

CONSUMPTION OF HYPERLIPIDEMIC DIET AND WATER INTAKE IN ALBINO RATS TREATED WITH *ECLIPTA ALBA* – ORIGINAL RESEARCH PAPERSATHEESH NAIK¹, RAMANATH B², BHEEMSHETTY S PATIL³, SADHU LOKANADHAM^{4*}

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ABSTRACT

Objective: A high-fat (HF) diet described as higher calories generating from fat instead of carbohydrate or protein. HF usually diets a typical low-carbohydrate diet.

Methods: Thirty adult Albino rats of Wistar strain accurately weighing between 165 and 215 g utilized for the present the study. As per CPCSEA guidelines, the protocol was approved by the institutional animal ethical committee no. BMCH/IAEC/01 Anat/2015 dated June 4, 2015. Animals were maintained and fed with standard rat chow, HF diet, and clean drinking water *ad libitum*, commercially available and manufactured by the National Institute of Nutrition, Hyderabad.

Results: Rate of food consumption increased in rats fed with the HF diet for 8 weeks and decreased significantly in rats treated with *Eclipta alba* for 1, 2, and 3 weeks progressively compared to control group. Water intake increased in the rats fed with an HF diet (43±2.1) compared to rats fed with a normal diet, decreased significantly in the rats treated with *E. alba* (31±1.4) compared to the HF diet-fed animals.

Conclusion: The rate of food consumption increased in rats fed with the HF diet for 8 weeks and decreased significantly in rats treated with *E. alba* for 1, 2, and 3 weeks progressively compared to control group. Water intake increased in the rats fed with an HF diet compared to rats fed with a normal diet, decreased significantly in the rats treated with *E. alba* compared to the HF diet-fed animals.

Keywords: Albino rats, *Eclipta alba*, Hyperlipidemic diet.

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INTRODUCTION

Eclipta alba (L.) belongs to *Asteraceae* family and commonly called as a false daisy in English, bhringoraj or *bhringraj* in Bangladesh and India and 43 considered as a weed with significant use in ethnomedicine. It was known in the three primary forms of medicine in the India Ayurveda, Unani, and Siddha, as bhringoraj, *bhangra*, and karissalaankanni. The Ayurvedic Pharmacopoeia of India considered the *E. alba* as a plant with higher hepatoprotective properties [1,2]. The plant and part of it used for the treatment of a variety of diseases by folk and tribal medicinal practitioners in India reported in ethnomedicine. The primary uses are limited to the treatment of gastrointestinal disorders, respiratory disorders, loss of hair, hyperthermia, and hair greying, diseases of the liver, cuts and wounds, and spleen enlargement [3,4].

A high-fat (HF) diet described as higher calories generating from fat instead of carbohydrate or protein. HF diet usually diets a typical low-carbohydrate diet [5,6].

METHODS

Thirty adult Albino rats of Wistar strain accurately weighing between 165 and 215 g utilized for the present the study. All the rats acquired from the animal house of the Basaveshwara Medical College and Hospital, Chitradurga. As per CPCSEA guidelines, the protocol was approved by the institutional animal ethical committee no. BMCH/IAEC/01 Anat/2015 dated June 4, 2015. Under the controlled environmental conditions (12 h light/dark cycle and room temperature (22–24°C), humidity (50±5%) animals were maintained and fed

with standard rat chow, HF diet, and clean drinking water *ad libitum*, commercially available and manufactured by the National Institute of Nutrition, Hyderabad. The rats divided into five groups each consist of six animals (Table 1).

Animal diets

Rats pellet chow and HF diet obtained from the National Institute of Nutrition, Hyderabad (Tables 2 and 3).

RESULTS

The food consumption calculated daily through deducting the amount of food leftover in each cage per rat (g/rat/day) given on the previous day. The rate of water intake calculated on the final week of the experiment by deducting the amount of water leftover in each cage from the measured amount of water given on the previous day. Rate of food consumption increased in rats fed with the HF diet for 8 weeks and decreased significantly in rats treated with *E. alba* for 1, 2, and 3 weeks progressively compared to control group (Table 4 and Graph 1).

Water intake increased in the rats fed with an HF diet (43±2.1) compared to rats fed with a normal diet, decreased significantly in the rats treated with *E. alba* (31±1.4) compared to the HF diet-fed animals (Table 5 and Graph 2).

DISCUSSION

In rats fed with the HF diet, there is an increase in food consumption and body weight significantly. Postprandial glycemia is more in high-calorie group than in the low-calorie group indicates that diet rich in

Table 1: Animals grouping

S. No.	Group	Animals treated
1	Group-I	Animals fed with normal diet (control)
2	Group-II	Animals fed with the HF diet for 8 week
3	Group-III	Animals fed with the HF diet for 8 weeks followed by 1-week post-treatment of <i>E. alba</i> with Normal diet
4	Group-IV	Animals fed with the HF diet for 8 weeks, followed by 2-week post-treatment of <i>E. alba</i> with Normal diet
5	Group-V	Animals fed with the HF diet for 8 weeks, followed by 3-week post-treatment of <i>E. alba</i> with Normal diet

E. alba: *Eclipta alba*, HF: High fat

Table 2: Normal diet

Ingredients	(G/100 g)
Casein 20	20
Methionine	0.3
Starch	15
Sucrose	30
Cellulose	15.5
Groundnut oil	3.5
Beef tallow	0
Moisture	10
Vitamins	2.5
Minerals	3.2
Energy density	292 Kcal/100g

Table 3: High fat diet (hyperlipidemic)

Ingredients	G/kg (%)
Carbohydrates	520
Protein	180
Fats	300
Sodium chloride	2
Multivitamins	1

Table 4: Effect of the HF diet and *E. alba* on food consumption on the final week of the experiment in control and experimental groups

S. No	Group	No. of animals	Mean + SD (g/rat/day)
1	Animals fed with normal diet	6	24.06±1.34
2	Animals fed with HF diet for 8 weeks	6	10.94±0.44
3	Animals fed with HF diet for 8 weeks+1 week treatment of <i>E. alba</i> with normal diet	6	10.68±0.56
4	Animals fed with HF diet for 8 weeks+2 weeks treatment of <i>E. alba</i> with normal diet	6	10.59±2.97
5	Animals fed with HF diet for 8 weeks+3 weeks treatment of <i>E. alba</i> with normal diet	6	10.43±2.08

E. alba: *Eclipta alba*, HF: High fat, Values expressed as mean±SD (n = 6)

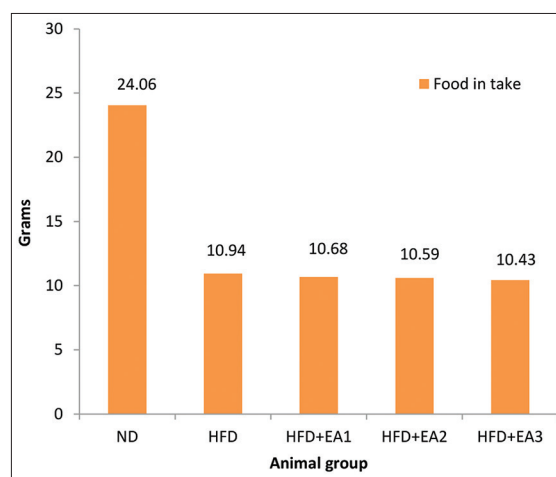
carbohydrate and fat is accountable for the progress of peculiarities of metabolic syndrome.

The rats fed with the HF diet ingested a small quantity of food than the controls; in contrast to the hypothesis with an HF content promotes hyperphagia in rodents [7]. The energy density of the HF diet more than the energy density of the control diet and two groups consumed

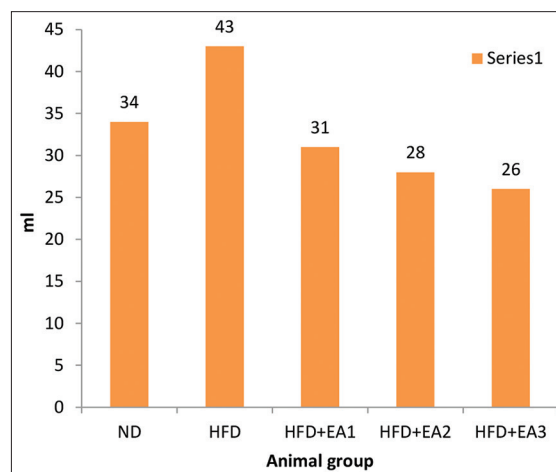
Table 5: Effect of water intake on the final week of the experiment in control and experimental groups

S. No.	Group	No. of animals	Mean + SD (g/rat/day)
1	Animals fed with normal diet	6	34±1.94
2	Animals fed with HF diet for 8 weeks	6	43±2.12
3	Animals fed with HF diet for 8 weeks+1 week treatment of <i>E. alba</i> with normal diet	6	31±1.43
4	Animals fed with HF diet for 8 weeks+2 weeks treatment of <i>E. alba</i> with normal diet	6	28±0.88
5	Animals fed with HF diet for 8 weeks+3 weeks treatment of <i>E. alba</i> with normal diet	6	26±0.56

HF: High fat, *E. alba*: *Eclipta alba*



Graph 1: Food consumption increased in animals fed with an high fat diet, compared to animals treated with *Eclipta alba*



Graph 2: Water intake increased in animals fed with an high fat diet, compared to animals fed with normal diet and *Eclipta alba* treated groups

the same amount of calories. The present results agree with previous literature observed a reduction of food consumption in HF diet-fed animals compared to control [8].

In most of the rats, long-term consumption (a minimum of 2 weeks) of HF diet leads to hyperglycemia and the fat utilized in the HF diet does not influence the insulin resistance [9].

During the first 2 weeks, both the rats receiving HF diet and AIN-93 diet have distinct weight gain whereas marked weight gain started in the 3rd week [10]. We observed more weight gain in the rats fed with HF diet about 6 weeks, than rats fed with a normal diet [11]. The similar result obtained after treating with *E. alba* for 24 weeks in HF diet-fed animals [12].

In 10% and 20% of rats, long-term administration of hyperlipidemic diet induces weight gain when compared to control animals. The induction of hyperlipidemia at a young age through an HF diet for several weeks is more effective, and weight gain gradually increases from 2 to 4 weeks. Rats fed with HF diet for 6 weeks maintain metabolic homeostasis when they start to develop hyperlipidemia [10].

The control rats (14% lipids) and HF diets (35% lipids) and HF isocaloric diet for 11 weeks treatment noticed increased body fat, glucose intolerance, and serum insulin elevation in the groups receiving HF diet. The presence of more amount of fat in the food, even with low-calorie content causes increased adipose tissue and hyperlipidemia, leads to resistance of insulin on a long-term administration [13].

CONCLUSION

The food intake in HF diet-fed animals increased when compared to normal diet-fed animals; whereas consumption of food in *E. alba* treated animals decreased than HF diet-fed groups. In the rats fed with a HF diet, water intake was increased compared to the normal diet-fed rats and significantly reduced in the *E. alba* treated rats compared to the HF diet-fed animals.

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CONFLICTS OF INTEREST

Nil.

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