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Original Research Article

PREVENTIVE EFFECTS OF FIGS POWDER & GARLIC POWDER IN MALE ALBINO RATS WITH INDUCED DYSLIPIDEMIA

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Abstract: *Dyslipidemia is one of the predisposing factors for the development of cardiovascular diseases due to the formation of atherosclerosis. Statin drugs are commonly used to manage dyslipidemia. However, due to different side effects, drug resistance, and affordability issues now, researchers are working on the different preventive and curative effects of different natural herbs, fruits, etc. This study aimed to evaluate & compare the preventive effects of Ficus Carica & Allium Sativum on serum lipid profile levels in albino rats on induction of dyslipidemia. This experimental study was conducted at the Department of Biochemistry Liaquat University of Medical & Health Sciences (LUMHS) Jamshoro, Pakistan. A total of 24 male albino rats weighing 170-190 grams were purchased from the Ojha campus of DUMHS Karachi Pakistan and caged at the Animal House of Agriculture University Tando Jam Pakistan. Twenty-four male albino rats were divided into four groups; each group contained 6 rats, group A as control group received a normal diet; Group B rats received high fatty diet; Group C rats received high fatty diet along with figs powder; Group D rats received a high fatty diet with garlic powder with the calculated and proper dose for six weeks. After six weeks, orbital capillary blood samples were drawn to estimate lipid profile parameters. Lipid profile performed on Cobas chemical analyzer of Roche Hitachi at Diagnostic & Research Laboratory LUMHS. The Statistical data was analyzed by SPSS version 21 by applying the ANOVA test for significance. The serum cholesterol level was highly observed in group B rats, and the serum cholesterol level was significantly ($P < .001$) low in the group C & D rats compared to group B male albino rats. The serum T.G. level is highly observed in group B rats; T.G.'s level is significantly ($P < .001$) low in the group C & D rats compared to group B male albino rats. The serum LDL level is highly observed in group B rats, with a significant serum LDL level ($P = 0.05$) low in the group C & D rats compared to group B male albino rats. The serum HDL level decline in group B rats serum HDL level was significantly ($P = 0.05$) high in the group C & D rats compared to group B male albino rats. Figs and garlic powder had a significant role in normal levels of different lipid profile parameters. This study concluded that figs powder and garlic powder could perform a preventive role in developing dyslipidemia.*

Keywords: Lipid Profile, Dyslipidemia, Male Albino Rats, Figs (Ficus Carica), Garlic (Allium Sativum)

Introduction

Dyslipidemia is one of the leading causes of cardiovascular disorders worldwide (Thongtang et al., 2022). Dyslipidemia initiates atherosclerosis, commonly leading to angina pectoris or myocardial infarction (Coenen et al., 2021). Dyslipidemia is directly or indirectly involved in the incline mortality ratio due to cardiovascular diseases worldwide. Three dietary habits like more usage of junk foods, lack of vegetables, lack of exercise, improper sleep timings, stress, etc., can lead to dyslipidemia (Ali & Sasidharan, 2022). Different complications can develop due to dyslipidemia, like diabetes mellitus, gall stones, biliary obstruction, fatty liver, cardiac diseases like ischemic heart diseases, etc. (El-Koofy et al., 2022). Statin drugs are commonly used all over the world for the management of dyslipidemia (Alam et al., 2021). However, due to some notable side effects and economic burden, patients of dyslipidemia are now searching for natural products to manage dyslipidemia like in the past decades before 1950 (Jayaraman et al., 2021). Nowadays, researchers are searching on the usage of different natural products like olive oil, garlic, figs, cucumbers, etc. Figs commonly belong to the botanical family, and their

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common botanical name is Ficus carica (Wang et al., 2022).Figs are considered hypolipidemic agents (Siyadatpanah et al., 2022). The anti-dyslipidemic effects of Ficus Carica are due to phenolic compounds like chlorogenic and vanillic acids (Sweidan et al., 2022).These compounds act as antioxidant agents. Garlic is also a natural herb used as medicine for treating diabetes, dyslipidemia, hypertension, and inflammatory conditions,(Ansari and Mahapatra, 2021) even in the management of cancers before the establishment of allopathic drugs. The garlic, known as Allum Sativum, contains important sulfur compounds like allicin and di allyl sulfide, which have antioxidant properties,(Sasi et al., 2021), and these compounds also block the activity of rate-limiting enzymes of cholesterol metabolism (Ezeorba et al., 2022).

The aim & Objective of this study was to evaluate & compare the preventive effects of Ficus Carica & Allium Sativum on serum lipid profile levels in albino rats on induction of dyslipidemia.

Methodology

This experimental study was conducted at the Department of Biochemistry Liaquat University of Medical & Health Sciences (LUMHS) Jamshoro, Pakistan. A total of twenty-four (24) male albino rats were selected for the preventive role of Ficus Carica and Garlic in this study; they were purchased from the Ojha Campus of Dow University of Medical & Health Sciences Karachi, Pakistan, and were kept for proper care at the Animal House of Agriculture University of Tando Jam Pakistan. Male Albino rats with a weight between 170 – 190 grams with normal physiological activities were included in this study, while female albino rats with body weights below 170 grams or above 190 grams, any animal disease with reduced activities, or lethargic rats were excluded from this study. A total of 24 male albino rats were divided into four groups; each group contained six male albino rats. Group A labeled as a control group in which only a normal diet was given to male albino rats, and group B in which normal diet along with a fatty diet with a calculated dose of 3ml/kg/day with the proportion of 3:1 of two fatty ingredients that were Banaspati ghee and coconut oil for 6 weeks; group C albino rats were given same fatty diet as group B with same dose and calculation along with 400 mg/kg of ficus carica (figs) powder; while group D male albino rats were given same normal and fatty induced diet as group B along with 400mg/kg of allium sativum (Garlic Powder) for six weeks. After six weeks, the retro-orbital blood sample with fasting of 10 -12 hours was drawn with the help of a capillary tube from the ocular plexus of every male albino rat. After the collection of samples, it was centrifuged for 15 to 20 minutes to separate the serum then the serum of each albino rat was preserved at -150C to -200C until the analysis from the Diagnostic & Research Laboratory LUMHS. The levels of lipid profile (serum cholesterol, serum triglycerides, serum HDL & serum LDL) were obtained by Cobas chemical analyzer of Roche Hitachi Company at LUMHS. Serum cholesterol levels were estimated by the cholesterol esterase method. Serum Triglyceride levels were estimated by hydrolysis of lipoprotein lipase, known as the calorimetric enzymatic method. The HDL and LDL levels also were estimated by the enzymatic calorimetric method. The statistical data was analyzed by SPSS version 21.0 by applying the ANOVA test to measure the significance between all groups under study.

Results

A total of 24 male albino rats were selected and divided into four groups, as mentioned earlier; Group A, B, C, D. Table No: 01 shows the mean serum cholesterol, T.G.'s, LDL & HDL levels in all four groups after the six weeks of experimental study. The results show that there was a highly significant ($P < .001$) control in serum cholesterol level and serum T.G.'s levels in group C and group D albino rats as compared to group B. There was also significant ($P = .05$) control in the level of LDL in groups C & D compared to group B. The HDL levels significantly ($P = .05$) were more boosted in groups C & D. This study also gives one important result: garlic powder has more potential preventive or reducing effects on serum cholesterol, T.G.'s, and LDL than figs powder

Table 1: Comparison of Lipid Profile Parameters in all Study Groups of Albino Male Rats

Parameter	Group A	Group B	Group C	Group D	P Value
Serum Cholesterol (mg/dl)	114 **± 7**	303 ±6	225 ±8	194±11	0.001
Serum T.G.'s (mg/dl)	153 ± 18	389 ± 10	274±16	239±19	0.001
Serum LDL (mg/dl)	96 ± 12	203 ± 6	177 ± 14	153 ± 15	0.05
Serum HDL (mg/dl)	37 ± 2	23 ± 2	35 ± 3	40 ± 1	0.05

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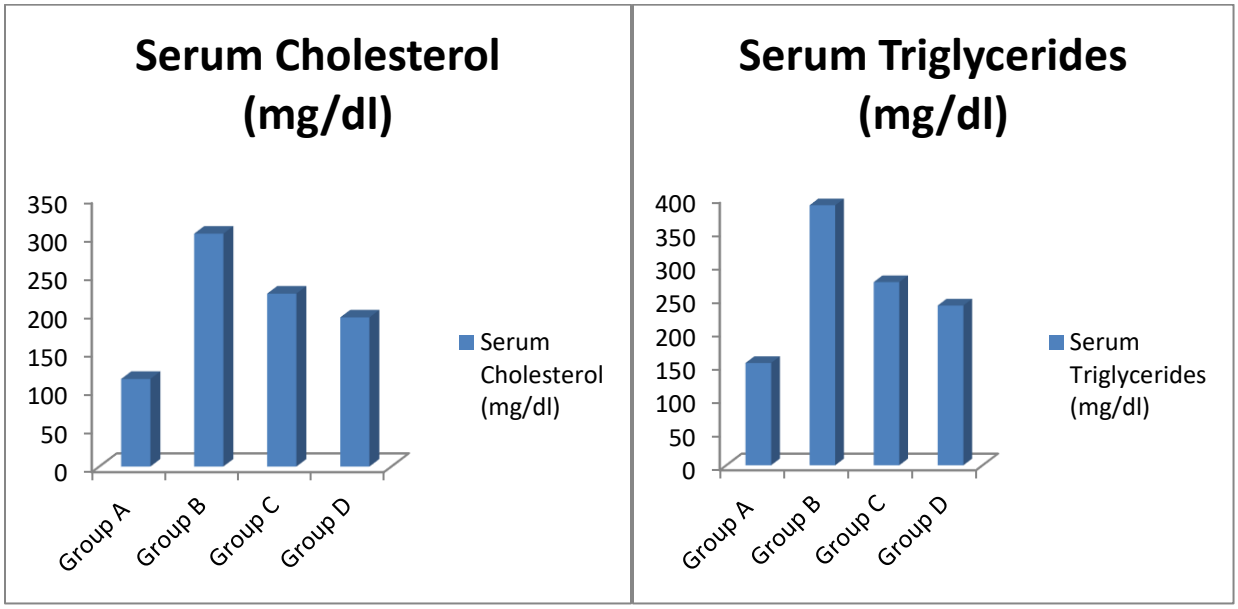

Figure 1: Graphical Presentation of Serum Cholesterol & T.G.'s Level

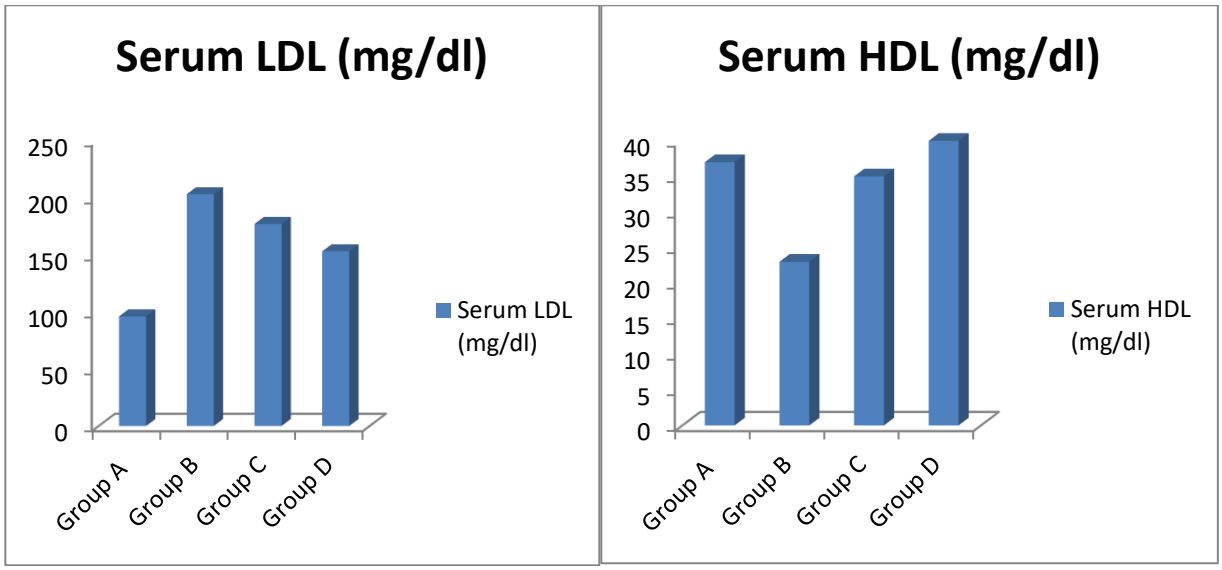

Figure 2: Graphical Presentation of Serum LDL & Serum HDL levels in all Groups

This experiment finally resulted in the preventive role of fig powder and garlic powder in reducing all health-hazardous lipid profile parameters. This study needs a large-scale sample size with multiple alterations in dose and period to observe and confirm the proper results**.**

Discussion

Dyslipidemia is one of the strong predisposing factors for developing cardiovascular disorders (Coenen et al., 2021). Cardiovascular disorders are the leading cause of mortality and morbidity worldwide.
Basically, disturbance in the ratio of LDL and HDL lipoproteins and elevated cholesterol and triglyceride levels is considered dyslipidemia (Nigatie et al., 2022). Dyslipidemia causes the development of atheroma in the large vessels, leading to the formation of cholesterol plaques known as atherosclerosis (Hasheminasabgorji and Jha, 2021). Atherosclerosis then leads to different cardiovascular disorders like angina pectoris, myocardial infarctions, cardiac arrest, cardiac failure, etc (Mir et al., 2021). Allopathic therapies for treating and managing dyslipidemia commonly practice worldwide, especially statin drugs. Due to side effects like (muscular cramps, generalized weakness, G.I.T

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disturbances),(Golder et al., 2021) drug resistance, and economic problems, many patients with dyslipidemia avoid or discontinue statin therapy. In natural medicine, different herbs, vegetables, and fruits have been discovered to manage different diseases like hypertension, diabetes mellitus, dyslipidemia, cancers, skin disorders, respiratory infections, etc (Saad et al., 2022). Now, developed as well in developing countries of the world use the different natural herbs, fruits in different forms (like powder form oil form, etc.) for the management and treatment of this clinical disorder with different dosage either proper or improper dosage (Saad et al., 2022).The fig, ficus carica, is a common fruit used worldwide. The Ficus carica contains essential elements like carbohydrates, proteins, vitamins, macro minerals, micro minerals, and phenolic compounds.[19] The phenolic compounds of ficus carica like "chlorogenic acid, vanillic acid, gallic acid, dihydro benzoic acid, luteolin-3,7-di-O-glucoside, luteolin 7-glucoside, quercetin 3-o-rutinoside, apigenin 8-c-glucoside" these compounds act as the antioxidant agent (Walia et al., 2022). These phenolic compounds also play an important role in regulating lipid metabolism and cholesterol synthesis, so figs act as anti-dyslipidemic agents (Russo et al., 2014).

Garlic (Allium Sativum) is one of the natural plants or herbs used for treating hypercholesterolemia for many centuries (Arafat et al., 2021). In the Roman Empire, garlic consider a drug of choice for cardiac problems and skin problems (Elkordy et al., 2021). The Garlic contains different sulfur-containing compounds like "Allicin, S-Allyl cysteine, S-Allyl cysteine Dipoxide, Diallyl disulfide, Dipropyl Disulfide, Diallyl Trisulfide" (Shang et al., 2019). These compounds act as antioxidant agents. Allicin and S-allyl cysteine are the main compounds that act on the regulatory enzyme of cholesterol synthesis, which is why garlic plays an important role in treating dyslipidemia (Ruiz León et al., 2021).

Our study shows that when we gave the figs powder and garlic powder with calculated dose in induced dyslipidemic albino male rats, these natural products significant ease the level of lipid profile parameters like cholesterol, T.G.'s, and LDL as compared to other rats, which were not given figs or garlic powder. Our study, supported by Irudayaraj et al. (2017) (Stephen Irudayaraj et al., 2017), reported that ficus carica had anti-diabetic and anti-dyslipidemic agents. Abdel Baki et al., 2020 (Abdel-Baky and Abdel-Rahman, 2020) and Sukowati YK et al., 2019 (Sukowati et al., 2019) also strengthened our study and reported that garlic powder or extract potentially normalizes lipid profile levels. Our study, contradictory to Miao Q et al., 2020 (Miao et al., 2020) reported that garlic did not affect the lipid profile, but he exited the sulfur compound from its preparation of garlic extract.

There is a need for an experimental study with a large sample size to evaluate the effects of these natural ingredients with different doses and their solitary and combined effects on lipid profiles.

Conclusion

This study concluded that figs powder and garlic powder could perform a preventive role in developing dyslipidemia.

Conflict of interest

The authors declared an absence of conflict of interest.

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