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ANTI-OBESITY ACTIVITY OF *DOLICHOS BIFLORUS* (*HORSE GRAM*) COMPARED TO 5HT IN ALBINO RATS

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ABSTRACT

Obesity is a global problem since not health risk but also cosmetic value is attached to it. Many genetic, environmental, behavioral, and cultural factors affect health. Diet is as vital as any of them for preventing disease and promoting well-being. The solution to this problem may lie in our traditional medicine where *Horse gram* grain *(Dolichos biflorus)*, in the form of decoction is indicated in corpulence (obesity). So this study was planned to find out anti-obesity activity of *Dolichos Biflorus* (*Horse gram*), compared to 5HT in Albino Rats. After obtaining animal ethics committee approval this study was carried out. Albino rats were divided to four groups (three males and three female in each group). Hot and cold extract of *horse gram* seed was prepared. Then anti obesity activity was compared with groups treated with 5HT and control group. It was found that *Horse gram* has antiobesity activity comparable with 5HT. Unlike 5HT, this response of *Horse gram* was influenced by gender. Magnitude was more pronounced in male than in female. Hot extract brings about weight reduction in male but only retardation of weight gain in female. Tolerance develops on chronic use in all groups.

key words: *Dolichos biflorus* seed hot and cold extract, *horse gram*, antiobesity activity, albino rats, 5HT.

INTRODUCTION

Weight loss induced by increased daily physical activity without caloric restriction substantially reduces obesity (particularly abdominal obesity) and insulin resistance in men. Exercise without weight loss reduces abdominal fat and prevents further weight gain [1]. Obesity is a global problem since not health risk but also cosmetic value is attached to it. Many genetic, environmental, behavioral, and cultural factors affect health. Diet is as vital as any of them for preventing disease and promoting well-being. We know that what we eat can lead to premature disability and mortality: to obesity, coronary heart disease, type 2 diabetes, degenerative arthritis, sleep apnea, and other illnesses [2].

The solution to this problem may lie in our traditional medicine where *Horse gram* grain *(Dolichos biflorus)*, in the form of decoction is indicated in corpulence (obesity). *Macrotyloma uniflorum* (horse gram, kulthi bean, hurali, Madras gram) is one of the lesser known beans. The whole seeds of *horse gram* are generally utilized as cattle feed. However, it is consumed as a whole seed, as sprouts, or as whole meal in India, popular especially in southern Indian states. Medical uses of these legumes have been discussed. In Andhra Pradesh, horse gram (Ulava (singular) Ulavalu (plural), is prescribed for persons suffering from jaundice or water retention, and as part of a weight loss diet [3]. The seed has the ability to reduce post-prandial hyperglycemia by slowing down carbohydrate digestion and reduce insulin resistance by inhibiting protein-tyrosine phosphatase 1 beta enzyme [4]. The chemical composition is comparable with commonly cultivated legumes. Like other legumes, these are deficient in methionine and tryptophan [5]. 2:3 combination of *P. betle* leaf aqueous-alcohol extract and *D. biflorus* seed alcohol extract appears to be an effective ingredient for

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weight management [6]. So this study was planned to find out anti-obesity activity of *Dolichos Biflorus* (*Horse gram*), compared to 5HT in Albino Rats.

MATERIALS AND METHODS

Preparation of extract of *Horse gram* seed (500mg/ml):

Cold Extract (CE)

20 g of *Horse gram* was soaked in 60ml water for 24 hours. Filtered and adjusted the filtrate volume to 40ml.

Hot Extract (HE)

The residue from the above step was pressure cooked with 40ml of water. Filtered and adjusted the filtrate volume to 40ml.

Grouping and dosing of Animals

Inbred Wistar strain Male White albino rats were, Male (160-180 g) & Female (130-150 g) were grouped into 3 Male + 3 Female / group and allocated as below. Divided into four groups (6 in each group)

- Group 1: Untreated animals were received 0.2ml of distilled water orally (NC)
- Group 2: 5HT treated at dose of 5mg/kg given intraperitoneally (5HT)
- Group 3: 2 g/Kg of hot extract of *Horse gram* was given orally.
- Group 4: 2 g/Kg of hot extract of *Horse gram* was given orally.
- The above drugs were given daily for 28 days.

Procedure

- Body weight of each rat was recorded daily prior to drug dosing.
- Based on pretreatment value the % reduction/gain in body weight for each rat was calculated at weekly intervals in all groups
- The magnitude of anti-obesity potential, if any was assessed as % weight loss by keeping mean weight of NC group as baseline, using the formula:

NC group mean-Test value/NC group mean X100.

Analysis of results

- The results were analysed using Anova.

Ethics

- Study was conducted after Institutional Animal Ethics committee approval. And we have adhered to the guidelines of our institution regarding the care and use of laboratory animals.

RESULTS

- **NC group:** Increase in weight consistently in both male and female (Male 24.9 ± 0.72 % & female 35.53 ± 0.41%) (Figure 1 & 2).
- **5HT group:** Decrease in weight in both male and female by two weeks (male 22.72 ± 1.97% & female 11.17 ± 1.9%) followed by increase in weight reaching pretreatment value by four weeks (Figure 1 & 2).
- **HE group:** In male rats the pattern was similar but the magnitude was more than 5HT except for week one. On the contrary, in the female rats there was slow but consistent increase in weight (Figure 1 & 2).
- **CE group:** In male rats, the pattern was similar to 5HT & HE but magnitude was less in week two. In female rats unlike in HE, there was decrease in weight by two weeks, followed by increase in weight which was greater in magnitude in magnitude than in HE (Figure 1 & 2).
- Anti obesity activity in male and female rats were calculated. Maximum reduction was seen by week two in all groups (Figure 3 & 4).

Male: HE > 5HT > CE (37% > 34% > 20.6%) (Figure 3).
Female: 5HT>CE>HE (23.2%>20.6%>13.5%) (Figure 4).

Table 1. % Gain or loss of weight in male and female rats

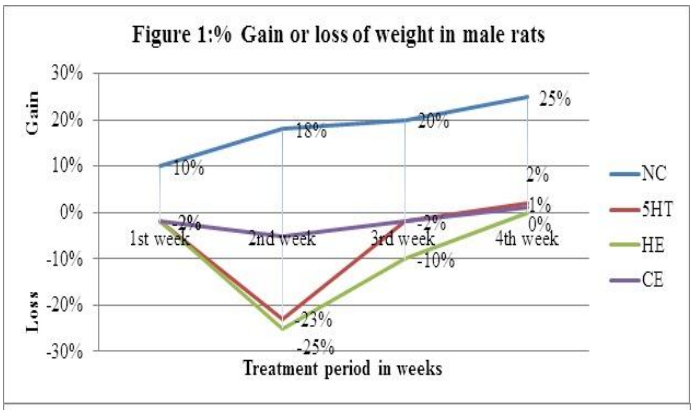
	1st week		2nd week		3rd week		4th week	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
NC	10%	8%	18%	19%	20%	28%	25%	36%
5HT	-2%	0%	-23%	-11%	-2%	-5%	2%	0%
HE	-2%	1%	-25%	2%	-10%	4%	0%	6%
CE	-2%	-2%	-5%	-5%	-2%	12%	1%	18%

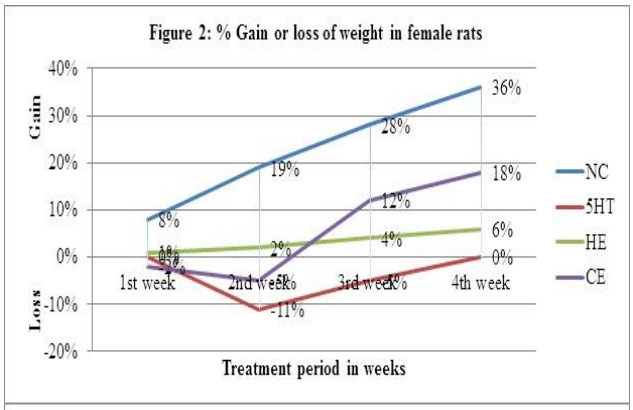
Anti obesity activity in male and female rats were calculated. Maximum reduction was seen by week two in all groups (Figure 3 & 4).**Male rats:** HE > 5HT > CE (37% > 34% > 20.6%) (Table 2).**Female rats:** 5HT>CE>HE (23.2%>20.6%>13.5%) (Table 2).

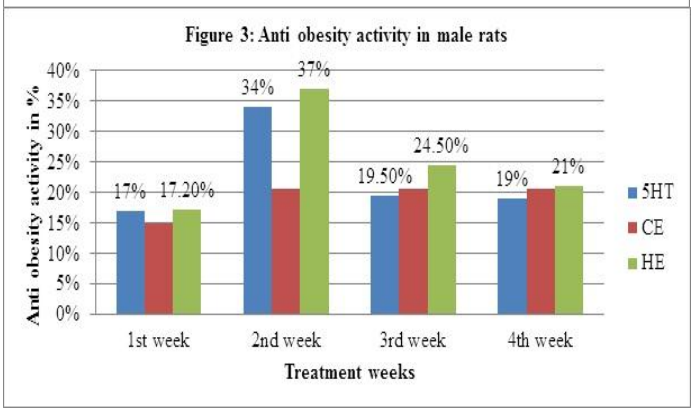
Table 2. Anti obesity activity in male and female rats

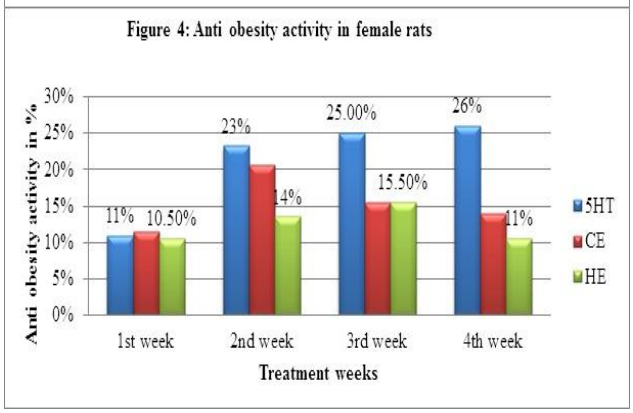
	1st week		2nd week		3rd week		4th week	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
5HT	17%	11%	34%	23%	19.50%	25.00%	19%	26%
CE	15%	12%	20.60%	20.60%	20.60%	15.50%	20.60%	14.00%
HE	17.20%	10.50%	37%	14%	24.50%	15.50%	21%	11%

Tolerance develops on chronic use in all groups









DISCUSSION AND CONCLUSION

NC group: Increase in weight consistently in both male and female. This shows that as the age of rats increases there was increase body weight.

5HT group: Decrease in weight in both male and female by two weeks (male 22.72 ± 1.97% & female 11.17 ± 1.9%) followed by increase in weight reaching pretreatment value by four weeks (Table 1). This shows that 5HT has maximum activity at two weeks.

HE group: In male rats the pattern was similar but the magnitude was significantly more than 5HT except for week one ($p < 0.05\%$). On the contrary, in the female rats there was slow but consistent increase in weight with the p value < 0.01% (Table 1). This shows that hot extract of *horse grams* decreases weight in male rats and only retards the weight gain in female rats. There is gender variation in activity of *horse gram*. But more studies are needed to confirm the no weight reduction effect of horse gram in female rats.

CE group: In male rats, the pattern was similar to 5HT & HE but magnitude was less in week two ($p < 0.01\%$). This shows that cold extract of *Horse gram* has antiobesity activity comparable with 5HT. In female rats unlike in HE, there was decrease in weight by two weeks, followed by increase in weight which was greater in magnitude in magnitude than in HE with the p value <0.01% (Table 1). This also shows that there was gender variation in the activity of cold extract of *horse gram*

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