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GASTROPROTECTIVE EFFECT OF SELECTED APPLE POLYPHENOLS: AN IN- SILICO AND IN VITRO STUDY TO REVEAL THE MECHANISTIC ASPECTS

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Abstract

Background: Peptic Ulcer (Pud) Is A Lesion And Localised Erosion Of Mucosal Region In The Lining Of The Stomach. Existing Drugs Like Ppi's, Histamine Receptor Antagonists Are Reported To Have Major Side Effects Like Heart Diseases, Hypersensitivity And Agranulocytosis. Choosing Dietary Sources As An Adjuvant Therapy Could Be A Better Option To Get Rid Away From The Existing Side Effects. Hence The Present Work Was Designed To Evaluate The Ulcer Healing And Anti-Inflammatory Property Of Major Polyphenols Present In The Apple.

Method: For *In Silico* Studies, Caffeic Acid, Ferulic Acid, Quercetin, Phloretin, Linoleic Acid, Epicatechin, Quercetrin, Rutin, Urosolic Acid Were Selected Based On The Lipinski's Rule Of 5. The Selected Ligands Were Docked Against The Gastrin Receptor (Rcsb Pdb Id: 5wrj). *In Vitro* Studies Were Performed In Rat Parietal Cells For H⁺K⁺ATPase Activity At A Concentration Of 10, 50, 100 µg/ml. Pentagastrin (5µg/ml) Induced H⁺K⁺ATPase Activity And Anti-Inflammatory Activity. Estimation Of Inorganic Phosphate Liberated From The Hydrolysis Of Atp By The H⁺K⁺ATPase Is Evaluated As Enzymatic Activity.

Results: Among all the phenolic compounds, caffeic acid, phloretin, ferulic acid and quercetin shows a better interaction in comparable with the standard drugs. *In vitro* studies of H⁺K⁺ATPase, pentagastrin induced H⁺K⁺ATPase and anti-inflammatory activity of selected polyphenols were performed. Caffeic acid, phloretin shows a concentration dependent decrease in the inorganic phosphate followed by the quercetin and ferulic acid as compared with the standard drugs. Phloretin and caffeic acid shows reduction in levels of nitrates at 100 µg/ml followed by quercetin and ferulic acid.

Conclusion: Our findings suggest that polyphenols like phloretin and caffeic acid present in apple shows an ulcer healing and anti-inflammatory activity. Considering apple as a dietary adjuvant, can exert a beneficial effect in prevention of ulceration via anti-inflammatory and ulcer healing property.

Keywords: Peptic ulcer, H⁺K⁺ATPase, phloretin and caffeic acid

BIOPRINTING AS AN ADVANCEMENT IN THE CANCER RESEARCH

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Cancer, the big threat to human population globally has been reported to increase the mortality rate. Even when the pharmaceutical industry has made relevant improvements in cancer therapy over the last decade, it still remains as a challenge to develop anti-cancer drugs and clinical practices effectively. 2D cell culture models used to develop understanding of the disease but they often failed to accurately replicate human behaviours. Hence, 3D bioprinting, a technology which has the potential to mimic the in vivo micro environment with high accuracy has been invented. Bioprinting is a manufacturing process where the bio materials like cells and factors that promote growth are compiled to create living tissue that imitates natural tissue. This technology uses bioink which create structures in layer by layer method. These find a vital role in tissue replacement and cosmetic surgeries. It involves pre-bioprinting, bioprinting and post-bioprinting. The printing techniques include inkjet, extrusion or laser. This advancement contributes significantly in the medical field of tissue engineering by promoting for research to be done on innovative materials called bio materials. Bioprinting aims to print organs like heart, liver, lungs etc. in order to test new drugs directly and perhaps eliminating the need for testing in animals. It fills the gap for the need of donor organs. Overall, bioprinting is gaining a wide scope in the field of medicine due to its potentiality to produce complex organs and tissues.

Keywords: Bioprinting, Bioink, Inkjet, Extrusion, Tissue Engineering, Biomaterials.

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