

Article

Investigation into the Phytochemical Composition, Antioxidant Properties, and In-Vitro Anti-Diabetic Efficacy of *Ulva lactuca* Extracts

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Abstract: In this research, the chemical compositions of various extracts obtained from *Ulva lactuca*, a type of green seaweed collected from the Nador lagoon in the northern region of Morocco, were compared. Their antioxidant and anti-diabetic properties were also studied. Using GC-MS technology, the fatty acid content of the samples was analyzed, revealing that palmitic acid, stearic acid, and linoleic acid were the most abundant unsaturated fatty acids present in all samples. The HPLC analysis indicated that sinapic acid, naringin, rutin, quercetin, cinnamic acid, salicylic acid, apigenin, flavone, and flavanone were the most prevalent phenolic compounds. The aqueous extract obtained by maceration showed high levels of polyphenols and flavonoids, with values of 379.67 ± 0.09 mg GAE/g and 212.11 ± 0.11 mg QE/g, respectively. This extract also exhibited an impressive ability to scavenge DPPH radicals, as indicated by its IC₅₀ value of 0.095 ± 0.12 mg/mL. Additionally, the methanolic extract obtained using the Soxhlet method demonstrated antioxidant properties by preventing β -carotene discoloration, with an IC₅₀ of 0.087 ± 0.14 mg/mL. Results from in-vitro studies showed that extracts from *U. lactuca* were able to significantly inhibit the enzymatic activity of α -amylase and α -glucosidase. Among the various extracts, methanolic extract (S) has been identified as the most potent inhibitor, exhibiting a statistically similar effect to that of acarbose. Furthermore, molecular docking models were used to evaluate the interaction between the primary phytochemicals found in these extracts and the human pancreatic α -amylase and α -glucosidase enzymes. These findings suggest that *U. lactuca* extracts contain bioactive substances that are capable of reducing enzyme activity more effectively than the commercially available drug, acarbose.

Keywords: *Ulva lactuca*; fatty acids; phenolic compounds; antioxidant activity; enzyme inhibition; anti-diabetic properties; molecular docking

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Nashik for their unwavering support in making this international conference and publication a resounding success We hope this book not only serves as a reference for scholars and practitioners across the globe but also as an inspiration for future explorations and collaborative efforts in academic and applied research Once again congratulations to all contributing authors Your voices have become part of a global movement toward knowledge driven progress The Bureau of Chemistry and Soils Gustavus Adolphus Weber,1928 **Journal of Nano Research Vol. 75** Efstathios I. Meletis,2022-09-21 This volume of the Journal of Nano Research contains peer reviewed articles reflecting the practical research results in the synthesis and properties analysis of nanomaterials and nanoparticles for various engineering applications The presented achievements will find practical use in microelectronics corrosion protection waste and water treatment technologies nanomechatronics heat engineering and biomedicine Report of the Chief of the Bureau of Chemistry and Soils United States. Bureau of Chemistry and Soils,1927 **The Bureau of Chemistry and Oils** Gustavus Adolphus Weber,1928 **Service Monographs of the United States Government** ,1928 Service Monographs of the United States Government Brookings Institution. Institute for Government Research,1928 Reprint and Circular Series of the National Research Council ,1929 **Research in Progress** North Carolina State University. Graduate School,1929 *Membranes, Special Materials and Technologies for Different Application* Ke Chen,Agus Dwi Anggono,Wanlop Kitisatorn,Sugianto Sugianto,2024-12-16 Special topic volume with invited peer reviewed papers only **Journal of the American Pharmaceutical Association** American Pharmaceutical Association,1922 *Report* United States. Bureau of Chemistry and Soils,1928 **Perfumery and Essential Oil Record** ,1917

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