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Original Article

Evaluation of anti-obesity activity of *Centratherum anthelminticum* in obese rats

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ABSTRACT: The effect of Ethanolic extracts of *Centratherum anthelminticum* on adiposity index serum levels of liver enzyme in obese rats investigated. twenty mature (180-210gm body weight) Swiss albino rats either sex randomly distributed into 5 equal groups.group1 was fed on basal diet and kept negative control, while the other 4 group were fed on HFD for 6 week to induce obesity .there after group2 as normal control while group 3,4,5, were orally given ethanolic extract of *Centratherum anthelminticum* at 0.25gm, 0.50gm, 0.75gm / kg b.w/ respectively once daily for 4 week at the end of feeding period final body weight of rats was recorded and the adiposity index was calculated. Feeding of male rats on high fat diet (HFD) for 6 weeks significantly ($P<0.05$) increased the final body weight, fat weight, and adiposity index as compared to negative control rats fed on basal diet oral administration of CAEt at doses 0.25 gm, 0.50 gm, and 0.75 gm/kg obese rats for 4 weeks caused significant ($P<0.05$) decreases in the final body weight, fat weight, and adiposity index compared to normal control /rats in a dose dependent manner.

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INTRODUCTION

Maintaining energy homeostasis is fundamental for survival; however, obesity is due to over-nutrition and increasing worldwide public health problem [1,2]. The world health organization recognized the obesity epidemic as one of the top 10 global health problems in developed countries. It is estimate that 5% of total health costs are related to obesity [3,4] and is often considered problem of the belly rather than of the brain.

Epidemiological studies from India suggest a risk in morbid obesity close to 5% [5]. Obesity is the excess accumulation of fat in the body and an imbalance in energy intake and energy expenditure, which is the most common nutritional disorder in the developed world and is considered of the major human diseases. Various factory may lead to obesity, such as sedentary life style, increased intake of high calorie (energy and fat) food, genetic determinants and psycho logic and behavioral determinants [5].

Phytolacca Americana L.C phytolacca berry is a common perennial native plant found in northern and central north America. It is widely used to treat obesity due to its appetite suppressant activity and hypocholesterolinic and excess body weight reducing properties [6].

MATERIAL AND METHOD

Plant materials collection

The fresh seeds of *Centratherum anthelminticum* (Wild) *Kuntze*; Family;Asteaceae were obtained from the commercial sources and identified and authenticated by Dr. Rakesh Kumar Tewari, Professor & Head, Department of Dravyaguna Bundelkhand Government Ayurvedic College & Hospital, Jhansi (U.P.), India sample was submitted in the museum (sample no.001A).

Drug and chemical

Preparation of extract

All the chemicals used were of analytical grade. Standard kit of RIA serum insulin level, GOD-POD kit serum glucose level, other biochemical kits were obtained from was obtained from Anmol pharma Jaipur (Rajasthan)

The dried seed were grinded and 500 gm of seed powder was soaked in ethanol (2L; 95%) for overnight at room temperature. Then filtered through Whatmann No.42 (125mm) filter paper twice and concentrated at 40^{o}C till dryness in a rotary vacuum evaporator. Finally obtained brown residue termed as ethanolic seed (extract ESEt) that was stored in refrigerator below 10^{0}until used [7]**.**

Experimental animals

Healthy Swiss albino rats weighing about (180-250gm) of either sex were obtained from animal house, Institute of Pharmacy, Bundelkhand university, Jhansi. The animals were housed in specific standard laboratory conditions. The conditions were kept in a temperature-controlled environment(25±2^{o}C) and with a regular 12h light/12hr dark cycle. All animals were fed with commercial diet and water during experiment. All protocols of the study were approved by Institutional Animal Ethical Committee with reference number BU/PHARM/IAEC/12/O42. The IAEC is approved by committee for the purpose of control and supervision of experiments of animals(CPCSEA) with registration number 716/02/a/CPCSEA.

Experiment and Group of Rats

The experiment was carried out on twenty mature (180-210gm body weight) Swiss albino rats either sex randomly distributed into 5 equal groups. Group1 was fed on basal diet and kept negative control, while the other 4 group were fed on HFD for 6 week to induce obesity .there after group2 as normal control while group 3,4,5, were orally given ethanolic extract of *Centratherum anthelminticum* at 0.25gm, 0.50gm, 0.75gm / kg bw/ respectively once daily for 4 week at the end of feeding period final body weight of rats was recorded and the adiposity index was calculated by dividing the total weight of mesenteric, visceral, epididymal and retroperitoneal adipose tissue by the body weight and multiplied by 100ie (Ad,I= fat weight /body weight×100)[8]. rats blood samples were collected from tail veins blood was left to clot and centrifuged at 3000 rpm for 15 min and 4^{o}C for separating the serum which was frozen and stored at 18^{o}C until biochemical analysis.

Induction of obesity

Obesity and acute hyperlipidemia was induced by feeding rats on high fat diet HFD which supplies 45% calories from fat (lard) for 6 weeks[8, 9]. while normal basal diet supplies 11% calories from fat (Corn oil). this model of obesity closely resembles the reality of obesity in humans.

STATISTICAL ANALYSIS

Results were presented as mean SEM. Statistical differences between the means of the various groups were evaluated using one-way analysis of variance followed by Tukey's multiple parametric tests. Data were considered statistically significant at P value ≤ 0.05 and highly significant at P 0.001. Statistical analysis was performed using Sigma stat statistical software (Ver.2.03).

RESULTS AND DISCUSSION

Feeding of male rats on high fat diet (HFD) for 6 weeks significantly (*P<0.05*) increased the final body weight, fat weight, and adiposity index as compared to negative control rats fed on basal diet oral administration of CAEt at doses 0.25 gm, 0.50 gm, and 0.75 gm/kg obese rats for 4 weeks caused significant (*P<0.05*) decreases in the final body weight, fat weight, and adiposity index compared to normal control /rats in a dose dependent manner as shown (table 1).

The result showed that rats fed on high fed –diet (HFD) for 6 weeks had significant (*P<0.05*) increases. In serum level of liver enzyme AST, ALT, and GGT when compared with negative control. Rats fed on basal diet oral administration of CAEt at doses 0.25 gm, 0.50 gm, and 0.75 gm/kg obese rats for 4 weeks reduction of the elevated serum level of the elevated serum levels of AST,ALTand GGT enzymes when compared to the normal control group, in a dose dependent fashion, as recorded in table 2.

Table 1: Effect of ethanolic extract of *Centratherum anthelminticum* on final body weight, fat weight and adiposity index in obese rats

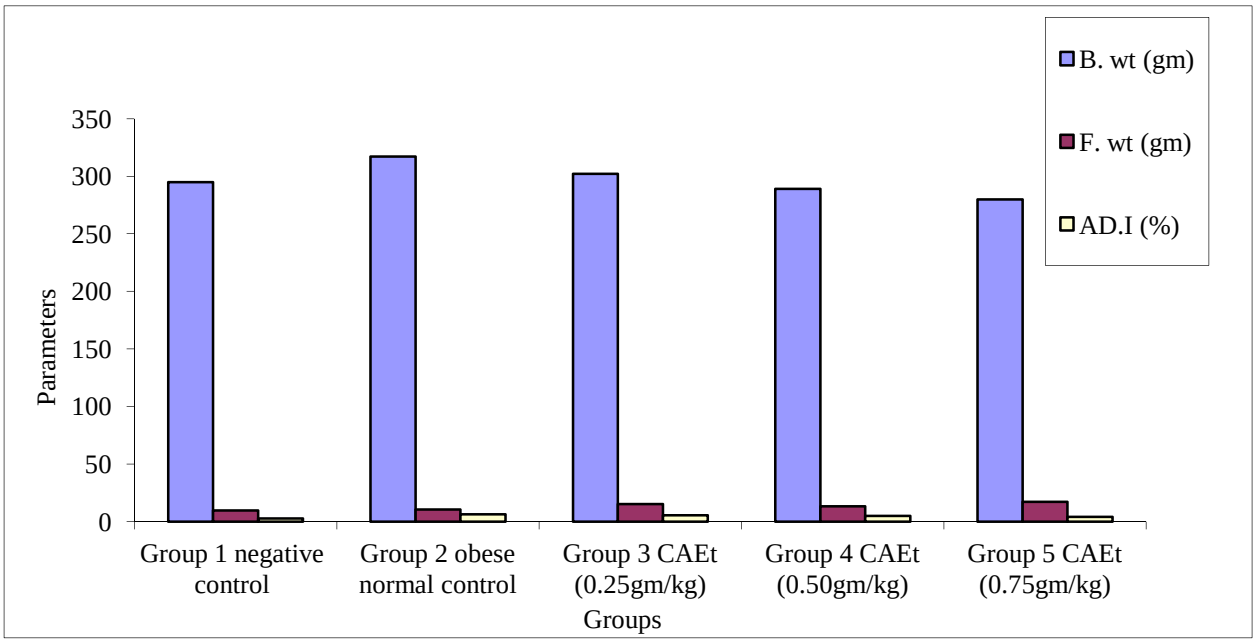
Parameter group	B. wt (gm)	F. wt (gm)	AD.I (%)
Group 1 negative control	295±14.0^{c}	9.65±0.13^{c}	2.70±0.17^{c}
Group 2 obese normal control	317±18.0^{a}	17.18±0.32^{a}	6.28±0.19^{a}
Group 3 CAEt (0.25gm/kg)	302±11.0^{c}	15.21±0.36^{b}	5.38±0.26^{b}
Group 4 CAEt (0.50gm/kg)	289±14.0^{b}	13.21±0.19^{b}	4.92±0.18^{b}
Group 5 CAEt (0.75gm/kg)	280±13.0^{b}	10.54±0.21^{b}	4.13±0.18^{b}

Mean ± SE with different letter super scripts in the same column are significant at *P<0.05* using one way Anova test n= 4 rats/group

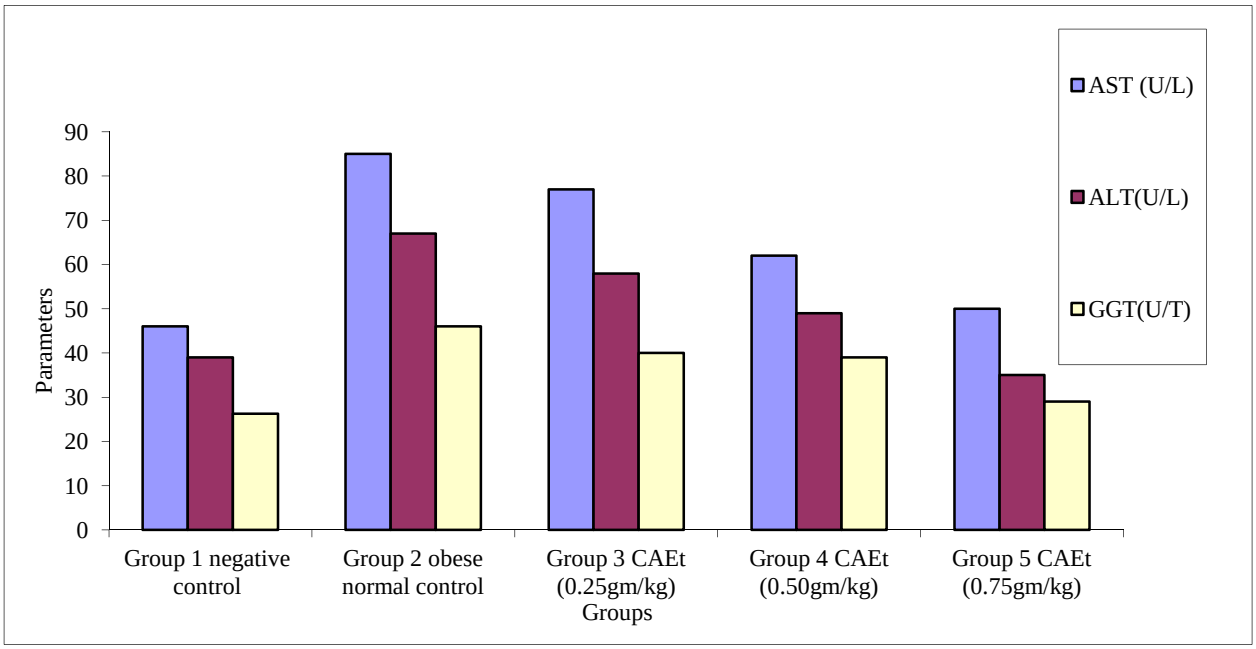
Table 2: Effect of CAEt on serum level of aspartate aminotransferage, alanine aminotrasferase and gamma – glutamyl transpeptidase liver enzymes in obese rats

Parameter group	AST (U/L)	ALT(U/L)	GGT(U/T)
Group 1 negative control	46.0±2.23[d]	39.0±2.31[d]	26.3±1.16[d]
Group 2 obese normal control	85.0±8.13[a]	67.0±6.32[a]	46.0±4.13[a]
Group 3 CAEt (0.25gm/kg)	77.0±6.14[b]	58.0±4.32[b]	40.0±3.32[b]
Group 4 CAEt (0.50gm/kg)	62.0±6.43[b]	49.0±4.17[b]	39.0±2.26[b]
Group 5 CAEt (0.75gm/kg)	50.0±3.14[c]	35.0±2.13[c]	29.0±2.17[c]

Mean ± SE with different letter super scripts in the same column are significant at *P<0.05* using one way Annova test n= 4 rats/group



Graph 1: Effect of ethanolic extract of *Centratherum anthelminticum* on final body weight, fat weight and adiposity index in obese rats



Graph 2: Effect of CAEt on serum level of aspartate aminotransferage, alanine aminotrasferase and gamma – glutamyl transpeptidase liver enzymes in obese rats

In the present era, medicinal plants and culinary herbs with antihyperlipidemic and anti-diabetic activities have gained much attention, especially those with title toxicity properties. It has been widely accepted that the biological value of plants depends on their bioactive constituents such as saponins, anthocyanins, flavonoids, diterpenes, triterpenes, and other phytochemicals.In the current study, obesity was experimentally induced by feeding rats on high fat diet for six weeks. This model of obesity in rats closely resembles the reality of obesity in humans. However experimental obesity could be also induced in rats and mice by other method such as feeding on high carbohydrate diet, damage in anterior hypothalamus and genetically induced obesity.

CONCLUSION

From these results, we conclude that ethanolic extract of *Centratherumanthelminticum* exhibited anti-obesity suggesting its use as anti-obesity.

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