

## EFFECT OF GURMAR AND SHILAJIT ON BODY WEIGHT OF YOUNG RATS

By

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General debility and loss of body weight is commonly associated with diabetes mellitus. This seems to be related to the deficiency of insulin, responsible for the inhibition of oxidative phosphorylation (10) and decreased synthesis of proteins (17) which in turn reduces the elaboration of anterior pituitary trophic hormones (9). Moreover the growth stimulating and nitrogen retaining effects of somatotropin are also inhibited in diabetes (14), (11), (16). This inhibition is likely to become more marked during ketosis because of increased secretion of adrenocortical steroids (19), (16) which are known to antagonise growth promoting effect of somatotropin (18). A few of the Ayurvedic anti-diabetic remedies, Tribang shila containing shilajit and Gurmar (*Gymnema sylvestre*) have been reported to prevent reduction in body weight, induced by the diabetogenic doses of the anterior pituitary hormones (5). It would therefore be of interest to investigate the effect of these drugs on body weight of young rats in view of the tonic property of the former (2), (3), (15) and insulin promoting and adrenocortical inhibitory effects of the latter drug (12), (6), (7).

### MATERIALS AND METHODS

Young albino rats, weighing between 30 to 40 gms., were divided into three groups so as to have litter mates of equivalent body weight in each. All the four rats of a group, duly numbered, were kept in a separate metabolic cages with a fine mesh at the bottom to retain the faeces. The urine was collected in glass jars containing toluene to prevent evaporation and decomposition. Water was provided from inverted graduated bottles fitted on the side of the cages. The animals were fed ad libidum on a synthetic diet as detailed below :—

Wheat flour	... 86.0%
Bone meal	... 8.0%
Powdered milk	... 3.0%
Yeast powder	... 1.0%
Cod liver oil	... 1.0%
Salt mixture	... 1.0%

(Mc Collum & Davis)

The food was made into a paste with adequate water and cooked over a water bath. The drugs were added and thoroughly mixed with the diet during treatment period.

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After a week's control observation of the normal daily food, water intake, urine output as well as the change in body weight, the drug treatment was started. The alcoholic extract of *Gymnema sylvestre* obtained by extraction of the dried leaves in ethanol for 5 hours as detailed previously (5), and shilajit obtained from Gurukul Kangri Pharmacy, was mixed with the food to form 0.1% and 0.005% of the diet given to the rats of Group II and III respectively. Group I rats were given no drug with the food so as to serve as control for comparison.

The fasting body weight of each rat of the three groups was recorded at weekly intervals. The amount of food eaten, water taken and urine excreted was measured daily and the total values for each week were worked out for a period of one month. The quantity of the food kept in each of the cages was kept in excess to ensure feeding ad libidum.

#### RESULTS

Weekly changes in the body weight, food and water consumption and urine output in the three groups of rats fed on diet containing the anti-diabetic drugs-*Gymnema sylvestre* (Group II) and Shilajit (Group III) as compared to that of the control (Group I) have been summarised in Table I, II and III and shown in Figure 1.

#### DISCUSSION

The effects of Shilajit (Bitumen) and Gurmar (*Gymnema Sylvestre*) the two well known ayurvedic antidiabetic remedies were investigated on the body weight of young rats. Analysis of the data presented in Table I, would show that shilajit caused a marked increase to the extent of 163.5% as compared to 136.05% increase in weight observed in the controls during a period of one month. This difference in the Body weight of the two groups was found to be highly significant ( $P < 0.01$ ). The animals treated with *Gymnema sylvestre* also produced an appreciable increase in the body weight to the extent of 146.6%. This was, however, less significant ( $P$  between 0.01 and 0.05) as compared to that observed with Shilajit. This weight promoting effect of the drugs seems to be related to their antidiabetic and endogenous insulin secretory effects in view of the fact that the growth stimulating and nitrogen retaining action of somatotropin have been shown to depend upon insulin (14, 11, 4). Further the protein sparing action of insulin which effects a positive nitrogen balance (13) (1) may in turn elaborate increased amounts of the anterior pituitary trophic hormones, responsible for the growth and body weight of the young rats fed with the antidiabetic drugs.

Further, on comparing the food consumption in relation to weekly increase in body weight, it would be observed from Table II that on the whole the food consumed in Gm/Kilo body weight has been significantly less in the drug treated groups as compared to the control. On considering the efficiency of food utilisation for adding per gramme body weight, it would be observed that Shilajit and Gurmar treated rats required 15.3 gm. and 15.9 gm. of food respectively to produce 1.0 gm. gain in body weight, as compared to 17.2 gm. needed by the controls for putting on the same weight. This seems to be indicative of a better utilisation of food per kilogramme body

TABLE I

*Showing effect of Gymnema sylvestre and Shilajit in the body weight  
(in gms.) of albino rats.*

Group & drugs	Rat No.	Initial	1st week	2nd week	3rd week	4th week
Group I Control	1.	32.00	42.00	54.00	68.00	81.00
	2.	36.00	45.00	59.00	72.00	82.00
	3.	33.00	43.00	58.00	71.00	79.00
	4.	35.00	48.00	61.00	69.00	79.00
	Tl.	136.00	178.00	232.00	280.00	321.00
	Av.	34.00	44.50	58.00	70.00	80.25
	S.D.	±1.28	±2.70	±2.94	±1.82	±1.52
Group II Gymnema Sylvestre	1.	32.00	45.00	57.00	72.00	81.00
	2.	35.00	48.00	62.00	69.00	85.00
	3.	33.00	44.00	60.00	71.00	83.00
	4.	35.00	51.00	60.00	74.00	84.00
	Tl.	135.00	188.00	239.00	286.00	333.00
	Tv.	33.75	47.00	59.75	71.50	83.25
	S.D.	±1.52	±3.16	±2.08	±2.16	±1.73
Group III Shilajit	1.	35.00	52.00	60.00	75.00	90.00
	2.	37.00	50.00	64.00	76.00	93.00
	3.	32.00	53.00	62.00	81.00	91.00
	4.	33.00	48.00	62.00	78.00	87.00
	Tl.	137.00	203.00	248.00	310.00	361.00
	Av.	34.25	50.75	62.00	77.50	90.25
	S.D.	±2.23	±2.23	±1.63	±2.70	±2.51

Tl.= Total of each group.

Av.= Average body weight of each rat.

S.D.= Standard deviation.

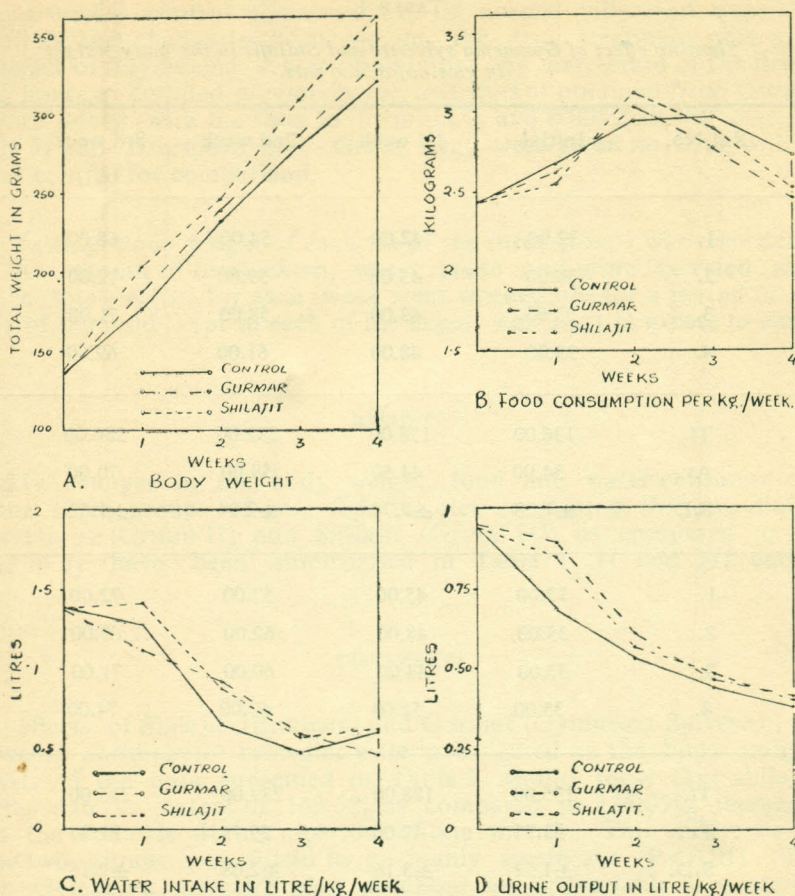


Fig. 1. Comparison of weekly cumulative effects on (a) body weight (b) food consumption (c) water intake and (d) urine output in albino rats of Group I, (controls) with Groups II and III administered *Gymnema sylvestre* and Shilajit respectively

weight in the drug treated animals (Group II and III). This in turn may be related to a more positive nitrogen balance, probably due to enhancement of endogenous insulin secretion from the islets of Langerhans by the anti-diabetic drugs under study. Further elucidation of the actual nitrogen retention after the drugs may, however, be essential to substantiate this hypothesis.

The drugs, *G. Sylvestre* and Shilajit were also observed to influence the water consumption and urine output when considered in relation to body weight. The water consumption per kilogramme body weight was found to be apparently more in Shilajit group as compared to controls, though not significant. This increase in water intake seems to be related to the common belief that the drug increases body heat. The urine output was also found to be increased in both the Shilajit and Gurmar treated rats

(Group II & III) as compared to the control (Group I). This is also in conformity with the diuretic action of Shilajit and Gurmar as mentioned by Chopra et al., (3) and Nadkarni (15) However on considering the ratio of water intake to urinary output as shown in Table III it would be observed that on the whole there was no significant ( $P>0.5$ ) change in ratio of both the Gurmar and Shilajit treated animals, indicating that drugs did not cause water retention. Therefore increase in body weight after the antidiabetic drugs under study seems to be related to their direct anabolic effect.

These interesting observations of the anti-diabetic drugs G. Sylvestre and Shilajit on body weight seem to substantiate the use of these drugs in conditions of debility.

#### SUMMARY

1. The effect of Shilajit (Bitumen) and Gurmar (Gymnema Sylvestre) the two well known Ayurvedic anti-diabetic remedies, was investigated on the body weight of young rats for a period of one month.
2. Body weight of the rats treated with Shilajit and Gurmar was found to be increased as compared to controls. The effect of Shilajit was, however, more marked and significant than that of G. Sylvestre.
3. The weekly food consumption in term of Gm/Kilo body weight was less in both the drug treated groups of rats as compared to control, indicating better utilization of food.
4. Urine output was also greater in drug treated rats as compared to controls. There was no significant difference in the ratio of water intake to urine output in Gurmar as well as in Shilajit treated rats.
5. The increase in body weight has been discussed in the light of their anabolic effects.

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