

**Effect of Kalajira on Lipid Profile in Normal & Hypercholesterolemic Rats**Shahin Ara<sup>1</sup>, Md. Anwar Habib<sup>2</sup>, MU Rashid<sup>3</sup>

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**Abstract**

Effect of crude kalajira (*nigella sativa* linn) on lipid profile in normal & hypercholesterolemic rats were studied. The experiment was carried out on 24 adult rats divided into two i.e., normal & hypercholesterolemic groups. The results were compared to their respective controls. Administration of crude kalajira powder at a dose of 6 mg/kg/day orally for 21 days in normal rats has showed significant ( $p < 0.01$ ) reduction of total cholesterol & serum triglyceride significantly ( $P < 0.01$ ). Rats were made hypercholesterolemic by administration of fatty diet that produced significant increase in total cholesterol, triglyceride & LDL-cholesterol ( $P < 0.001$ ) whereas there was no change in HDL-cholesterol level. Administration of crude kalajira powder in hypercholesterolemic rats at a same dose and duration decreased serum total cholesterol, triglyceride & LDL-cholesterol significantly ( $P < 0.001$ ). Serum HDL-cholesterol level was unchanged. From this study, it reveals that kalajira may have lipid lowering effect both in normal & hypercholesterolemic rats.

**Key words :** Kalajira, Lipid profile, Hypercholesterolemic rats.

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**Introduction**

Kalajira (*nigella sativa* linn) seeds are endogenous herbal product of South-East Asia. It is used as condiment & culinary purposes. This spicy plant is belonging to the family Ranunculaceae. It grows abundantly & is available throughout the year in Bangladesh. There is popular belief that kalajira might improve debilitating condition & improve lactation following delivery. In our country, it is also used by some people as a lipid lowering agent. Till today, several studies have been carried out regarding different aspects of its effects. Roy et al studied the antibacterial activity of a mixture of garlic & kalajira in the treatment of urinary tract infection.<sup>1</sup> Nazma studied the antibacterial effects of kalajira.<sup>2</sup> An immunopotentiating role of kalajira in human was studied by Elkadi & Kandil.<sup>3</sup> Kumar et al investigated the effects of lapotab forte, a new polypharmaceutical herbal formulation on the progression of atherosclerosis in cholesterol fed rabbits.<sup>4</sup> Lapotab forte contains three herbal ingredients, kalajira is one of them. This medicine was advocated for the treatment of hyperlipidemia in the unani system of medicine. Saha also studied

the lipid lowering effects of kalajira on serum lipid profile in rats.<sup>5</sup>

Hypercholesterolemia is a metabolic disorder which predisposes atherosclerosis. Complication of atherosclerosis such as myocardial infarction, stroke & peripheral vascular diseases are responsible for 50% deaths in USA.<sup>6</sup> Once atherosclerosis is developed following hypercholesterolemia, it is very difficult to revert back to normal. So treatment as well as prevention of atherosclerosis is very important.

Several modern drugs are available for the treatment of hypercholesterolemia. Most of these drugs are very costly and have many adverse effects. Therefore safe, cheap, easily available and less toxic hypolipidemic agents have been investigated. Many natural agents like onion<sup>7</sup>, garlic<sup>8</sup>, Indian pulses<sup>9</sup>, karela<sup>10,11</sup> & kalajira<sup>4</sup> have been studied for their hypolipidemic effect. They are not only cheaper but also lack of many adverse effects. In this context, the protocol of this study is designed to re-establish the lipid lowering effect of cheap and easily available herbal product kalajira.

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## Materials & Methods

### Preparation of powder:

Dried kalajira seeds were collected from the local market of Rajshahi in the month of May, 2005. Samples got identified from the Department of Botany, Rajshahi University. After removing extraneous matter kalajira were washed and dried in an oven for 4-5 days at 45°C and then crushed into fine powder by electric grinder.

### Animal experiment:

A total number of 24 adult male Long Evans Norwegian rats weighing 200-250 grams of 2-3 months old were purchased from animal house of International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B). Prior to the commencement of the experiment, all the rats were acclimatized to the new environmental condition for a period of one week. During the experimental period, the rats were kept in a well-ventilated animal house at room temperature of  $23 \pm 2^\circ\text{C}$ , maintaining relative humidity 50-60% and were fed with standard pellets supplied from ICDDR,B & fresh drinking water ad libitum. They were kept in cages maintained in well ventilated room under condition of natural light and dark schedule.

### Induction of hypercholesterolemia:

The rats were randomly divided into group I & II, each containing 12 rats. Group I & II were categorized as normal & hypercholesterolemic respectively. All the rats of group II were rendered hypercholesterolemic by administering fatty diet containing 10 gm cholesterol plus 2.5 gm cholic acid dissolved in 100 ml of vegetable oil (dalda).<sup>12</sup> This mixture was made homogeneous by heat. This diet when fed to the rats provided 0.15 gm cholesterol which was equivalent to 0.25% cholic acid.

### Study design:

Group I rats were again divided into group Ia & group Ib, each containing 6 rats. Group Ia served as normal control while group Ib was treated with crude kalajira at a dose of 6 mg /kg/d orally for 21 days. On the other hand, group II rats were similarly divided into two (IIa & IIb) each containing 6 rats. Group IIa served as

hypercholesterolemic control while group IIb was treated with crude kalajira with a same dose for 21 days. On the 22nd day, blood were collected from all the rats from external jugular vein after fasted overnight under mild chloroform anesthesia for estimation of lipid profile. Estimation of total cholesterol(TC), triglyceride(TG) & serum HDL-cholesterol(HDL-chol) was made by enzymatic colorimetric method. The LDL-cholesterol (LDL-chol) was calculated indirectly by Friedewald equation.<sup>13</sup> The significance of difference between two groups were calculated by using unpaired student's "t" test.

## Result

Table I shows the total result. Treatment of normal rats with crude kalajira showed significant reduction of TC( $P<0.01$ ) & TG( $P<0.01$ ) level. There was insignificant reduction of HDL & LDL-chol. Administration of fatty diet increased serum TC, TG & LDL-chol level significantly ( $P<0.001$ ) when compared to control and there was no change in serum HDL-chol level. Treatment with kalajira powder to fat fed rats showed highly significant reduction of serum TC, TG & LDL-chol( $P<0.001$ ) except HDL-chol which remain unchanged.

**Table I: Effect of crude kalajira on lipid profile in normal and hypercholesterolemic rats.**

Groups	Lipid Profile				
	TG (mmol/L)	TC (mmol/L)	LDL (mmol/L)	HDL (mmol/L)	
I	I <sub>a</sub> (Control)	0.97±0.01	1.95±0.08	0.90±0.50	0.90±0.03
	I <sub>b</sub> (Kalajira treated)	0.67±0.07*	1.55±0.02*	0.88±0.02	0.88±0.02
II	II <sub>a</sub> (Control)	2.05±0.02 #	4.55±0.03 #	4.55±0.03 #	0.95±0.03
	II <sub>b</sub> (Kalajira treated)	0.72±0.04**	1.84±0.05**	1.24±0.08**	.93±0.02

# - Significantly different from normal control group

\* - Significant ( $P<0.01$ )

\*\* - Highly significant ( $P<0.001$ )

## Discussion

Nowadays researchers are engaged to explore the hypolipidemic compounds from natural sources, though statins and fibrates are the conventional drugs used to control this disease. This study has been designed to observe the effect of kalajira on lipid profile in normal and hypercholesterolemic

rats. Results of the study showed that kalajira has significant lipid lowering effect in normal as well as in hypercholesterolemic rats. These findings are in partial agreement with other study.<sup>4</sup> HDL-chol level remained unchanged in our study but earlier study showed significant rise of HDL-chol level. Thus overall findings suggest that taking of kalajira in diet regularly in certain amount may lower lipid level or prevent the rising of lipid level or keep the lipid level in normal condition. Though no such study on normal human volunteers have yet been done. Further studies are hereby needed to confirm its hypolipidemic effect in normal human volunteers.

We could not investigate the mechanism of hypolipidemic effect of kalajira. But, hypothesis suggest that kalajira contain saponin which increases the faecal excretion of bile acid & cholesterol.<sup>14</sup> Further studies are therefore needed to find out the active fractions responsible for hypolipidemic effect to establish its exact mechanism of action.

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