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Phytochemical and anti hyper lipidemic activity of *Brassica juncea* L.

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SUMMARY

The phytochemical and antihyperlipidemic activity of *Brassica juncea* L. seed showed the presence of tannins, alkaloids, flavonoids, steroids, amino acids, reducing sugar and carbohydrate. In antihyperlpidemic activity, the levels of cholesterol, LDL, VLDL, triglycerides, phospholipids were decreased by the administration of *Brassica juncea*. The level of HDL cholesterol was elevated in hyperlipidemic treated with *Brassica juncea*. The result indicates, the orally administrated was effective and suppressing the high fat diet induced hyperlipidemia.

Key words : LDL, VLDL, Triglycerides, phospholipids and *Brassica juncea* L.

Herbal medicines are comparatively safe and environment friendly than synthetic ones and also very effective, cheaply available supposedly have no side effect and used as alternative to allopathic medicine (Rajesh *et al*., 1979). *Brassica juncea* is a perennial herb, usually grown as an annual or biennial, up to 1m or more tall; branches long, erect or patent; lower leaves petioled, green sometimes with a whitish bloom, ovate to obovate, variously lobed with toothed, scallopad or frilled edges, lyrate-pinnatisect with 1-2 lobes or leaflets on each side and a larger sparsely setose, terminal lobe, upper leaves subentire, short petisled, 30-60 mm long, 2-3.5 mm wide, constricted at intervals, sessile attenuate into a tapering seedless, short beak 5-10 mm long. Mustard greens are high in vitamin A and C and iron. It contains calcium - 60%, water - 91.8 g, protein - 2 .4 g, fat - 0.4 g, fiber-1.0 g, ash-1.1 g, sodium-24 mg, thiamine - 0.06 mg, riboflavin-0.14 mg and niacin-0.8mg (Knowles *et al*., 1981; Maity *et al*., 1980; Collins *et al*., 1994).

Drug therapy for hyperlipidemia, if required, should be viewed as an adjacent to dietary management and other lifestyle changes. These are currently a range of lipid – lowering drug available with a variety of actions. The most common drugs for the treatment of primary hypercholesterolemia are HMGCOA reductase inhibitors and the bile acid sequestrates resins. The most common drugs for the treatment of primary hypercholesterolemia or combined hyperlipidemia are the fibrates or nicotinic acid and its derivatives (Perioff, 1991). Many plants and plant products have been used to solve the problem associated with hyperlipidemia. So in this present study, tried dietary supplement of *B. juncea* L. for reducing the cholesterol which is induced in male albino rats.

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MATERIALS AND METHODS

The seeds of *Brassica juncea* (mustard) were purchased from local market, Thanjavur, Tamilnadu, India. *B. juncea* powder was used for phytochemical and pharmacological analysis. Test for tannins, saponin, alkaloids, flavonoids, steroids, terpenoids, reducing sugar, aminoacid and carbohydrates was carried out in phytochemical studies. Swiss male albino rats (Wt 150 - 200 mg) were used for pharmacological study (Sinha, 1972; Trease and Evans, 1978; Chung, 1995). The animals were divided in to four groups. Group I used as control. Group II acted as experimental control (The animals were fed with 0.5 mg of cholesterol along with the feed for 20 days). Group III animals were treated with aqueous extract of mustard seeds (1 g) and cholesterol feed. Group IV is fed with aqueous extract of mustard seeds. The collected serum used for the determination of cholesterol, LDL – cholesterol, VLDL – cholesterol, HDL – cholesterol, triglycerides and phospholipids were estimated by the method (Kakkar and Dar Viswanathan, 1999; Samman, 2001). All the groups of data were statistically evaluated by using't' test.

RESULTS AND DISCUSSION

The results obtained from the present investigation are presented below:

Phytochemical analysis:

The qualitative analysis of the phytochemical in *Brassica juncea* was made, which is presented in Table 1. Certain active constituents like tannins, saponin, alkaloids, flavonids, steroids, terpenoids, reducing sugar, phenolic

Table 1 : Qualitative analysis of the phytochemical constituents of *Brassica juncea*

Sr. No.	Constituents	*Brassica juncea* L.
1.	Tannins	+
2.	Phlobo tannins	-
3.	Saponin	+
4.	Alkaloids	+
5.	Flavonids	+
6.	Steroids	+
7.	Terpenoids	+
8.	Reducing sugar	+
9.	Anthroquinones	-
10.	Phenolic compounds	+
11.	Amino acids	+
12.	Carbohydrates	+

+ – Presence of constituents
- – Absence of constituents

compounds, amino acids and carbohydrate were present in the *Brassica juncea* L. Phlobotannins and anthroquinones were absent in the plant. Indeed, about 25% of the prescription drugs dispensed in the United States contain at least one active ingredient derived from plant material. It focuses on the phytochemical constituents presenting the crude sample of *Brassica juncea*.

Animal study:

A number of herbal drugs are used to reduce hyperlipidemia, so in the present study, the herbal drugs of *B. juncea* have been used for the reduction of cholesterol. The treatment with aqueous extract of *Brassica juncea* produced significant changes in Group II rats. Increased levels of cholesterol were observed after cholesterol and coconut oil administration. After herbal drug treatment the values were decreased (Table 2).

Table 2: Effect of *Brassica juncea* L. on serum cholesterol

Sr. No.	Group	Description	Cholesterol (mg/dl)
1.	I	Normal rats	75.65 ± 0.01
2.	II	Cholesterol induction	95.06 ± 0.57
3.	III	Coconut oil +	84.75 ± 0.65
4.	IV	*Brassica juncea*	78.65 ± 0.75
		Brassica juncea	

Values expressed as mean ± S.D for 4 animals in each group

Group animals showed alteration in the level of LDL after cholesterol treatment. It was observed that administration of aqueous extract of herbal drug produced significant changes in LDL (Table 3). Group II animals showed alteration in the level of VLDL after cholesterol treatment. It was observed that administration of aqueous extract of herbal drug produced significant changes in VLDL (Table 4).

Table 3 : Effect of *Brassica juncea* L. on serum LDL

Sr. No.	Group	Description	LDL (mg/dl)
1.	I	Normal rats	15.82 ± 0.17
2.	II	Coconut oil induction	27.56 ± 0.65
3.	III	Coconut oil + *Brassica juncea*	20.6 ± 0.17
4.	IV	*Brassica juncea*	18.6 ± 0.65

Values expressed as mean ± S.D for 4 animals in each group

The treatment with aqueous extract of herbal drug increased the level of HDL and decreased the atherosclerotic lesion (Table 5). In group II rats the values of triglycerides levels were increased when compared to group II (Table 6). But treatment with aqueous extract of *B. juncea* for the group III rats slightly decreased the level of triglyceride. The level of phospholipids in serum values were decreased on the treatment with aqueous extract of mustard in normal and experimental animals (Table 7).

Table 4 : Effect of *Brassica juncea* L. on VLDL

Sr. No.	Group	Description	VLDL (mg/dl)
1.	I	Normal rats	13.42 ± 0.53
2.	II	Coconut oil induction	27.56 ± 0.65
3.	III	Coconut oil + *Brassica juncea*	20.6 ± 0.17
4.	IV	*Brassica juncea*	18.6 ± 0.65

Values expressed as mean ± S.D for 4 animals in each group

Table 5 : Effect of *Brassica juncea* L. on serum HDL

Sr. No.	Group	Description	HDL (mg/dl)
1.	I	Normal rats	35.82 ± 1.19
2.	II	Coconut oil induction	28.3 ± 0.65
3.	III	Coconut oil + *Brassica juncea*	33.4 ± 0.75
4.	IV	*Brassica juncea*	36.6 ± 0.34

Values expressed as mean ± S.D for 4 animals in each group

Table 6 : Effect of *Brassica juncea* L. on serum triglycerides

Sr. No.	Group	Description	HDL (mg/dl)
1.	I	Normal rats	70.12 ± 3.56
2.	II	Coconut oil induction	87.16 ± 2.25
3.	III	Coconut oil + *Brassica juncea*	75.6 ± 0.75
4.	IV	*Brassica juncea*	73.6 ± 0.45

Values expressed as mean ± S.D for 4 animals in each group

In hyperlipidemia, increase in plasma cholesterol is generally associated with high LDL. High circulating levels of LDL facilitate the entry of LDL into the artery wall. Further more, oxidation of LDL enhances access to

Table 7 : Effect of *Brassica juncea* L. on serum phospholipids

Sr. No.	Group	Description	Phospholipids (mg/dl)
1.	I	Normal rats	90.65 ± 4.65
2.	II	Coconut oil induction	106.65 ± 5.65
3.	III	Coconut oil + *Brassica juncea*	87.65 ± 0.05
4.	IV	*Brassica juncea*	92.65 ± 0.65

Values expressed as mean ± S.D for 4 animals in each group

arterial wall macrophages resulting in formation of foam cells, LDL cholesterol levels (> 160 mg/dl) indicate high risk. In this study, decrease in HDL level indicated the extent of cardial damage whereas the increase in HDL level exhibited the protective nature of the aqueous extract of *Brassica jancea* which has a positive feed back on its cardio productivity (Cromwell, 2004; Folhott *et al*., 1973). LDL and VLDL are reported to promote TG synthesis. This increase in triglycerides enhances the synthesis of VLDL that is dependent on an increase influx of free fatty acid from peripheral tissues (Clayton, 1998; Fox, 1997).

Serum phospholipids levels in rats showed a significant elevation after cholesterol feeding as compared to normal group. Cholesterol feeding elevates the level of serum and hepatic cholesterol, phospholipids which lead to the development of atherosclerosis and hyperlipidemia (Sarawath, 1979; Leffler and Doughald, 1963). The significant increase of the free fatty acids level in cholesterol fed rats may be due to the breakdown of membranes phospholipids by the action of oxygen derived free radical induced during hyper lipidemia (Scott, 1993; Fruchart, 2001; Park *et al*., 1996). Previous reports showed that administration of Dolichous biflorus extractin HFD rabbit reduced the phospholipids levels. This effect may be due to the increased activities of phospholipase enzyme. In our results, also there is a decrease in the level of phospholipids in Group III rats which may be due to lipases enzymes.

REFERENCES

Chung, R.T. (1995). Complication of chronic liver disease care. *Clin. Microbiol*., **11**: 431.

Clayton, M. (1998). Effect of chronic administration on serum HDL cholesterol in rats. *Pathol. Pharmacol.*, **13**: 563-569.

Collins, R., Peto, R., Baigent, C. and Slight, P. (1994). Aspirin heparin and fibrinolytic therapy in suspected acute myocardial infarction. *New England J. Med.*, **336**: 847-860.

Cromwell, P. (2004). Do the patients we treat with hypolipidemic drugs have coronary risk? *American J. Clin. Butr*., **20**(1): 49-53.

Folhott, K., Folhott, W. and Lund, B. (1973). Health – promoting properties of common herbs. *American J. Clin. Butr*., **46**:105-111.

Fox, A.A. (1997). Management of patient following myocardial infarction medicine. *American J. Clin. Butr*., **25**(11): 68-72.

Fruchart, J. (2001). Peroxisome proliferator activated receptor and high density lipo protein metabolism. *Clin. Chem*., **12** : 24 – 29.

Kakkar, P. and Dar Viswanathan, P.N. (1999). Amoudified spectro photometric assay of superoxide dismutase (SOD). *Indian J. Biochem. Biophy*., 130-132.

Knowles, P.R., Kearney, T.E. and Cohen, D.B. (1981). Species of rapeseed and mustard as oil crops in California. *J. Agri. Microbiol*., **12** : 255-268.

Leffler, P. and Doughald, M.C. (1963). *Encyclopeida of Common Natural Ingredients Used in Food, Drugs and Cosmetics*. John Wiley & Sons, New York. pp. 25-28.

Maity, P.K., Sengupta, A.K. and Jana, P.K. (1980). Response of mustard variety varuna (*Brassica juncea*) to levels of irrigation and nitrogen. *Indian Agricult.,* **24** (1) : 43-47.

Park, K.H., Shin, H.J. and Song, Y.B. (1996). Possible role of ginsenoside Rbl on regulation of rat liver triglycerides. *Biol. Pharm. Bull*., **19**: 1434 – 1439

Perioff, A. (1991). Peroxisome proliferator activated receptor and high density lipo protein metabolism. *American J. Cardiol*., **88**: 24 – 29.

Rajesh, R., Mitchell, J.C. and Rook, A. (1979). Cardio vascular disease mortality in familial forms of hypertriglyceridemia: A 20 year prospective study circulation *J. Clin. Biol*., **101**: 27-77.

Samman, S. (2001). Green tea extract added to foods reduces nonheme – iron absorption. *American J. Clin. Nutr*., **73** (3): 607 – 612.

Sarawath, S. (1979). Herbs and dietary supplements in prevention and treatment of cardiovascular disease prevention. *Cardioli Winter*, **3**: 24-32.

Scott, R. (1993). Improved manual spectrophotometric procedure for determination of serum triglycerides. *Clin. Chem*., **19** : 1077-1078.

Sinha, A.K. (1972). Colorimetric assay of catalase. *Anal. Biochem*., **47**:389-394.

Trease, H.S. and Evans, H.C. (1978). *Text Book of Pharmacognosy*. Nineth Edition, Bailiar Zindall and Co., London. pp. 25-54.

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