

**COMPARISON OF ANTI OBESE POTENTIAL OF PUMPKIN SEED OIL AND
APRICOT OIL: EFFECT ON LIPID PROFILE IN HIGH-FAT DIET-INDUCED OBESE
RATS**

1. Dr. Maria Asif, MBBS, M.Phil Biochemistry, Lecturer Biochemistry, LUMHS,
Jamshoro
2. Dr. Beenish Ghafar MBBS, M.Phil Biochemistry, Assistant Professor Biochemistry LUMHS,
Jamshoro
3. Dr. Sofia Chandio MBBS M.Phil Biochemistry Lecturer, LUMHS, Jamshoro
4. Dr. Sadat Memon MBBS, M.Phil Pharmacology Assistant Professor Pharmacology, LUMHS
,Jamshoro
5. Dr. Rubina Ahmadani MBBS, M.Phil. Physiology, Associate Professor Physiology, LUMHS,
Jamshoro
6. Dr. Urooj Bhatti MBBS, Ph.D. Physiology, Assistant Professor Physiology, LUMHS,
Jamshoro

Corresponding author:

Dr. Urooj Bhatti, MBBS, Ph.D. Physiology, Assistant Professor Physiology, LUMHS Jamshoro

ABSTRACT:

BACKGROUND: Obesity and lipid profile disturbance are the key role player in developing coronary heart disease. Herbal medicines are famous and the focus of research nowadays because of their being highly effective in healing with lesser side effects. **METHODS:** This was the experimental study and it was done at Biochemistry Department in teamwork with the Diagnostic and Research Lab, Liaquat University of Medical and Health Science Jamshoro, Sindh. The sample size was (n=48). The study was conducted on 48 male albino rats. Negative controls (n=12) were fed a basal normal diet. Positive controls (n=12) were given a high-fat diet (sixty percent fats, with twenty percent proteins and carbohydrates). Experimental (n=12) high-fat diet-induced dyslipidemia given pumpkin seed oil 100 mg/kg body weight. Experimental (n=12) high fat diet-induced dyslipidemia given apricot essential oil 100 mg/kg body weight. At the end of the experiment, the rats were left overnight fasting for eight hours. After taking their weight, fasting rats were anesthetized to get a blood sample from the retro-orbital capillary plexus. The lipid profile was determined on Cobas e 411 (Roche). **RESULTS:** The end experiment lipid profile was compared in four groups, negative controls, positive controls, intervention pumpkin seed oil, and intervention apricot oil. Serum cholesterol, triglycerides, and LDL were significantly high in positive controls as compared to negative controls; while the intervention with pumpkin seed oil revealed a decrease in cholesterol to 194mg/dl and intervention of apricot showed a decrease in cholesterol up to 214.2 mg/dl. (p value<0.01). Pumpkin seed oil is more effective in reducing cholesterol levels. Compared to the positive control, HDL levels in pumpkin seed oil fed was 37.9 mg/dl and in apricot oil fed groups was 39.6 mg/dl. The most significant increase in HDL was observed in the apricot oil-treated group.(p-value <0.01). End Experiment body weight negative and positive controls were found as 237.5±8.58 mg/dl and 282.03±8.260 grams (P=0.0001).

Compared to the positive control, the body weight in pumpkin seed oil fed was 233.69 ± 6.17 grams and in apricot oil, fed groups were 208.82 ± 5.52 grams. The most significant body weight decrease was observed in the apricot oil-treated group. ($P < 0.01$) **CONCLUSION:** Pumpkin seed oil is more effective in decreasing cholesterol levels as compared to apricot oil while apricot oil has more potential of increasing good cholesterol HDL.

KEYWORDS: Apricot oil, Body weight, High fat diet, Pumpkin seed oil

INTRODUCTION:

Coronary heart disease is a major public health problem of modern era and is the main cause of mortality worldwide.¹ Dyslipidemia is characterized by altered circulating lipoproteins predisposing to atheroma formation in vessel wall. Dyslipidemia is mainly characterized by hyperlipidemia because, there is always increase in triglyceride levels, total cholesterol and LDLc concentrations except HDL cholesterol.² In dyslipidemia, the LDL becomes deposited in the tunica intima of blood vessels causing atherosclerosis predisposing to coronary artery disease and CVD. Increased metabolic syndrome and dyslipidemia in modern urban community demands searching for alternative herbal agents for the amelioration of blood lipoproteins and related complications.³ A variety of herbs are known in the Ayurveda, which are used for medicinal purposes because of lesser side effects or no toxic effects.⁴ In current time, the prospective of herbal medicinal treatments for obesity are the focus of research. The components yielded from oil seeds are associated with decline in body weight, e.g. appetite suppressants, inhibitors of factors of adipogenesis, inhibitors of enzymes implicated in digestion and absorption of dietary fat and carbohydrates. ⁵ Pumpkin seed oil and apricot oil are of medical significance for treating dyslipidemia. Pumpkin belongs to the family cucurbitaceae and its seeds are shattered in industrialized dissipate but its oil is affluent resource of fibers, poly unsaturated fatty acids,

proteins, phenolic compounds and the carotenoids. They contain folate, tocopherol, thiamine, riboflavin, zinc, potassium, phosphates, magnesium, iron and manganese.⁶ Meanwhile, Apricot is a fruit tree and its fruit contains micronutrients like vitamins and the macronutrients like organic acids, sugars and the amino acids. For the most part prominently, apricot include rich anti-oxidants and present many health benefit properties to humans, which depending on the wide biological activities, include anti-oxidant, cardiovascular benefits, hepato-protective, anti-microbial, anti-dyslipidemia, anti-diabetic, nephro-protective, anti-inflammatory activity, anti-cancer activity.^{7,8} Meanwhile, it is also used for the treatment of genito-urinary infections, nerve and skin problems. Increasing trends of metabolic syndrome demand essential oils of herbs to be researched for managing the hyperlipidemia and dyslipidemia. Therefore, present study has been intended to evaluate the effects of pumpkin seed oil and apricot oil on body weight and lipid profile in the rats fed with high fat diet.

METHODS:

This was the experimental study, which was performed at Biochemistry department in alliance with Diagnostic and Research Lab, Liaquat University of Medical and Health Sciences (LUMHS) Jamshoro after approval from Ethical Review Committee, LUMHS Jamshoro. Overall 48 male albino rats were acquired from animal house, University of Karachi. The experimental practice was in accord with 'NIH – Animal Care' for performing animal research. Pumpkin seed oil and Apricot essential oil validation was done in Botany department, University of Sindh, Pakistan. Fat rich diet was primed by mixing 60 percent fats with 20 percent carbohydrates and proteins. Sampling technique was simple random sampling.

- Negative controls – were fed basal normal diet (10% fats with 20% proteins and 70% carbohydrates)
- Positive controls – given high-fat diet (60% fats, 20% proteins and 20% carbohydrates)
- Experimental high-fat diet induced dyslipidemia given Pumpkin seed oil 100 mg/Kg body weight.
- Experimental high-fat diet induced dyslipidemia given Apricot essential oil 100 mg/Kg body weight.

In the end of experiment, rats were permitted fasting for eight hours. After taking their weight, rats anesthetized by injecting ethylene ether and then pricked with capillary tube beneath and at the back of eyeballs to obtain sample of blood from retro – orbital capillary plexus. Serum was separated by centrifuging blood at 13000 revolutions per minute for continuous 4 minutes. Then, lipid parameters evaluated on cobas e 411 (Roche).

RESULTS:

End Experiment lipid profile was compared in four groups, negative controls, positive controls, intervention pumpkin seed oil and intervention apricot oil. Serum cholesterol, triglycerides, LDL were significantly high in positive controls as compared to negative controls; while intervention with pumpkin seed oil revealed decrease in cholesterol to 194mg/dl and intervention of apricot showed decrease in cholesterol up to 214.2 mg/dl. (p-value<0.01). Pumpkin seed oil is more effective in reducing cholesterol levels. Compared to positive control, HDL levels in pumpkin seed oil fed was 37.9 mg/dl and apricot oil fed groups was 39.6 mg/dl. Most significant increase in HDL was observed in apricot oil treated group. (p-value <0.01). **Table No. 1**

End Experiment body weight negative and positive controls were found as 237.5±8.58 grams and 282.03±8.260 grams (P=0.0001). Compared to positive control, the body weight in pumpkin seed

oil fed was 233.69 ± 6.17 grams and apricot oil fed groups was 208.82 ± 5.52 grams. Most significant body weight decrease was observed in apricot oil treated group. ($P < 0.01$) **Figure 1**

Table No. 1: Lipid profile in Negative controls (n=12), positive controls (n=12), High fat diet induced obese rats given pumpkin seed oil (n=12) and High fat diet induced obese rats given apricot oil (n=12)

	Negative control	Positive control	Pumpkin seed oil (100mg/kg body weight)	Apricot seed oil (100mg/kg body weight)	p- value
Cholesterol	122.7±9.7	385.5±33.1	194.6±18.3	214.2±21.7	<0.01**
Triglycerides	174.3±17.3	402.1±12.3	251.2±26.7	242.3±9.1	<0.01**
LDL	109.8±12.0	242.9±13.3	165.5±13.2	157.3±6.5	<0.01**
HDL	41.1±1.1	21.4±2.2	37.9±2.1	39.6±1.2	<0.01**

** shows highly significant difference statistically

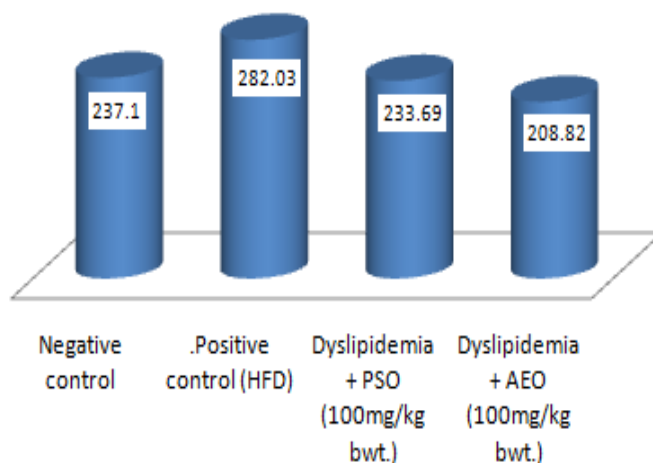


Figure 1: Body weight in male albino rats in grams

DISCUSSION:

The prevalence of obesity is at epidemic magnitude in Pakistan, calling for urgent lifestyle intervention strategies to prevent and manage this important cardio-metabolic risk factor.⁹

In Pakistan, the discernment of a healthy diet in general populace is diverse. Pakistani foods are cooked with an elevated fraction of saturated fats (ghee), trans fatty acids and free sugar which are contributory to elevated calories intake in food. Here, meat is utilized frequently cooked in ghee and the trend of celebrating cultural events with distribution of sweets are the common dietary practices. The vegetables, fruits, high fiber diet, and cereals are mostly expensive to be purchased by a common person, that's why to fetch energy they run behind un-expensive customs of energy like fats (ghee) and sugar.¹⁰ Present study aimed to explore the hypolipidemic and anti-obesity role of pumpkin seed oil and apricot oil in high fat diet induced obese male rats. Herbal medicines

are gaining more trend of consumption because of declined chances of side effects and for prevention of harmful effects of artificial food additives on human health. Apricot seeds are the rich source of bioactive components and their usage is related to reduction of chronic diseases.¹¹ Present study has revealed that the group of rats who were hyperlipidemic and fed apricot oil found with decreases in total cholesterol and increases in HDL levels. Similarly found by Kopčeková J, et al¹² that average total cholesterol levels in young age volunteers decreased from 4.86 to 4.44 mmol/l after consuming bitter apricot oil seeds for 12 weeks but in contrast to this study, they did not revealed significant increase in HDL levels after consumption of apricot oil seeds. Present study revealed significantly increased HDL levels in the group of rats fed on pumpkin seed oil but rats fed on apricot essential oil found with more significant increases in HDL levels i.e., 39.6 mg/dl from 31.1 mg/dl ($p < 0.01$) Pumpkin seed oil has been reported as the effective for lowering lipid profile and better glycemic control.¹³ Pumpkin seed oil is also rich in unsaturated fatty acids as well as plant sterols, which have numerous cardiovascular benefits.¹⁴ Elsenousy A, et al¹⁵ revealed that administration of pumpkin seed oil resulted in significant decrease in cholesterol, triglyceride and LDL levels in the rats found elevated mentioned parameters and increase in HDL and albumin levels. Therefore, it could be concluded that pumpkin seed oil has hypolipidemic effect in rats fed high-fat diet.

There is need of developing the policies and guidelines regarding diet and nutrition based on a understanding the cultural, geographical, social, as well as economic situation of state, in collaboration with all the stakeholders, at general level and approval from Government with implementation among the community. There is enormous wealth inequity in Pakistan leading the populace to consume unhealthy fast-foods. More scientific work is necessary to study the extent of problem, mainly the role of our present dietary habits as modifiable factor in cardio metabolic

diseases exact to Pakistani people. ¹⁶Therefore, there is a pressing requirement to concentrate on the lack of framework on nutrition for Pakistani population.

CONCLUSION:

Pumpkin seed oil is more effective in decreasing cholesterol levels as compared to apricot oil while apricot oil has more potential of increasing good cholesterol HDL.

CONFLICT OF INTEREST: None

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