

Amla, a potential measure to treat Diabetes mellitus

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Abstract: Diabetes is a metabolic disorder characterized by chronic hyperglycemia with disturbances of carbohydrates fat and protein metabolism. It is a serious complication. The lifestyle and day today circumstances are playing major role in occurrence of this. Majorly inefficient and insufficient secretion of insulin is the causative factor. Amla or Indian gooseberry is widely used in the Indian system of medicine and believed to increase defense against diabetes. Amla has been used by Indian doctors for many chronic conditions including blood sugar control. Vitamin C, tannins and flavonoids present in amla are very powerful antioxidants. Because of these, amla is showing wonderful results in the treatment of Diabetes mellitus. To study the effect of Amla in type 2 diabetes mellitus (T2DM), 30 T2DM subjects were selected as experimental group (N=30) from Acharya Nagarjuna University in Guntur of Andhra Pradesh. A control group of same size (N=30) was selected from Guntur city. The experimental group of 30 patients was given a medium sized fresh Amla (approximately 35 g) on a daily basis for 6 months. Subjects were advised to consume the fruit in a raw form daily before breakfast. During the course of supplementation no modification in the diet or medication was made for both experimental and control groups. The anthropometric measurements and Biochemical parameters like FBS, PPBS, HBA1C and lipid profile were monitored at the end of supplementation period. Supplementation of one medium size Amla (35g) for 6 months led to a significant decrease in the FBS, PPBS, HBA1C, Lipid profile values in the experimental group, while there were no significant changes in the control group.

Introduction

Diabetes mellitus is a chronic disease which cannot be cured except in very specific situations. Management concentrates on keeping blood sugar levels as close to normal as possible, without causing hypoglycemia. This can usually be accomplished with diet, exercise, and use of appropriate medications. To be healthy one should be free from diseases of body and mind. The whole universe is influenced by our mind. With the harmony of work in mind and all other organs of the body, human being enjoys peace and happiness and performs his duties well. But increased stress and strain deteriorating human health and increasing the metabolic disorders like Diabetes mellitus, Hyper tension etc., because mental balance would lead to efficacy in all aspects of life.

Amla, or Indian gooseberry, has been used by Indian doctors for many chronic conditions including blood sugar control. This edible fruit is well-known for its high content of vitamin C and its potent antioxidant activity, more potent than many other herbs. Due to its high content of vitamin C and polyphenols, amla extract is a potent antioxidant. When stress and strain prevails, the harmony with regard to work between mind and organs get changed. Hence pancreatic dysfunction occurs. The insulin secreted by β -cells of Islets of Langerhans of pancreas may not be sufficient to take care of the blood glucose levels. Hence rise in blood sugar (more than 120mg/100ml) occurs which results in Diabetes mellitus.

Nature has gifted us with defensive antioxidant mechanisms-superoxide dismutase, catalase, glutathione (GSH), GSH peroxidases, reeducates, Vitamin E (tocopherols and tocotrienols), Vitamin C, etc., along with several dietary components. Higher consumption of components/nutrients with antioxidant capabilities has been associated with lower frequency of numerous human morbidities or mortalities as per many epidemiological studies. Diverse potential applications of antioxidant/free radical manipulations in prevention or control of disease has been revealed by ongoing research. Natural products from dietary components such as Indian spices and medicinal plants are known to possess antioxidant activity. The study by Poltanov *et al.* investigated the chemistry and antioxidant properties of amla fruit extracts. Extracts produced positive responses in the total phenol. Amla is excellent source of Vitamin C. The Vitamin C is easily assimilated by the human body. The Vitamin C in the amla fruit is bonded with tannins that protect it from being destroyed by heat or light. The regular use of Amla improves digestion, absorption, and assimilation of food. Amla is used to revitalising potency and the digestive system, rejuvenating longevity, treat constipation, reduce fever, purify the blood, reduce cough, alleviate asthma, strengthen the heart, benefit the eyes, stimulate hair growth, enliven the body, and enhance intellect.

- Amla or Amla is considered an effective remedy for heart disease.
 - Amla or Amla is helpful in tuberculosis of lungs, asthma, and bronchitis.
 - Amla or Amla prevents ageing and maintains strength in old age
 - Amla or Amla helps enriching hair growth and hair pigmentation.
 - Amla or Amla improves immunity and protects from common cough and cold.
- a. Amla protects cells against free radical damage and provides antioxidant protection
 - b. Amla is used to treat skin disorders, respiratory infections, and premature aging
 - c. Amla is useful in hemorrhage, diarrhea, dysentery, and has therapeutic value in treating diabetes
 - d. Amla has antibacterial and astringent properties that help to prevent infection and help in the healing of ulcers
 - e. Amla is sometimes used as a laxative to relieve constipation in piles.

Diabetes mellitus is a dreadful disorder that is brought about by the body's inability to convert blood sugar or glucose into energy. It also arises from the body's inability to manufacture insulin. There are a number of methods for controlling the symptoms and negative effects of diabetes. These include devising a suitable meal plan, taking the right medications and performing regular exercise. The present study was conducted by taking amla as measures to control Diabetes mellitus. The study was conducted for six months. One with amla second is control group, exclusively on medication. After the period of study results were analysed, since data was taken 3 times-one is at the beginning, second is in the middle and third is after completion. After analysis, findings reveal that there was significant difference with the biochemical parameters.

METHODS AND MATERIALS

The study was conducted in Acharya Nagarjuna University as well as Guntur City. We Selected 60 patients of type 2 DM in the age-group of > 40 yrs. Patients of nephropathy, retinopathy (proliferative) and coronary artery disease or any other complications of diabetes were excluded. The subjects were divided into two groups. One is Control group with 30 subjects were only having diabetes and this group is taken from Rajeev Gandhi Nagar, Mangal Das nagar, OldGuntur, Akulavarithota, Budampadu, Brahmanakoduru, Nehrunagar of Guntur and another one is Experimental group with 30 subjects. The experimental group of 30 subjects were taken from the Acharya Nagarjuna University, Guntur. Experimental group was supplemented with one medium size amla (35gms) every day. Both the experimental and control groups were subjected to continue same medications throughout the study period. Blood samples for FBS, PPBS, HBA1C, Lipid profile, Serum creatinine, blood Urea, were estimated before starting and in the middle and at the end of the programme

Results

	Diabetes with amla					Control group				
	I	D	M	D	F	I	D	M	D	F
weight	73.2	2.3	70.9	3.6	67.3	63.4	0.9	62.5	0.6	61.9
waist	94.3	1.6	92.7	3.4	89.3	90.5	1.1	89.4	1.3	88.1
Hip	100.9	1.9	99.0	5.0	94.0	98.9	1.5	97.4	1.4	96.0
wt/Hip	0.93	0	0.93	-0.01	0.94	0.89	0	0.89	-0.02	0.91
BMI	25.9	0.8	25.1	1.3	23.8	25.2	0.3	24.9	0.2	24.7
RBS	166.1	24.7	141.4	26.5	114.9	177.5	10.8	166.7	8.2	158.5
PPBS	260	46.6	213.4	49.3	164.1	285.7	17.6	268.1	12.9	255.2
HBA1C	8.0	0.69	7.31	0.73	6.58	8.37	0.33	8.04	0.25	7.79
TG	146.0	26.5	119.5	19.6	99.9	119.3	8.4	110.9	6.2	104.7
HDL	34.2	-5.2	39.4	-10.1	49.5	34.3	4.0	30.3	5.7	24.6
LDL	186.2	14.6	171.6	16.8	154.8	159.4	15.7	143.7	11.3	132.4
VLDL	28.8	4.9	23.9	3.3	20.6	22.7	1.5	21.2	1.3	19.9
S.cho	249.8	15.2	234.6	20.8	213.8	217.6	19.5	198.1	27.7	170.4
S. Cr	1.04	0.02	1.02	0.28	0.74	1.20	0.32	0.88	0.21	0.67
S.urea	38.9	4.4	34.5	4.3	30.2	38.6	2.0	36.6	1.1	35.5

BMI = BODY MASS INDEX

IBW = IDEAL BODY WEIGHT

RBS = RANDOM BLOOD SUGAR

PPBS = POST PRONDIAL BLOOD SUGAR

HbA1C = GLYCOSILATED HAEMOGLOBIN

TG = TRIGLYCERIDES

HDL = HIGHDENSITY LIPO PROTEINS

LDL = LOWDENSITY LIPO PROTEINS

VLDL = VERY LOWDENSITY LIPOPROTEINS

S.CHO- SERUM CHOLESTEROL

S. CR- SERUM CREATININE

S.UREA- SERUM UREA

I -Initial Values

M- Middle values

F-Final values

D-Difference

It is shown from the table that the component with amla and pranayama has shown good results compared to other two as both are very effective than the single administration either with amla or pranayama. rather to take single administration it's better to go with a formula that includes both amla and pranayama. Amla contains highest amount of Vitamin C (ascorbic acid), low and high molecular weight tannins 30%, phyllembin (2.4%), phyllemblic acid (6.3%), gallic acid (1.32%), ellagic acid in natural form and

cytokine like substances identified as Zeatin, Z riboside, Z nucleotide. Amla fruit ash contains chromium, 2.5; zinc, 4; and copper, 3 ppm. Presence of chromium is of therapeutic value in diabetes. The fruit contains 482.14 units of superoxide dismutase/g fresh weight, and exhibited ant senescent activity. Chromium, a trace element possesses significant anti diabetic activity in various experimental models of diabetic mellitus. It has been reported that insulin derived with chromium is capable of reversing blood sugar, serum cholesterol and phospholipids levels. IDDM patients may require injection of insulin for adequate control of glucose level. Further, in spite of anti-diabetic therapy patients may suffer from dyslipidemia with increase in circulating triglycerides, very low-density lipoprotein (VLDL) and hence an increased morbidity and mortality due to diabetes induced cardiovascular complications. WHO has approved use of traditional medicines as a part of health programme. So, the present study was taken to see the consumption of amla as well as practicing of pranayama influence over diabetes. The leaves, fruit as well as its aqueous and methanolic extracts have shown hypoglycemic effects in animal models (Akhtar 1995, Sabu and Kuttan 2002). *E. officinalis* fruit and its extracts have shown antiinflammatory, antioxidant and free radical scavenging properties in animal models (Asmawi et al. 1993, Hazra et al. 2010, Muthuraman et al. 2010, Nampoothiri et al. 2010, Reddy et al. 2010). *E. officinalis* has also been reported to have beneficial effects in the treatment of acute pancreatitis in rats (Sidhu et al. 2010). However, systematic scientific studies to clinically evaluate its anti-hyperglycemic and anti-hyperlipidemic effects in human volunteers are still limited. The present study was therefore conducted to evaluate the effects of powdered *E. officinalis* fruit on blood glucose levels and lipid profiles in normal subjects and type 2 diabetic human patients.

Conclusion

Overall, the results of the present study suggest that Amla fruit (*E. officinalis*, Gaertn.) has both antihyperglycemic and lipid-lowering properties and might be used as an ideal plant food supplement in developing successful alternative therapies in the prevention and treatment of diabetes, dyslipidemia, obesity and cancers in general population. However, further comprehensive phytochemical studies, followed by pharmacological evaluations in animal models and subsequently in humans, are required to evaluate and pinpoint the real hypoglycemic principle(s) and to precisely determine the mechanism(s) of its hypoglycemic actions.

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3. Hence, it was concluded that **Amla** has been a potential measure to control diabetes mellitus, since ancient times by virtue of having powerful anti oxidants.
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