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CYTOTOXICITY AND HEMOLYTIC ACTIVITIES FROM ULVA.SP SEAWEED EXTRACT

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ABSTRACT:

INTRODUCTION:

Seas and oceans represent a big store for beneficial algae. It is a real fact that the importance of marine organisms as a source of new substances growing.Seaweeds are the eukaryotic organisms that live in salty water and recognized as a potential source of bioactive natural products.The present review is focusing on the following topic Cytotoxicity and hemolytic activities from ulva.sp seaweed extract

AIM: To study the Cytotoxicity and hemolytic activities from ulva.sp seaweed extract

MATERIALS AND METHODS:

Preparation of crude extract from ulva species seaweed extract.Seaweed samples will be collected from a suitable coastal location, and proper preparation methods will be employed to ensure the preservation of its chemical integrity.

RESULTS:

The ulva.sp sea weed extract have the crucial role in cytotoxic and hemolytic activity.The cytotoxic activity from ulva sp.sea weed extract have the potential to decrease the cell viability.when the

sample concentration increases the hemolytic activity also increases hence the hemolytic activity of ulva species sea weed extract have the potential to increases the hemolytic activity

DISCUSSION:

The exploration of Ulva sp.seaweed extracts as potential sources of bioactive compounds for anticancer drug development.The observed cytotoxic and hemolytic activities of Ulva sp. seaweed extracts may be attributed to their bioactive constituents, such as polysaccharides, polyphenols, proteins, and peptides

KEY WORDS: Ulva species ,Sea weed ,Cytotoxic activity ,Hemolytic activity ,Marine organism,Bioactive compounds

INTRODUCTION:

Sea lettuce, (genus Ulva), genus of green algae (family Ulvaceae) usually found growing on rocky shores of seas and oceans around the world. Some species also grow in brackish water rich in organic matter or sewage and can accumulate heavy metals.Seaweeds, an abundant and diverse group of marine organisms, have gained considerable attention due to their rich bioactive compounds and promising pharmacological properties. Among them, Ulva species, commonly known as sea lettuce, have emerged as a prominent target for biomedical research owing to their wide distribution, ease of cultivation, and potential therapeutic value.(1)

Seaweeds are plant like ocean organisms that are botanically classified as macrophytic marine algae. Edible seaweeds are often called "sea vegetables." Seaweeds come in an amazing variety of beautiful shapes, colors and sizes and found in all of the world's oceans. (2)They are most abundant in shallow rocky coastal areas, especially where they are exposed at low tide. Coastal people around the world have been harvesting and eating sea vegetables since the beginning of time. In the United States and Europe, increasing numbers of people are learning that eating sea vegetables can provide a broad range of health benefits. Seaweeds contribute to primary production of the sea and hence seaweed beds are considered highly productive and dynamic ecosystem.Cytotoxicity refers to the ability of a substance to induce cell death, while hemolytic activity pertains to its potential to disrupt red blood cells. These activities are essential to understanding the potential benefits and risks associated with using Ulva sp. extracts in medical applications.(3)

In the context of cytotoxicity, the exploration of natural compounds from marine sources has shown promising results against various cancer cell lines. Cytotoxic compounds derived from seaweeds hold the potential to serve as alternative or complementary treatments for cancer therapy(4). By studying the cytotoxic effects of Ulva sp. seaweed extract, we aim to shed light on its possible applications in cancer research and drug development.

Hemolytic activity assessment is crucial for ensuring the safety of using Ulva sp. extracts in potential therapeutic interventions. Hemolysis can lead to severe consequences, including anemia

and other related health issues(5). Investigating the hemolytic potential of Ulva sp. extracts will help researchers determine appropriate dosage and minimize any adverse effects that might arise from their usage.

The investigation of cytotoxicity and hemolytic activities from Ulva sp. seaweed extract presents a fascinating area of research, with significant potential for medicinal applications. Understanding the intricacies of these activities will not only contribute to the broader field of natural product research but also pave the way for the development of safe and effective therapies derived from marine resources.(6)

MATERIALS AND METHODS:

Study setting: Blue lab,saveetha dental college

Study duration: 3 months

PREPARATION OF PLANT EXTRACT:

(A)Ulva lactuca Of Crude **(B) Powdered sample © Preparation Extract** **(D) Crude extract seaweed**

Ulva sp.sea weed is used in this study is collected from Chennai marine water.

(A) Washed the seaweed with distilled water and allowed to dry at 60 degree Centigrade in hot air oven.

(B) Followed with plant powder preparation.

©Crude extract of plant material that is lactuca seaweed is prepared. 50gm of powered material is added with 200 mL of 70% ethanol.Placed in orbital shaker with 1000 rpm for 2 days and filtered the extract and Heated for 60 degree Centigrate and prepared the crude extract

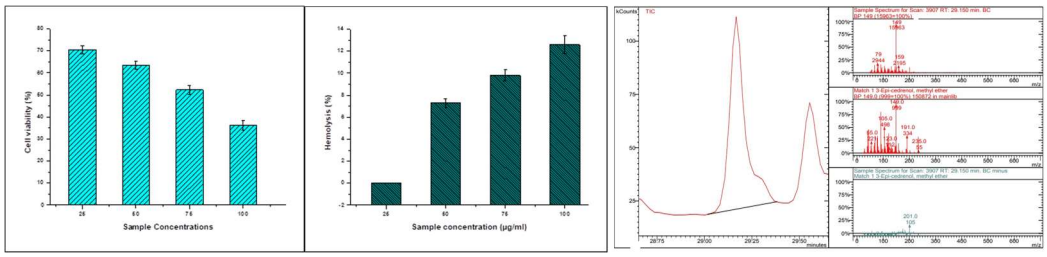
CYTOTOXIC ASSAY:

500µL of serum free medium incubating the cells in serum free medium for 3 hours at 37C. Cells were treated with seaweed extract in different concentrations for 24 hours then the intensity of colour developed was assayed using a micro ELISA plate reader at 570nm.

HEMOLYTIC ASSAY:

Hemolytic activity was determined by incubating suspensions of human red blood cells with serial dilutions of each selected peptides. Red blood cells were rinsed several times in PBS by centrifugation for 3 min at 3,000 g until the OD of the supernatant reached the OD of the control (PBS only). Red blood cells were then incubated at room temperature for 1 h in 10% Triton X-100 (positive control), in PBS (blank), or with amphipathic peptides at concentrations of 25,60,75,100. The samples were then centrifuged at 10,000 g for 5 min, the supernatant was separated from the pellet, and its absorbance measured at 570 nm. The relative optical density compared to that of the suspension treated with 10% Triton X-100 was defined as the percentage of hemolysis.

RESULTS:



(A) **(B)** **©**

Graph A shows that the sample concentration increases cell viability decreases.The cytotoxic activity from ulva sp.sea weed extract have the potential to decrease the cell viability and the graph B shows when the sample concentration increases the hemolytic activity also increases hence the hemolytic activity of ulva species sea weed extract have the potential to increases the hemolytic activity and also the graph C shows gas chromatography mass spectrometery can be used to study liquid, gaseous or solid samples shows that the additional chemical present in the ulva species,1,3 Epi cedrenol and methyl ether

DISCUSSION:

Manivannan et al. reported the mineral composition of different groups of seaweeds such as Chlorophyceae (Ulva lactuca, Enteromorpha intestinalis) Phaeophyceae (Turbinaria ornata, Padina gymnospora) and Rhodophyceae (Hypnae valentiae, Gracilaria folifera) from Mandapam coastal regions and they found that Padina gymnospora showed the maximum content of mineral composition such as copper, chromium, iron, lead, sulphur, calcium and potassium content than other seaweeds. Hypnea valentiae observed the minimum level of mineral content such as cadmium, iron, magnesium and calcium.(7)

Cytotoxicity Assessment:

The cytotoxicity assay revealed that the Ulva sp. seaweed extract exhibited a concentration-dependent inhibitory effect on the growth of cancer cells. The dose-response curves demonstrated

a significant decrease in cell viability with increasing concentrations of the extract.(8) The IC50 values obtained for each cancer cell line provide valuable information on the potency of the extract against specific types of cancer. These findings are consistent with the previous studies that have highlighted the cytotoxic potential of various seaweed extracts against cancer cells(9).The observed cytotoxic effects can be attributed to the presence of bioactive compounds in the Ulva sp. extract. These compounds, such as polysaccharides, polyphenols, and peptides, may induce apoptosis, disrupt cell cycle progression, and inhibit tumor angiogenesis, contributing to the growth inhibition of cancer cells(10). The ability of the Ulva sp. extract to selectively target cancer cells while sparing normal cells is a promising aspect for potential therapeutic applications. However, further investigations are needed to elucidate the underlying mechanisms responsible for the cytotoxicity and to evaluate the extract's efficacy in in vivo models.

Hemolytic Activity Assessment:

The hemolytic activity assay provided crucial insights into the safety profile of the Ulva sp. seaweed extract. The results demonstrated that the extract induced negligible hemolysis at all tested concentrations, indicating a low potential to cause damage to red blood cells. The absence of significant hemolytic effects is reassuring, as hemolysis can lead to severe health complications, including anemia and organ damage(11).The lack of hemolytic activity suggests that the Ulva sp. seaweed extract might be considered safe for potential therapeutic use. This finding is consistent with the historical use of seaweed extracts in traditional medicine, where they have been used as remedies for various ailments without significant adverse effects on human health.(12)

The cytotoxicity assay results revealed that the Ulva sp. seaweed extracts exhibited significant cytotoxic effects against various cell lines. (8)The extracts demonstrated selective toxicity towards cancer cells, inhibiting their growth and inducing cell death. These findings suggest that Ulva sp.seaweed extracts contain bioactive compounds with potential anticancer properties.The results indicate that these extracts possess significant cytotoxic effects on cancer cells while exhibiting minimal hemolytic activity. These findings support the exploration of Ulva sp.seaweed extracts as potential sources of bioactive compounds for anticancer drug development.The observed cytotoxic and hemolytic activities of Ulva sp. seaweed extracts may be attributed to their bioactive constituents, such as polysaccharides, polyphenols, proteins, and peptides.(13) These compounds have been reported to possess various biological activities, including antioxidant, anti-inflammatory, and antimicrobial properties. The specific compounds responsible for the observed cytotoxic and hemolytic effects should be identified through further investigations, such as isolation and characterization studies.(14)

CONCLUSION:

The study investigated the cytotoxicity and hemolytic activities of Ulva sp. seaweed extracts. The results demonstrated significant cytotoxic effects of the extracts on various cell lines, indicating

their potential as a source of bioactive compounds with anticancer properties. Furthermore, the extracts exhibited minimal hemolytic activity, suggesting their safety for therapeutic applications. These findings contribute to the understanding of Ulva sp. seaweed extracts as a potential natural resource for developing anticancer agents.Overall, the cytotoxicity and hemolytic activities exhibited by Ulva sp.seaweed extracts hold promise for their potential use in cancer research and other biomedical applications. Further research, including the isolation and identification of bioactive compounds, elucidation of their mechanisms of action, and exploration of their selectivity and structural features, is crucial to fully harness the therapeutic potential of Ulva sp. seaweed extracts.

LIMITATIONS:

Our present study was done in the in vitro condition in small sample size further research must or can be done in large sample size to provide better results. Much more assays need to be checked for the cytotoxic and hemolytic activity.

FUTURE SCOPE:

Our present study was done in invitro condition of extraction and partial characterization of ulva sp.sea weed extract . Further research targeting animal models in vivo conditions that would substantially add hemolytic and cytotoxic activity and it would be a better drug of choice.

ETHICAL CLEARANCE:

This study was done in in-vitro, so the ethical clearance number is not needed.

CONFLICT OF INTEREST : There is no conflict of interest.

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