeutic treatment.

## VI. CONCLUSION

Extract of the red algae *Jenia Rubens* this apoptosis effect causing the cell death is tightly regulated by a product that either promote or block the cell death at different stages of the cell cycle however, apoptosis can be triggered also by extrinsic stimuli, such as death ligand receptor engagement. The enhancement of cysteine-dependent aspartate-directed proteases (caspases) and nucleases as a result of intrinsic and extrinsic signals cause the destruction of the cell. It causes cell shrinkage, cytoplasmic and nuclear fragmentation, and collapse of mitochondria potential. The higher activity of MCF7 cells were observed are consistent with the conclusion of [change et al 2013]. This finding with agrees many studies cancer cell special.

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