Therapeutic effect of flavonoid rich extract of apricots on high-fat diet induced hyperlipidemia in rabbits

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AIM OF THE STUDY

To determine the antihyperlipidemic effect of flavonoid rich extract (FREt) of *Prunus armeniaca* (Apricots) in high-fat diet (HFD) induced hyperlipidemia in rabbits by determining the lipid profile including:

- total cholesterol (TC)
- triglycerides (TG)
- low density lipoprotein (LDL-c)
- high density lipoprotein (HDL-c)
- antiatherogenic index (AAI)
Hyperlipidemia, A Risk factor for Coronary Artery Disease!

- Health organization reports that high blood cholesterol contributes to approximately 56% cases of coronary artery disease worldwide and causes about 4.4 million deaths each year.

- Hyperlipidemia, along with decrease in high-density lipoprotein (HDL-c) is the predictor of coronary artery disease (CAD) and an important risk factor in initiation and progression of atherosclerosis (*Makwana et al.*, 2012).

- Several factors, such as diet high in saturated fats and cholesterol, age, family history, hypertension and lifestyle play a significant role in the onset of CAD (*Dhulasavant et al.*, 2010).
• Therefore, prime consideration in the therapy for hyperlipidemia and arteriosclerosis is to attenuate the elevated blood lipid levels
• To reduce the risk of CAD researchers are focusing mainly on the treatment of hyperlipidemia (Balamurugan & Shantha, 2010)
• Treatments include;
• Diet and life style changes are the first step in treating hyperlipidemia (Lin et al., 2005)
• The known lipid lowering drugs, such as fibrates, statins and bile acid sequestrants have many side effects
• Therefore use of natural agents / herbal medicines, due to their minimal side effects and cost effectiveness is increasing day by day all over the world (Sowmya & Ananthi, 2011)
Prunus armeniaca

- Common name: Apricot
- Family: Rosaceae
- Origin: grows over the five continents of the World
- Rich in minerals, vitamins and a range of bioactive constituents (Jannatezadeh A et al, 2008)
- Also have hepatoprotective effect (Yurk & Celik, 2011)
- Beneficial effects on myocardial ischemia-reperfusion injuries (Parlakpinar et al, 2009)
- Protective effect on intestinal oxidative damages (Vardi et al, 2008)
- Currently its flavonoid extract was investigated for antihyperlipidemic potential in improving CAD in high-fat diet induced hyperlipidemia in rabbits
**METHODOLOGY**

- **Preparation of flavonoid rich extract of Apricots:**

  Fruits of *P. armeniaca* were purchased and grinded to fine powder.

  10 gms grinded powder, repeatedly extracted with 100 ml 80% aqueous methanol.

  Filtered and evaporated into dryness over water bath.

  Brown residue obtained referred as **Flavonoid Rich Extract (FREt)** (Bohm & Kocipai-Abyazan method, 1994)
Animals grouping:

- **Rabbits** (0.5 – 1.5 kg)
  - Control (D.W 1 ml/kg)
  - HFD Control (D.W 1 ml/kg)
  - HFD Positive Control (Simvastatin 20 mg/kg)
- High Fat Diet (HFD) (orally per kg body weight)
- HFD Test
  - FREt (200 mg/kg)
• **Biochemical Parameters:**
  - TC, TG and HDL-c were determined by commercially available kits (Randox, UK)
  - LDL-c and AAI were calculated by formulae;
  - LDL-c (mg/dl) = TC – TG/5 – HDL-c
  - AAI (%) = \[\frac{\text{HDL-c}}{\text{TC} – \text{HDL-c}}\] x 100 (*Vazquez-Freire MJ, et al.*, 1996)

• **Statistical Analysis:**
  - Results expressed as mean ± SD (Standard deviation).
  - Data analyzed by one way ANOVA followed by LSD (least significant difference) test (SPSS, version 17.0). Differences considered significant with \( p < 0.05 \)
RESULTS

- Effect of FREt on lipid profile:

Data: mean ± SD (n=6), * = statistically significant (p<0.05) when compared with HFD control.
**Effect of FREt on antiatherogenic index (AAI):**

Data: mean ± SD (n=6), * = statistically significant (p<0.05) when compared with HFD control
DISCUSSION

• According to the result dose of FREt @ 200 showed a significant decrease in serum TC, TG and LDL-c levels and increase in HDL-c level

• The underlying mechanism of FREt in decreasing cholesterol may be by inhibiting the activity of rate-limiting enzyme of cholesterol metabolism i.e., HMG-CoA reductase (Ahmed, 2011) or by enhancing entero-hepatic circulation of cholesterol (Bahramika et al., 2008)

• Whereas decrease in TG may be by increasing activity of lipase that hydrolyzes TG under normal conditions or increase excretion of TG via feces (Sukla et al., 2004)
• Increase in HDL-c has major role in athero-protective reverse cholesterol transport process involving HDL-c mediated efflux of cholesterol from peripheral tissues to the liver for excretion (Chapman et al., 2010)
• On the other hand, increase in LDL-c transports cholesterol to peripheral tissues or arteries forming atherosclerotic plug (Qureshi SA et al., 2010)
• In the present study increase in HDL-c and decrease in LDL-c was observed in test rabbits indicating that apricot FREt has antiatherogenic effect which is confirmed by calculating AAI
• FREt showed pronounced increase in AAI indicating its cardio-protective effect.
CONCLUSION

• FREt of *P. armeniaca* is a potent antihyperlipidemic and antioxidative agent

• Due to significant effect on lipid profile further research will help in finding most potent dose of *P. armeniaca* as antiatherogenic agent in humans and its most possible mechanism of action in lowering of blood lipids.
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Thank You
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