Republic of Iraq Ministry of Higher Education & Scientific Research AL-Muthanna University College of Science Department of Biology



"In-vitro evalution of (*Silybum marianum* L.) Seeds extract as antidiabetic and antioxidat activity"

A Thesis Submitted to the Counical of collage of Science /Al Muthanna University as Partial Fulfillment of the Requirements for the Degree of Master of Science in Biology

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Abstract

People with fatigue because of type 1 and type 2 diabetes, need to enhance their energy production, normalize blood sugar levels, and reduce oxidative stress-associated fatigue, and high blood sugar. In the present study, the Chemical Profiling, and Biological Investigation of (*Silybum Marianum* L.) Seed.

The study was comprised of two phases. In 1st phase, nutritional composition, that is, moisture, Lipid, protein, and ash, was determined according to their respective methods. Moreover, The identification of free amino acids, Fatty acids, and individual phenolic compounds was performed by an amino acid analyzer, Gas chromatography GC, and High-Performance Liquid chromatography (HPLC) respectively in 2nd phase, and assessment of antioxidant and antidiabetic activities of different *S. marianum* ethanolic and aqueous extracts were evaluated using in vitro.

The result *Silybum Marianum* seeds are rich in Carbohydrates, protein, and lipids content which was 54.732 g/100 g, 27.133 g/100 g, and 20.066 g/100g respectively *S. Marianum* contains five fatty acids, Thirteen amino acids, five phenolic compounds, Ferulic acid, Gallic acid, Rutin, kaempferol, and Qurcetine were 96.766, 86, 66, 13.1, 41.066 μ g/gm identified as the major phenolic compound respectively. The DPPH (Radical scavenging activity) and FRAP (ferric reducing power) assay were performed to determine the in vitro antioxidant potential of the plant extracts. The anti-diabetic effects were investigated by evaluating the inhibitory properties of S. marianum seed extracts towards carbohydrate hydrolyzing enzymes, i.e., α -glucosidase and α -amylase, whereas methods were employed for metabolite profiling of *S. marianum* seed extracts. Among 70%, 80% ethanolic and Aqueous extract S. marianum 80% ethanolic extract

exhibited the highest antioxidant activity based upon its DPPH radical scavenging ability IC₅₀ of 5.13 μ g/mL) and FRAP 45.1 mmol Fe (II)/g. The 80% ethanolic seed extract of S. marianum also proved to be the most efficient α -glucosidase and α amylase inhibitor with IC₅₀ values of 21.5 μ g/mL and 42.5% respectively. The present study indicated that seeds of S. marianum have phenolic contents, amino acids, and fatty acids.

Therefore, *Silybum marianum* can be used as a potentially rich source of antioxidants. The findings of this study depict *S. marianum* seed extracts as a promising α -glucosidase and α -amylase inhibitor, and therefore, can be utilized for the development of anti-diabetic functional diets / Nutra-pharmaceuticals.