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## M.Phil Thesis Summary

# Bioevaluation of *Moringa oleifera* Against Oxidative Stress in Albino Rats

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Plants are now being considered as a natural source of anti-oxidants because of containing bioactive compounds such as polyphenols, carotenoids, tocopherols, and anthocyanins. These antioxidants provide numerous health benefits, having the ability to combat various metabolic diseases[1]. *Moringa oleifera* also referred to as a miracle tree-because of being a highly nutritional plant mostly rich in anti-oxidants and phenolic acids is now becoming very popular for the same properties[2]. Various parts of Moringa-seeds, leaves, and pods-having active constituents, have been studied to be beneficial owing to the presence of high amounts of phytochemicals, minerals, and vitamins, giving it a natural ability to be used as an antidiabetic, anticancer and anti-oxidant drug[3].

The present study was designed to examine the phytochemistry and antioxidative potential of *Moringa oleifera* leaves extract against oxidative stress caused by self-induced metabolic syndrome in Wistar albino rats. Methanolic extract of *Moringa oleifera* leaves was analyzed for polyphenolic content using GC-MS while ethanolic extract was given as a treatment against oxidative stress caused by metabolic syndrome. The study was divided into three phases: extraction of *Moringa oleifera* leaves (I), induction of metabolic syndrome in selected groups (II) and treatment of selected groups (phase III). *Moringa oleifera* leaves extract was prepared in phase I by using respective techniques. In phase II twenty Wistar albino rats were taken and divided in to four groups ($G_1$, $G_2$, $G_3$, $G_4$). Animals of $G_1$ which were assigned to be the 'Negative Control group' received only normal chow and normal tap water in phase II. The group wasn't induced with disease and got no treatment in phase III. 'Positive Control group' ($G_2$) was induced with metabolic syndrome through the consumption of Fructose Drinking Water (FDW) for eight weeks (period for phase II)). After being diseased, being the positive control group, animals of $G_2$ were not treated with Moringa extract in the third phase (phase III). Animals of $G_3$ were not diseased in phase II, but received Moringa extract in phase III for comparison purposes. Animals of $G_4$ were induced with metabolic syndrome though FDW in phase II and also

received treatment with Moringa extract in phase III. For biochemical study blood samples of all the animals were collected at the baseline, after induction of metabolic syndrome, and then after the treatment period which lasted for twelve months.

Samples were analyzed for complete lipid profiling and antioxidant status including Malondialdehyde (MDA) and glutathione peroxidase (GPx) using respective methods. For disease safety Evaluation, Liver Function Test (LFT) and Renal Function Test (RFT) were performed. Bioevaluation of *Moringa oleifera* leaves extract against oxidative stress in Wistar albino rats showed positive results by scavenging the Reactive Oxygen Species (ROS) through its strong antioxidant activity of phenolic acids and flavonoids. The active anti-oxidants present in the plant helped reducing weight, blood glucose levels, Low-Density Lipoproteins (LDL), High-Density Lipoproteins (HDL) and cholesterol. Intake of ethanolic extract of moringa leaves also enhanced anti-oxidant status in rats and % reduction in lipid peroxidation.

GraphPad Prism 6.01 was used for statistical analysis which gave values in mean + standard error of the mean (SEM). Significant values of lipid profile parameters and blood glucose levels were obtained at the baseline and end of the study, when comparisons were made between control and treatment groups. Serum Malondialdehyde (MDA) levels in the diseased animals increased after induction of metabolic syndrome while significantly reduced back when treated with Moringa leaves extract. After the treatment period values for glucose and serum cholesterol and low-density lipoprotein levels decreased in the treated groups indicating a strong anti-oxidant activity of Moringa extract against reactive oxygen species. Values for triglycerides also decreased in the treated groups. Creatinine and urea levels didn't give very significantly altered values for control and treatment groups along with the parameters of the Liver Function Test (LFT). Consumption of *Moringa oleifera* leaves extract also enhanced the level of Glutathione Peroxidase (GPx) in the blood of animals.

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