

Original Research Article

Apricots Contain Vitamin A, Beta-Carotene, Potassium and Phytosterols: Treatment for Oxidative Stress

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Abstract: Just look at regular intake of two fruits ie; apple and apricot may help to escape patients from sufferings related to hyperlipidemia. These two fruits have had been researched by scientist for treatment of hyperlipidemia by decreasing low density lipoprotein cholesterol (LDL-C) and increasing high density lipoprotein cholesterol (HDL-C). It was placebo based research work conducted at General Hospital Lahore from January to April 2022. 100 already diagnosed patients of primary/secondary hyperlipidemia were enrolled in research study with (written/explained and approved) consent. Inclusion criteria was their age (20-70 years), gender (male and female) and patients not on any hypolipidemic allopathic medicines. Exclusion criteria was smokers, alcoholic additives, and patients of thyroid, liver, lung, and severe heart related diseases. **Grouping:** They were divided in four equal groups including 25 patients in each group. Group-one was on apple half kg per day for the period of three months. Group-two was on apricot half kg per day for the period of three months. Group-three was on apple ½ kg plus apricot ½ kg for the period of three months. Group-four was placebo group and they were advised to take any fruit except these two fruits ie; apple and apricot. **Method:** Their name/age/gender/occupation/address/cell number was kept in separate folder for research record. Their base line lipid profile was determined at pathology/biochemistry laboratory of the hospital. Fortnightly visit was advised to them. After three months therapy their lipid profile was re-determined. Mean values of their LDL-C and HDL-C \pm SEM was analyzed biostatistically by applying paired t-test. P-values >0.05 was regarded as non-significant, p-values <0.01 and <0.001 were regarded as significant and highly significant changes in tested parameters respectively. **Results:** After three months therapy it was observed that apple reduced LDL-cholesterol 23.77 mg/dl and increased HDL-cholesterol 3.3 mg/dl. Apricot reduced LDL-cholesterol 7.5 mg/dl and increased HDL-cholesterol 5.3 mg/dl. Combination of both fruits decreased LDL-cholesterol 16.1 mg/dl and increased HDL-cholesterol 6.6 mg/dl in three months therapy. **Conclusion:** It was concluded from results of this research work that apple and apricot given separately or in combination, have remarkable effect on LDL-C and HDL-C in patients suffering from primary/secondary hyperlipidemia.

Keywords: Vitamin A, Beta-Carotene, Potassium and Phytosterols, Cholesterol.

INTRODUCTION

Apricots and peaches are stone fruits from the botanical family *Rosaceae*. Both fruits are highly nutritious and range in color from yellow to orange, with reddish tones. Apricots are smaller, though, about a quarter of the size of a

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peach. Peaches are sweeter and have more water, making them juicier than apricots. One small peach has about 10.9 grams (g) of sugar, while a typical apricot has about 3.23 g. To prevent development of coronary artery disease (CAD), it is uttermost important that plasma lipid levels remain normal. Various drugs are used for prevention of dyslipidemia in conventional method of Therapeutics, but their adverse effects have made them 'DRUGS OF LOW COMPLIANCE' in allopathic therapeutic discipline of medical sciences [3]. Herabal medications including fruits are going to replace scientifically proved allopathy related hypolipidemic drugs. Apples have certainly rehabilitated their image since first becoming known as the little fruit that brought down the Garden of Eden. Their résumé of health benefits could easily fill a book. Epidemiological studies have linked the consumption of apples with reduced risk of some cancers, cardiovascular disease, asthma, and diabetes. And that's just for openers [4]. Apples contain quercetin, a flavonoid that, in a 2001 Mayo Clinic study, helped prevent the growth of prostate cancer cells. Another study, at Cornell University, showed that phytochemicals in the skin of an apple inhibited the reproduction of colon cancer cells by 43 percent. And the National Cancer Institute reported that foods containing flavonoids like the ones in apples may reduce the risk of lung cancer by as much as 50 percent [5-7]. Apples are also ranked second for total concentration of phenolic compounds, a huge class of biochemically active substances most of which belong to the flavonoid group. There are literally thousands of flavonoids in the fruit. And compared to every other fruit, apples have the highest portion of free phenolics. While that may sound like the phenolics just got out of prison, it actually means they're not attached to other compounds in the fruit, which in turn means they're more available for absorption into your bloodstream, where they can go to work providing you with all the amazing health benefits and cancer-fighting ability they have to offer [8, 9]. Apples contain pectin, a valuable source of soluble fiber that can lower bad cholesterol (LDL) and help regulate blood sugar [10]. Two medium apricots have about 1½ g of fiber, 1,348 IUs of vitamin A, 766 IUs of beta-carotene, 181 mg of potassium, and, just for good measure, 13 mg of phytosterols, plant chemicals that have numerous health benefits. Apricots also contain beta-cryptoxanthin, a member of the carotenoid family that is a strong antioxidant and seems to reduce the risk of lung and colon cancer [11]. Some studies have demonstrated that beta-cryptoxanthin can reduce the risk of lung cancer by more than 30 percent, and other studies have shown that it reduces the risk for the untold arthritis by 41 percent. In order to absorb the beta-cryptoxanthin, it's essential that your diet contains some fat, since, like other carotenoids, beta-cryptoxanthin is fat soluble [12]. Apples are also ranked second for total concentration of phenolic compounds, a huge class of biochemically active substances most of which belong to the flavonoid group. There are literally thousands of flavonoids in the fruit. And compared to every other fruit, apples have the highest portion of free phenolics.

PATIENTS AND METHOD

Research was done at Jinnah Hospital, Lahore-pakistan from March to July 2022. One hundred hyperlipidemic patients were selected after written and approved consent from all patients. Inclusion criteria was age limit of 17 to 65 years age of both gender. Diabetic, alcoholics, cigarette smokers, patients of peptic ulcer, thyroid disease, and with renally or hepatically impaired were excluded from the study. They were divided in four groups. Group-I was advised to take 10 grams of Ajwain in three divided doses for the period of three months. Group-II was on 10 grams of Alsi in divided doses for three months. Group-III was directed to take 10 grams of Ajwain and 10 grams of Alsi combinely in three equally divided doses for three months. Group-IV was on placebo to take three capsules (containing grinded wheat) thrice daily for the period of three months. Their base line lipid profile at day-0 was determined by conventional methods of estimation. They were advised to visit lipid research clinic of the hospital fortnightly. After three months their lipid profile was estimated and change in LDL-cholesterol and HDL-cholesterol was compared. Data were expressed as the mean \pm Standard Diviation and "t" test was applied to determine statistical significance as the difference. A probability value of <0.05 was considered as non-significant and $P<0.001$ was considered as highly significant change in the results when pre and post-treatment values were compared.

RESULTS

After three months research study it was observed that Apple reduced LDL-c 10.3 %, and increased HDL-c 7.6 % in 23 hyperlipidemic patients. Apricot when used by 23 hyperlipidemic patients, it reduced LDL-c 7.6% and increased HDL-c 15.9%. Apple and Apricot when used in combination in 22 hyperlipidemic male and female patients, it reduced their LDL-c 7.9%, and increased HDL-c 6.6%. In placebo group, only let them to be conscious about their hyperlipidemic state, they just left their sedentary life style, without change in their eating habits, their LDL-c reduced 1.6% and increase in HDL-c was 1.1%. Changes in mean values of tested parameter in these patients before and after treatment with biostatistical significance are shown in following table.

Table: Illustrating changes in tested parameters before and after treatment with apple, apricot and combination of these two fruits with their p-values (Biostatistical Significance)

| Parameter | Apple (n=23) | Apricot (n=23) | Apple+Apricot (n=22) | Placebo (n=23) |
|-------------------------|-------------------|-------------------|----------------------|-------------------|
| Before Treatment | | | | |
| LDL-C | 231.58 \pm 3.01 | 207.50 \pm 2.32 | 204.11 \pm 2.11 | 201.97 \pm 3.22 |
| HDL-C | 43.54 \pm 2.11 | 33.33 \pm 3.01 | 33.10 \pm 3.05 | 38.53 \pm 1.71 |

| Parameter | Apple (n=23) | Apricot (n=23) | Apple+Apricot (n=22) | Placebo (n=23) |
|------------------------|-----------------------------|-----------------|----------------------|----------------|
| After Treatment | | | | |
| LDL-C | 207.87±2.09 | 191.77±1.92 | 188.01±2.93 | 198.82±2.10 |
| HDL-C | 46.78±1.74 | 38.60±2.28 | 39.71±2.92 | 39.67±2.88 |
| Change | LDL-C 23.77 HDL-C 3.3 | 15.7 5.3 | 16.1 6.6 | 3.2 1.1 |
| p-value | LDL-C <0.001 HDL-C >0.05 | <0.001 >0.05 | <0.001 >0.05 | >0.05 >0.05 |

LDL-C = low density lipoprotein cholesterol, HDL-C = high density lipoprotein cholesterol, ± was standard error of mean values. All parameter's mean values were measured in mg/dl. n= number of patients/sample size, p-value >0.05 = non-significant, <0.01= significant, <0.001 = highly significant change in tested parameter.

KEY: P-value <0.01= significant, p-value >0.05 = non-significant changes in lipid profile. HDL-c and LDL-c values are measured in milligrams per milliliter. 'n' written along with drug group of patients indicates number of patients in tested and placebo group.

DISCUSSION

Two medium apricots have about 1½ g of fiber, 1,348 IUs of vitamin A, 766 IUs of beta-carotene, 181 mg of potassium, and, just for good measure, 13 mg of phytosterols, plant chemicals that have numerous health benefits. Low density lipoprotein cholesterol (LDL-C) is essential factor to cause oxidation and atherosclerosis in systemic circulation leading to development of coronary artery disease (CAD) which may be morbid or mortal. High density lipoprotein cholesterol (HDL-C) is known as GOOD CHOLESTEROL, and its high concentration in plasma is good indicator for prevention of atherosclerosis or CAD. Herbal medications are now a days replacing allopathic hypolipidemic drugs due to lesser adverse effects and good patient compliance. We have tried to compare hypolipidemic potential of herbal medicines AJWAIN, ALSI separately and when given in combination. Ten grams of Ajwain when used for three months, LDL-C in 24 hyperlipidemic patients reduced from 231.67±2.11 to 207.96±1.98 mg/dl which is 10.3% reduction in the parameter. HDL-C increased from 43.65±1.09 to 46.99±1.08 mg/dl. These results are matched with results of Nagalakshmi S *et al.*, [13] and Kumari KS and Prameela14 M who proved that Ajwain has more hypolipidemic potential than Alsi. Alsi in our results reduced LDL-C from 207.50±1.11 to 200.02±1.11 mg/dl which is approximately 3.6% reduction in the parameter. HDL-C increased was about 3.6%. These results match with Chen ZY [17] who observed same changes in HDL-cholesterol, but they proved lesser reduction in LDL-cholesterol i.e. only 2%. This contrast may be due to ethnic related genetic variation in hyperlipidemias in different population of the world, which needs more elaborative research work. When Ajwain and Alsi were administered in 23 hyperlipidemic patients LDL-cholesterol reduction was 7.9% and rise in HDL-cholesterol was 19.9 % and these changes match with results of study conducted by Srivastava KC [15]. He proved and explained about so much increase in HDL-cholesterol by using Ajwain and Alsi combinately that synergetic effect of two herbal medicines are conventional on two different parameters of lipid profile. Ishikawah T *et al.*, [16] have described change in inter-drug response may be observed by combination of two herbal drugs having same hypolipidemic potential due to same active ingredients. McHugan A [18] proved too much reduction in LDL-cholesterol when 30 grams of Ajwain and 15 grams of Alsi was used in 111 male hyperlipidemic patients. He proved 20.91% reduction in LDL-cholesterol and 33.12% increase in HDL-cholesterol. These contrasts in two results are because concentration of both drugs was high and sample size was good enough to get much change in results. Apers linda *et al.*, [19] and C Strandas *et al.*, [20] have again augmented view point of Ishikawah T *et al.*, [16] that drug drug interaction in herbal combined medication always and almost cause synergetic or potentiating of response. Low density lipoprotein cholesterol (LDL-C) is essential factor to cause oxidation and atherosclerosis in systemic circulation leading to development of coronary artery disease (CAD) which may be morbid or mortal. High density lipoprotein cholesterol (HDL-C) is known as GOOD CHOLESTEROL, and its high concentration in plasma is good indicator for prevention of atherosclerosis or CAD. Herbal medications are now a days replacing allopathic hypolipidemic drugs due to lesser adverse effects and good patient compliance. We have tried to compare hypolipidemic potential of herbal medicines AJWAIN, ALSI separately and when given in combination [21-25].

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