

EFFECT OF MORINGA OLEIFERA ON BLOOD GLUCOSE, LDL LEVELS IN TYPES II DIABETIC OBESE PEOPLE.

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ABSTRACT

The leaves of *Moringa oleifera* Lam (Moringaceae) are used by the Indians in their herbal medicine for many decades. In this study the scientific basis for their use in NDDM in obese patients was therefore examined. It was found that supplementation of the powder of *Moringa oleifera* leaf decreased serum glucose and LDL. These values were also found to be statistically Significant. And it is concluded that the leaves of *Moringa oleifera* have definite hypoglycemic and hypocholesterolemic activity in type II diabetes mellitus in obese people.

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INTRODUCTION

In the last few years there has been an exponential growth in the field of herbal medicines and these drugs are gaining popularity both in developing and developed countries because of their natural origin and less side effects. Many traditional medicines in use are derived from medicinal plants, minerals and organic matter [Grover, J.K 2002]. A number of medicinal plants, traditionally used for over 1000 years named rasayana present in herbal preparations of Indian traditional health care systems [Scartezzini, P 2000]. India is the largest producer of medicinal herbs and is called as botanical garden of the world [Seth 2004]. In Indian systems of medicine most practitioners formulate and dispense their own recipes [Seth 2004].

The World Health Organization (WHO) has listed 21,000 plants, which are used for medicinal purposes around the world. Among these 2500 species are in India, out of which 150 species are used commercially on a fairly large scale. The global prevalence of diabetes is estimated to increase, from 4% in 1995 to 5.4% by the year 2025. Recently the prevalence of type II diabetes mellitus has reached epidemic levels in many parts of the world. However, effective control of the onset of diabetes and its complications has been not established. Obesity has long been accepted as a major risk factor of NIDDM and the risk is related to both duration and degree of obesity (drenick.et.al.1980) Body fat distribution is an important variable to consider between obesity and metabolic complications such as insulin resistant, hyperinsulinemia, and diabetes mellitus (bjornstrops.et.al.1991)

Diabetes mellitus and obesity are major health issues in India. Prevalence studies estimated that around 6-12% of urban and 2-3% of rural Indians are diabetic. The most common form of diabetes about 90 to 95% have type II diabetes. (NIDDM). It is associated with older age, obesity,

family history, physical inactivity and ethnicity. In several ethnic populations including the relatively non-obese South Indian population, the android pattern of body fat, typified by more upper body adiposity measured as waist hip ratio (WHR) was found to be a greater risk factor for type II diabetes than general obesity (Ramachandran.,1992 and Shelgikar, K 1991). These studies have shown that central obesity is common in Indians despite low rates of obesity. The adverse effect of central obesity is manifested in increasing percentage of BMI both in men and women, the effect being more evident in women. This is probably one of the reasons for a higher prevalence of diabetes in women in urban area. Indians with low BMI have WHR comparable to the Mexican Americans, who are obese (Ramachandran.,2002). The risks conferred by increasing BMI and WHR are high in both populations when compared to the white population.

In Indian traditional system of medicine, *Moringa oleifera* Lam. Syn. *Moringa pterygosperma* Gaerth (*Moringaceae*) is commonly used as healing herb to treat diabetes. *Moringa oleifera* Lam is native to south Asia, but grows in tropical Africa and Latin America (Ramachandran et al., 1980; Sofowora, 1982). Different parts of this plant are used in the indigenous systems of human medicine for the treatment of a variety of human ailments. The leaves of *Moringa oleifera* are reported to be used as a hypocholesterolemic agent, and hypoglycemic agent (Dangi, et al., 2002; Ghasi, et al., 2000; Siddiqui and Khan., 1968).

The current study focuses on herbal supplementation from *Moringa oleifera* used in the treatment of diabetes mellitus type II, a major crippling disease in the world leading to huge economic losses.

2. Methods and materials

2.1 Selection of subjects

For this study 15 subjects (9 men and 6 women) with NIDDM with obesity were selected from NRI hospital, Guntur Dt, Andhra Pradesh. Blood pressure and mild heart attack were other complications mostly seen in these subjects. Prepared *M. oleifera* powder was supplied to all subjects in 50 grms pouches .All subjects were asked to use this powder with their food regularly for 40 days.

2.1. Preparation of Moringa oleifera supplementation powder

The fresh leaves of *M. oleifera* were collected from the local agricultural market , District Guntur ,Andhra Pradesh. It was shade dried at room temperature and coarsely pulverized to powdered form. To the dried Powder 5% of salt,7% of red chili powder and 7% of coriander powder were added and slightly fried in open pan without any oil to increase acceptance

2.3 Biochemical information

The study was extended over a period of 20 days supplemented with *M. oleifera* leaf powder. it was a pretest and post test design where the subjects initial fasting and post prandial (2hrs after consumption of food) blood samples were drawn and analyzed.

2.4 Determination of blood glucose levels

All results were expressed as mean + SEM and significance of statistical difference between means was determined using Pearson correlation test.

RESULTS AND DISCUSSION

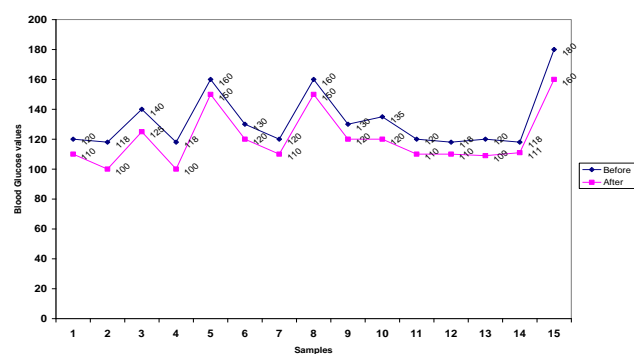
3.1. Effects on glucose levels

In this analysis, the values obtained from supplemented samples fed before and after study. When *Moringa oleifera* powder administered with the food, serum glucose levels were decreased. It was observed that the percentage decrease in Serum glucose levels was 8.9 % (134.33-122.33 mg per 100 ml of serum) (Tables and figure No1). The glucose -lowering action of the *M. oleifera* leaf powder was found to be significant ($P < 0.05$) in serum,

Table No :1 Effects of Moringa oleifera Lam on on Blood Glucose

SAMPLES	BEFORE	AFTER
1	120	110
2	118	100
3	140	125
4	118	100
5	160	150
6	130	120
7	120	110
8	160	150
9	130	120
10	135	120
11	120	110
12	118	110
13	120	109
14	118	111
15	180	160
Mean	132.46	120.33

Fig. 1. Changes of blood glucose in samples before and after Supplementation M.Oleifera leaf powder



The study validates scientifically the widely claimed use of *M. oleifera* as an ethno medicine to treat diabetes mellitus. The known compounds isolated and characterized from the *Moringa oleifera* extract were niazirin (=4-(α -L-rhamnopyranosyl) phenylacetoneitrile; 1), niazicin A (=methyl N-{4-[(4'-O-acetyl- α -L-rhamnopyranosyl)benzyl]}thiocarbamate; 4),methyl N-4-[(α -Lrhamnopyranosyl) benzyl]} carbamate (7), and methyl N-{4-[(4'-O-acetyl- α -Lrhamnopyranosyl) benzyl]} carbamate (8). The combined yield of these compounds from dried *M. oleifera* fruits was 1.63%. In rodent pancreatic β -cells (INS-1), compounds 4, 5, 6, 7, and 8 at 100 ppm significantly stimulated insulin release. (Jayaraj A.et.al 2004).

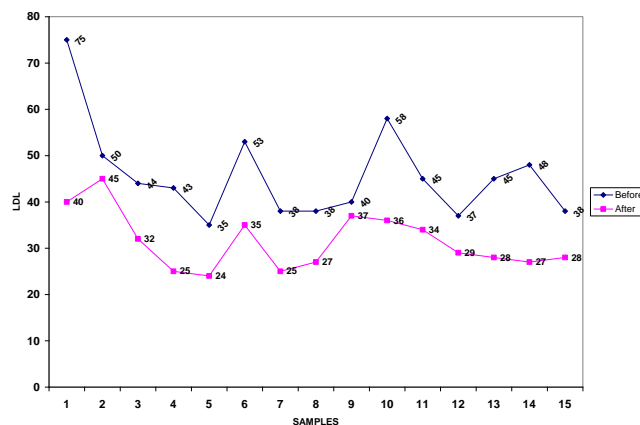
3.2. Effects on LDL levels

. When *Moringa oleifera* powder administered with the food serum glucose levels were decreased. It was observed that the percentage decrease in Serum LDL levels was 30.94 % (45.66- 31.53 mg per 100 ml of serum) (Tables No 1 and figure No2). LDL -lowering action of the *M. oleifera* leaf powder was found to be significant ($P < 0.05$) in serum, S. Ghasi et.al (2000) study concluded that the leaves of *Moringa oleifera* have definite hypocholesterolemic activity and that there is valid pharmacological basis for employing them for this purpose in India. *Moringa oleifera* was found to lower the serum cholesterol, phospholipid, triglyceride, VLDL, LDL, cholesterol to phospholipid ratio and atherogenic index, but were found to increase the HDL ratio (HDL/HDL-total cholesterol) as compared to the corresponding control groups. Treatment with *M. oleifera* or lovastatin in normal rabbits decreased the HDL levels. *Moringa oleifera* was found to increase the excretion of faecal cholesterol. Thus, the study demonstrates that *M. oleifera* possesses a hypolipidaemic effect.(Late Komal Mehta, 2003)

Table No :2 Effects of Moringa oleifera Lam on on LDL

SAMPLES	BEFORE	AFTER
1	75	40
2	50	45
3	44	32
4	43	25
5	35	24
6	53	35
7	38	25
8	38	27
9	40	37
10	58	36
11	45	34
12	37	29
13	45	28
14	48	27
15	38	28
MEAN	45.8	31.46

Fig. 2. Changes of LDL Levels in samples before and after Supplementation M. oleifera leaf powder.



Naznin Ara et.al(2003)revealed that the leaves extracts of *Moringa oleifera* with atenolol has got profound hypolipidemic activity. Lowering of blood glucose, heart weight, and body weight in adrenaline induced rats ($p<0.0001$) was significant. The lowering serum triglyceride level and serum cholesterol level between leaves extract of *Moringa oleifera* and atenolol in adrenaline induced rats was very significant ($p<0.001$ & $p<0.01$).Oral administration of aqueous extract of *M. oleifera* (250 and 500 mg/kg) to ISO-induced rats daily for a period of 21 days showed a significant improvement in lipid profile along with marker enzymes in serum and heart homogenate. It also decreased the levels of thiobarbituric acid reactive substances and improved antioxidant status by increasing the activities of antioxidant enzymes.

CONCLUSION

From this study it is concluded that, Obese people with type II diabetes can take *M. oleifera* leaf powder in their regular diet to reduce glucose levels and cholesterol in natural way. This powder is recommended for not only diabetic persons but also for general public, who are health conscious to keep away the prevalence of such chronic disorders as preventable measure. It is most convenient, simple, acceptable and economical measure.

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