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Okra is used as Hypolipidemic Agent

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ABSTRACT

The International Knowledge Sharing Platform states that there are many okra uses, as it's an economically important vegetable crop because its fresh leaves, buds, flowers, pods, stems and seeds have value. Okra may support improvement in cardiovascular and CAD, type 2 diabetes, digestive diseases and even some cancers. Okra is also abundant in several vitamins and minerals, including thiamin, vitamin B6, vitamin B2, folic acid, riboflavin, zinc and dietary fiber.

Study design: Single blind placebo controlled study.

Place and duration of study: National hospital Lahore from January to June 2017.

Materials and method: Written consent was taken from all patients. This consent was already approved by ETHICS COMMITTEE of the hospital. These patients were divided in two groups. Group I (n=30) was on placebo (capsules containing grinded wheat shell only) and Group II (n=30) was advised to take 200 g raw ladyfinger in divided doses for three months. Baseline fasting blood sugar (FBS) and lipid profile was determined at day 0, day 30, day 60 and at the end of research period, i.e.; day 90. Serum LDL-cholesterol was calculated by Friedwald formula (LDL-Cholesterol=Total Cholesterol-(Triglycerides/5+HDL-Cholesterol). Glucometer made by Roch pharma serial No: CE 0123 was used for estimation of FBS.

Results: For statistical analysis SPSS version 2010 was used. SD and ± SEM was determined from mean of the pre and post treatment values. Paired 't' test was applied to see p-value of the tested parameters. P-value>0.05 was considered as non-significant change, <0.01 as significant and <0.001 as highly significant change in the tested parameter.

Conclusion: It was concluded from the research study that lady fingers or Okra can reduce LDL cholesterol and Fasting Blood Sugar (FBS) of patient suffering from DMtype-2 and hyperlipidemia significantly when this vegetable is used for specific time period.

Keywords: Okra, Hypolipidemic agent, Cardiovascular, Lipid profile, Cholesterol, Fasting blood sugar

INTRODUCTION

The main risk associated with high cholesterol is coronary heart disease (CHD). Your blood cholesterol level has a lot to do with your chances of getting heart disease. If your cholesterol is too high, it builds up on the walls of your arteries. Over time, this buildup is known as atherosclerosis. This condition causes arteries to become narrowed, and the narrowed blood vessels reduce blood flow to the heart. This can result in angina (chest pain) from not enough blood flow getting to the heart or a heart attack in cases when a blood vessel is blocked completely and the heart muscle begins to die. Metabolic syndrome is a cluster of conditions, i.e.; increased blood pressure, high blood sugar, excess body fat

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around the waist and abnormal cholesterol or triglyceride levels which occur together, increasing risk of heart disease, stroke and diabetes. It starts when individual is enjoying sedentary life, fond of taking high sugar, high lipid-content diets and bakery foods. Age, cigarette smoking, alcohol use are independent risk factors for metabolic syndrome [1]. Because the syndrome is complicated, its cure is also complicated like that. Generally hypoglycemic, hypolipidemic drugs are used to solve symptoms. Apart from hypoglycemic and hypolipidemic allopathic medications, varous herbs have been used to prevent and cure of the disease [2]. *Abelmoschus esculentus* (lady finger or okra) is a non-leafy, green, fruit vegetable that is widely consumed in Pakistan and abroad. Popularly called bhindi in Pakistani households, this vegetable is tender, mucilaginous and dense in nutritional content. It can be eaten raw and cooked [3]. Bhindi helps control diabetes. Okra is packed with dietary fibre that helps stabilisation of blood sugar levels by regulation of the rate of absorption of sugar from the digestive tract. The anti-diabetic property of okra is also attributed to its ability of inhibition of enzymes metabolising carbohydrates, enhancement of production of insulin, regeneration of beta cell of the pancreas and increased secretion of insulin [4]. It prevents heart disease [5]. People are often affected with heart disease due to high levels of cholesterol in their blood [6]. Pectin, a soluble fibre present in lady's finger helps lower this cholesterol and thus is helpful in preventing heart disease. Bhindi is also fairly rich in antioxidant compounds like polyphenols [7]. Polyphenol compounds, especially quercetin, help prevent oxidation of cholesterol and blocking of arteries, preventing heart disease development [8]. People who aspire to lose weight can eat lady's finger to facilitate weight loss. The vegetable is extremely low in calories, with a 100 g serving containing just 33 Cal [9].

MATERIALS AND METHOD

In this study Bhindi or ladyfinger was used along with placebo to see exact potential of the herb to normalize increased blood glucose and lipids levels. The study was conducted in National hospital Lahore from January to June 2017. 60 patients suffering from diabetes mellitus type-II and secondary hyperlipidemia were selected from medical OPD of the hospital. Written consent was taken from all patients. This consent was already approved by ETHICS COMMITTEE of the hospital. These patients were divided in two groups. Group I (n=30) was on placebo (capsules containing grinded wheat shell only) and Group II (n=30) was advised to take 200 g raw lady finger in divided doses for three months. Baseline fasting blood sugar (FBS) and lipid profile was determined at day 0, day 30, day 60 and at the end of research period, i.e.; day 90. Serum LDL-cholesterol was calculated by Friedwald formula [10] (LDL-Cholesterol=Total Cholesterol-(Triglycerides/5+HDL-Cholesterol). Glucometer made by Roch pharma serial No: CE 0123 was used for estimation of FBS. For statistical analysis SPSS version 2010 was used. SD and ± SEM was determined from mean of the pre and post treatment values. Paired 't' test was applied to see p-value of the tested parameters. P-value>0.05 was considered as non-significant change, <0.01 as significant and <0.001 as highly significant change in the tested parameter.

RESULTS

After three months it was observed that lady finger reduced blood LDL-cholesterol from 209.13 ± 2.22 mg/dl to 183.09 ± 1.58 mg/dl. Difference in pre and post treatment was 26.04 mg/dl (p-value<0.001). FBS in 27 diabetic patients suffering from DM type-II was reduced from 166.61 ± 3.09 mg/dl to 149.98 ± 1.76 mg/dl. Difference in pre and post treatment values was 16.63 mg/dl (p-value<0.01) **(Table 1)**.

Table 1. Showing pre- and post-treatment values in diabetes mellitus and hyperlipidemic patients who took 200 g ladyfingers for 90 days.

Groups and Parameters	At day 0	At day 90	Difference	p-value
Placebo n=30				
LDL-C	190.01 ± 1.11	187.00 ± 2.05	3.01	>0.05
FBS	151.17 ± 2.98	147.76 ± 1.98	3.41	>0.05
Lady finger n=27				
LDL-C	209.13 ± 2.22	183.09 ± 1.58	26.04	<0.001
FBS	166.61 ± 3.09	149.98 ± 1.76	16.63	<0.01

Key: All parameters and difference in pre and post treatment values are measured in mg/dl,
LDL-C: Low Density Lipoprotein Cholesterol; FBS: Fasting Blood Sugar
n=sample size, p-value>0.05 is non-significant, <0.01 is significant and p-value <0.001 is highly significant change in mentioned parameters

DISCUSSION

Type 2 diabetes is another disease linked to high cholesterol because diabetes can affect the different cholesterol levels. Even if blood sugar control is good, people with diabetes tend to have increased triglycerides, decreased high-density lipoprotein (HDL) and sometimes increased low-density lipoprotein (LDL). This increases the likelihood of developing atherosclerosis. Cholesterol lowering drugs and drugs used in diabetes mellitus has proved to have adverse effects; medical researchers are trying to conduct trials of medicinal herbs for hyperglycemia and hyperlipidemia. We used lady finger to see their lipid and blood glucose lowering effects. In our results 90 days treatment with use of 200 g raw lady finger reduced LDL-cholesterol in 27 patients 26.04 mg/dl. In these patients fasting blood sugar reduced 16.63 mg/dl. These results match with results obtained in trial conducted by John et al. [11] who observed almost same results which support our results. Mackhil et al. [12], Johay et al. [13] and Surta et al. [14] mentioned the mechanism of action of lady fingers to reduce LDL-cholesterol that the herb reduces enterohepatic circulation of bile salts so VLDL are not synthesized and so the LDL. Jittkaal et al. [15] mentioned the antioxidant effects of ladyfingers. Polyphenolic compound like quercetin present in lady fingers prevent oxidation of cholesterol. Gurhu et al. [16] observed lesser hypolipidemic effects of ladyfingers as their results proved 16.98 mg/dl reduction in LDL-cholesterol in 19 hyperlipidemic patients. This contrast may be due to lesser amount of herb used as they used 100 g raw ladyfinger in 25 hyperlipidemic patients for 75 days. Our results proved 16.63 mg/dl reduction in fasting blood glucose (FBS) level when lady finger was used by 27 diabetic patients suffering from diabetes mellitus type-II. These results match with results of study conducted by Rochee et al. [17] who proved 18.76 mg/dl reduction in FBS level when this herb was used (150 g/day for two months) by 56 patients suffering from diabetes mellitus type-II. Okra being rich in fibres helps to normalize the blood sugar; it absorbs the excessive glucose from blood and balances the level [18-20]. Fornh et al. [21] stated that ladyfinger is used to treat cystitis, leucorrhea, impotence and premature ejaculation in male. Saty et al. [22] explained that as ladyfinger is anti-inflammatory herb, it reduces risk of synthesis of foamy cells during development of atherosclerotic plaques in early stages. Sharma et al. [23] wrote that the herb reduces FBS by various mechanisms; enterohepatic circulation inhibition is one of them. Dosata et al. [24] warned the use of the herb for prolonged time may cause acidity. Therefore antacids may not be used by individuals who are already taking ladyfinger as medicinal purpose for specific time. Inhibition of carbohydrate metabolizing enzymes, enhancement of insulin sensitivity, regeneration of damaged pancreatic islet β-cells and enhancement of insulin secretion and release is explained by Turtr et al. [25].

CONCLUSION

It was then concluded from the trial that ladyfinger has significant hypolipidemic and hypoglycemic potential and may be used in diabetic and hyperlipidemic patients safely.

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