



University of Zabol
Graduate School
Faculty of Science
Department of Biology

The Thesis Submitted for the Degree of M.Sc
(in the field of Plant Physiology)

Title

Evaluation of some secondary metabolites of shir. khesht manna from *Cotoneaster*
and its anti- diabetic effect on antidiabetic- induced rat with streptozotocin.

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Abstract

The development of urbanization and life in the industrial world has increasingly confronted us with the increasing prevalence of non-communicable diseases such as diabetes, stroke and other risk factors. Complications of diabetes are renal failure in 25% and amputation and blindness in 50%. Normally, blood glucose levels are controlled by insulin (a hormone produced by the pancreas), a hormone that lowers blood glucose levels (that is, normal blood glucose levels after a meal) equals an increase in insulin production. And lowering blood glucose equals lowering insulin production to normalize blood glucose levels, so in patients with diabetes, insufficient insulin production causes hyperglycemia with insufficient production. Milk thistle is a member of the *Cotoneaster* species of the rose family (Rosaceae). *Cotoneaster* species produce a sweet secretion called mana. Mana is the most important component of *Cotoneaster* species. Mana contains different types of sugars such as glucose and mannitol, or in any case, the specific composition of mana is related to the relevant species. Milk thistle is composed of flavonoid compounds, phenols and essential micronutrients. The aim of this study was to investigate some of our secondary metabolites of milk thistle and its anti-diabetic effects on streptozotocin-induced diabetic mice. In this study, the anti-diabetic effects of milk thistle extract (Mann) *in vivo* were performed using three groups of mice (healthy control (control), diabetic control (negative control), and diabetic treated with the extract (treatment)). To initially confirm the anti-diabetic effect of the extract, blood glucose levels were first measured in three groups of rats. After observing a decrease in blood glucose in the treatment group compared to the negative control, incisions were made from the liver, kidney and testicular tissues of mice in all three groups to further confirm the anti-diabetic properties. Histopathological results showed repair of streptozotocin-induced tissue damage in the treatment groups. The anti-diabetic effects of clay milk extract can be attributed to the presence of phenolic compounds and secondary metabolites of the plant, because the presence of these compounds due to important properties such as antioxidant properties, causes repair of damaged tissues in diabetic conditions. The antioxidant properties of the extract increase cell growth and division and thus increase insulin secretion from pancreatic cells, eliminate free oxygen radicals produced and subsequently repair and protect cells in diabetic conditions. Further histopathological and cell-molecular studies are necessary to further confirm these results.

Keywords: Secondary metabolites, Phenol compounds, Total flavonoids, *Cotoneaster* discolour