

Preliminary Study on the Effect of *Aegle marmelos* in Hyperlipidemia

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Abstract

Introduction: We examined the effect of *Aegle marmelos*, an Indian herb in the management of hyperlipidemia

Materials and Methods: A randomized group pre-test and post-test study trial was carried out on 50 males (30-70 years), hyperlipidemic volunteers who were asked to follow their normal routine diet and activity pattern throughout the investigation period. *A. marmelos* in dose of 5 g was administered for 1 month.

Results: The *A. marmelos* when given in a daily dose of 5 g once a day for 1 month brought about an observable improvement in all the lipid parameters by significantly reducing total cholesterol (10%), low-density lipoprotein (LDL-C) (12.6%), very - low-density lipoprotein (VLDL-C) (27.4%), triglycerides (34.7%), and bringing these values much nearer to the normal levels. In the control group, no such effects were noticed. A significant increase in high-density lipoprotein (HDL-C) was noted.

Conclusion: *A. marmelos* is a safe and effective hypolipidemic agent and is free from any potential toxicity.

Key words: *Aegle marmelos*, Cholesterol, Hyperlipidemia, Lipoproteins, Triglycerides

INTRODUCTION

Dyslipidemia is a major contribution toward many chronic non-infectious diseases such as atherosclerosis, diabetes mellitus, myocardial infarction, angina, and stroke. Dyslipidemia is mainly related to some genetic variation in lipid metabolism/dietary food habits or both which are highly prevalent in the Indian subcontinent.

The main cause of atherogenesis is dyslipidemia, in humans typically occurs over a period of many years, usually decades. In general, after a prolonged silent period, atherogenesis may become clinically significant. The fatty streak and thickening of the intima of blood vessels represent the initial lesions of atherosclerosis.

Aegle marmelos Linn., also known as Bilwa in Hindi and Bel in Bengali, belongs to the family Rutaceae and grows

wild in dry forests, outer Himalayas, and Shivaliks. It is a medium to large sized deciduous glabrous, armed tree with axillary and 2.5 cm long alternate trifoliate leaves, short flower, and globular fruits. This plant has shown various activities including antidiabetic, anti-inflammatory, antihyperlipidemic, anticancer, and antiviral properties.

A. marmelos leaves contain sitosterol, aegelin, lupcol, rutin, marmesinin, eugenol, (beta)-sitosterol, flavon, glycoside, montanine, 6-isopentanyl halfordiol, marmelin, and Phenylethyl cinnamamides.

In modern practice, there are many drugs such as statins and fiberates, which are in use as hypolipidemic agents but the therapy is not cost effective. So, herbal drugs proved a boon here.¹⁻⁷

MATERIALS AND METHODS

A randomized group pre-test and post-test study trial was carried out on 50 adult males (30-70 years). Hyperlipidemic subjects not taking any hypolipidemic medicines and who had not suffered from heart attack was carried out in Katihar medical college, Katihar. The subjects were divided into experimental (40) and control (10).

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The leaves of *A. marmelos* were collected in the month of May, washed, dried in air, and powdered and were kept ready for administration. The dose administered was 5 gm once daily in empty stomach to each of the 40 subjects of the experimental group for 30 days. The control group comprising of 10 subjects was given placebo. All the study subjects were advised to follow their routine diet and activity pattern. By the end of study period, 4 subjects from the experimental groups and 2 from the control group were deleted because they were irregular in taking the daily dose. Finally, the whole study group comprised of 44 (36 experimental and 8 control) subjects.

Lipid profile of each subject was estimated using enzymatic auto-pack kits of Biosystem company at beginning and after completion of the study.

For this, 5 mL of fasting blood was collected in a clean, dry, sterilized vial and was allowed to stand at room temperature for 15 min, which was then centrifuged at 2000 rpm for 5 min. The supernatant (serum) was used for the biochemical estimation of total cholesterol, triglycerides, and high-density lipoprotein (HDL-C). Very-low-density lipoprotein (VLDL) and low-density lipoprotein (LDL-C) levels were calculated by the standard formula. Paired *t*-test was employed to test the significance of the difference between average values of specific lipid parameter before and after administering the dry powder of *A. marmelos* leaves.

RESULTS

Definite trend of hypolipidemic effect of *A. marmelos* was observed on all the lipid parameters in the experimental group as evident from the observation. The initial mean cholesterol level (276.6 ± 29.6 mg/dl) was significantly lowered to 248.7 ± 25.4 mg/dl. Although it could not attain the safe limit of < 200 mg/dl ($P < 0.01$) in a trial period of 30 days, the reduction of 10% in total cholesterol is encouraging.

Likewise, the initial average level of LDL-C, one of the important parameters of lipid profile was 185.7 ± 30.2 mg/dl which came down to 162.0 ± 28.7 mg/dl. Here also, although the reduction was significant ($P < 0.01$), yet the LDL-C values observed after the experimental period were higher than the normal desirable levels of 130 mg/dl. The similar beneficial effect was observed on VLDL levels also, where "*A. marmelos*" in a daily dose of 5 g, when

administered for 30 days could significantly reduce it by 27.4% from the pre-experimental level of 44.5 ± 5.3 mg/dl. The drug exhibited its efficacy in significantly raising the levels of scavenger lipoprotein that is HDL-C within a month by 33.4%. Likewise, a drastic decrease of 34.7% was observed where initial and final triglyceride levels were 248.2 ± 44.9 mg/dl and 162.1 ± 42.7 mg/dl, respectively.

DISCUSSION

From the above results, it can be inferred that the herb "*A. marmelos*" when administered in a dose of 5 g per day for 30 days could significantly lower the total cholesterol, LDL-C, VLDL-C, and triglyceride levels and raise HDL-C levels of hyperlipidemic subjects. These results are indicative of beneficial effects of "*A. marmelos*." Although in the present investigation the dose and duration of treatment with the herb did not bring the values of lipid parameters to normal limits, with the increased dose or duration or both, it can be expected that the herb can suitably be used as an effective hypolipidemic agent. The beneficial effects of the herb are seen in bringing down the triglyceride levels to quite safe limits. Moreover, the subjects did not report any visible or psychological complications.

CONCLUSION

A. marmelos is a safe and effective hypolipidemic agent and is free from any potential toxicity.

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