EFFECT OF FEEDING BHC ON T HE BIOCHEMICAL PAKAMLIEKS Or BLOOD IN RABBITS

Pages with reference to book, From 75 To 78

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Abstract

Studies were made by feeding 25 mg per kg body weight of BHC to rabbits daily for twelve weeks. BHC in the blood increased progressively without affecting blood pH. The levels of glucose, cholesterol, total proteins and creatinine increased while that of urea decreased in the blood of treated animals. The differences among the control and treated rabbits for these parameters were highly significant as every one microgram per ml accumulation of BHC in the blood, affected a corresponding increase of 1.82 mg/dl glucose, 2.618 mg/dl of cholesterol, 0.02 g/dl of total proteins and 0.13 rng/dl of creatinine, while a decrease of 0.105 mg/dl of urea was observed. The feeding of BHC, therefore, affected these vital biochemical parameters significantly (JPMA 39: 75, 1989).

INTRODUCTION

Pesticides/insecticides are commonly used for increasing the agricultural production. These compounds are potentially toxic, their presence in food is a serious source of human health hazards. Hexachiorocyclohexane (BHC) is an organochbrine insecticide. Long term exposure to BHC in food has been found to cause liver damage and disturbances of the blood biochemical parameters in man and animals. In continuation of the work reported earlier[1] the present paper describes the effects of BHC on some vital biochemical parameters.

MATERIALS AND METHODS

Fifteen adult female rabbits of approximately same weight (1540 ± 25g) were randomly divided into two groups, control (A) consisting of five rabbits and treated (B) having ten rabbits. Group B was fed BHC orally at the rate of 25 mg per kg body weight for twelve weeks in addition to the stock diet while the animals in group A were given stock diet and water ad-libitum throughout the experimental period. All rabbits were kept in individual cages and the room temperature maintained at 28°C ± 2°C. Blood samples were withdrawn from the jugular vein, at weekly intervals. BHC in blood was estimated by thin layer chromatography[2,3]. Blood glucose was determined by a spectrophotometric method[4]. Total proteins, urea and creatinine in blood were estimated by Merckotest Kits[5]. The blood pH was also recorded. One rabbit from group A and two from group B, were slaughtered after four weeks and this procedure was repeated after every two weeks till the end of twelve weeks.

RESULTS AND DISCUSSION

The analysis of blood indicated a progressive increase in the amount of BHC accumulated. A maximum of 86.0 12 ug per ml was recorded (Table I)

TABLE I. Amount of BHC in the Blood of Rabbits fed 25 mg Insecticide per kg Body Weight daily.

S.No.	Weeks	BHC (μg/ml)
1	0	0.00
2	1	9.216
3	2	12.288
4	3	18.431
5	4	24.575
6	5	33.790
7	6	39.934
8	7	46.078
9	8	52.221
10	9	58.365
11	10	64.509
12	11	70.653
13	12	86.012

in twelve weeks. The blood pH of both the groups did not differ significantly (Table-II)

TABLE II. pH values of the Blood of Rabbits fed 25 mg BHC per kg Body Weight Daily.

Weeks	pH	
	Control	Treated
1	7.64	7.73
2	7.69	7.64
3	7.66	7.77
4	7.66	7.77
5	7.64	7.71
6	7.72	8.06
7	7.64	7.66
8	7.66	7.86
9	7.64	7.60
10	7.60	7.76
11	7.43	7.38
12	7.15	7.92

The blood glucose of group A remained fairly constant (100 to 108 mg/dl) while that of the group B increased from 100 to 231 mg dl in twelve weeks. Statistically this difference was highly significant ($P<0.01$). The correlation analysis between the accumulated BHC amount and glucose levels in blood of treated rabbits, revealed a highly significant positive correlation ($r = 0996$). The regression analysis (Figure I)

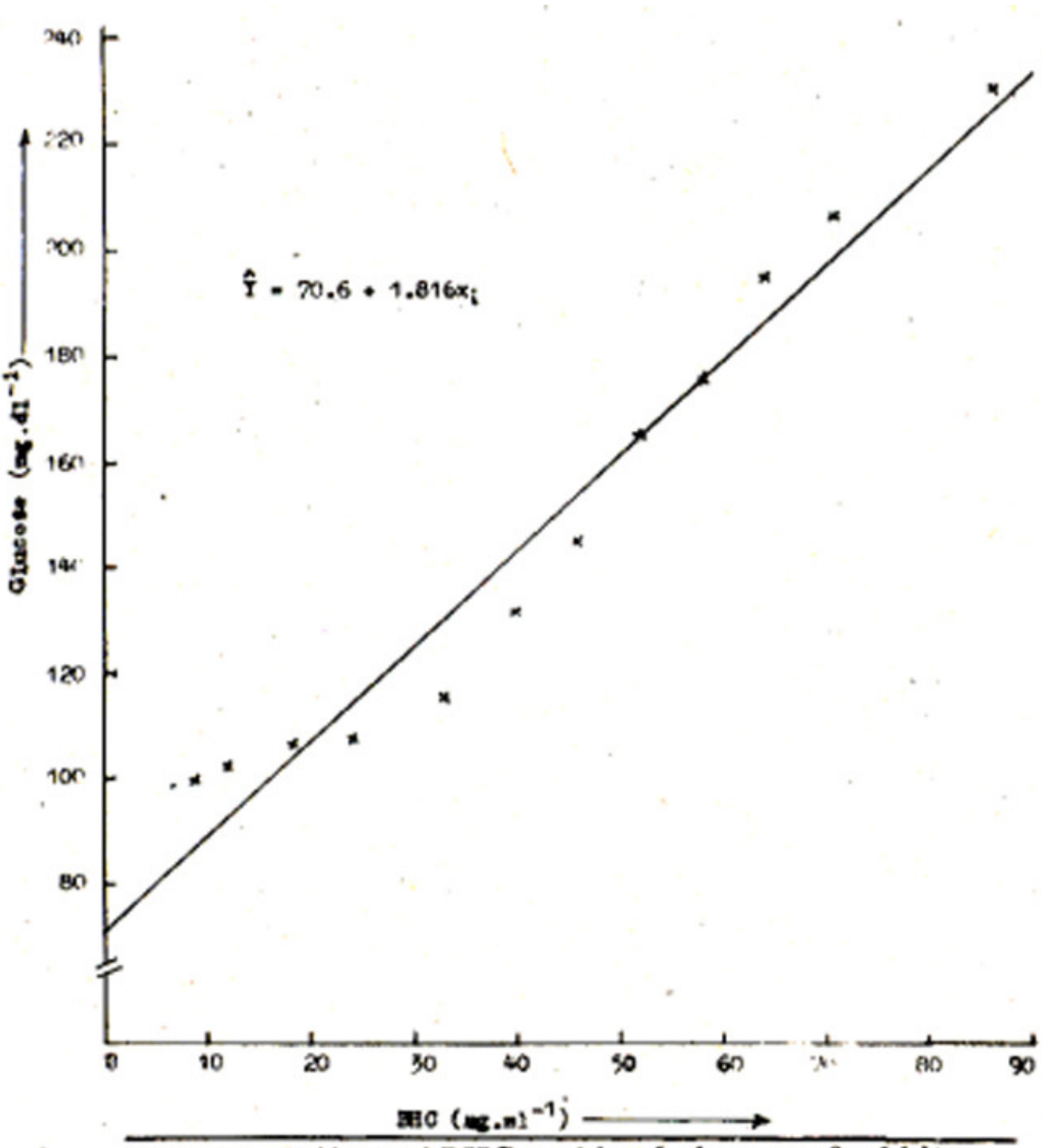

Figure 1. Effect of BHC on blood glucose of rabbits.

indicated that for every one microgram per ml accumulation of BHC in the blood, 1.82 mg/dl of blood glucose was increased. The analysis of blood for cholesterol indicated almost constant values (68 to 71 mg/dl) in the control group whereas those of the treated group increased from 68.6 to 252.6 mg/dl in twelve weeks, indicating a highly significant difference in the two groups. The increased values of blood cholesterol due to the accumulation of BHC in the blood, were used to fit the regression line (Figure 2)

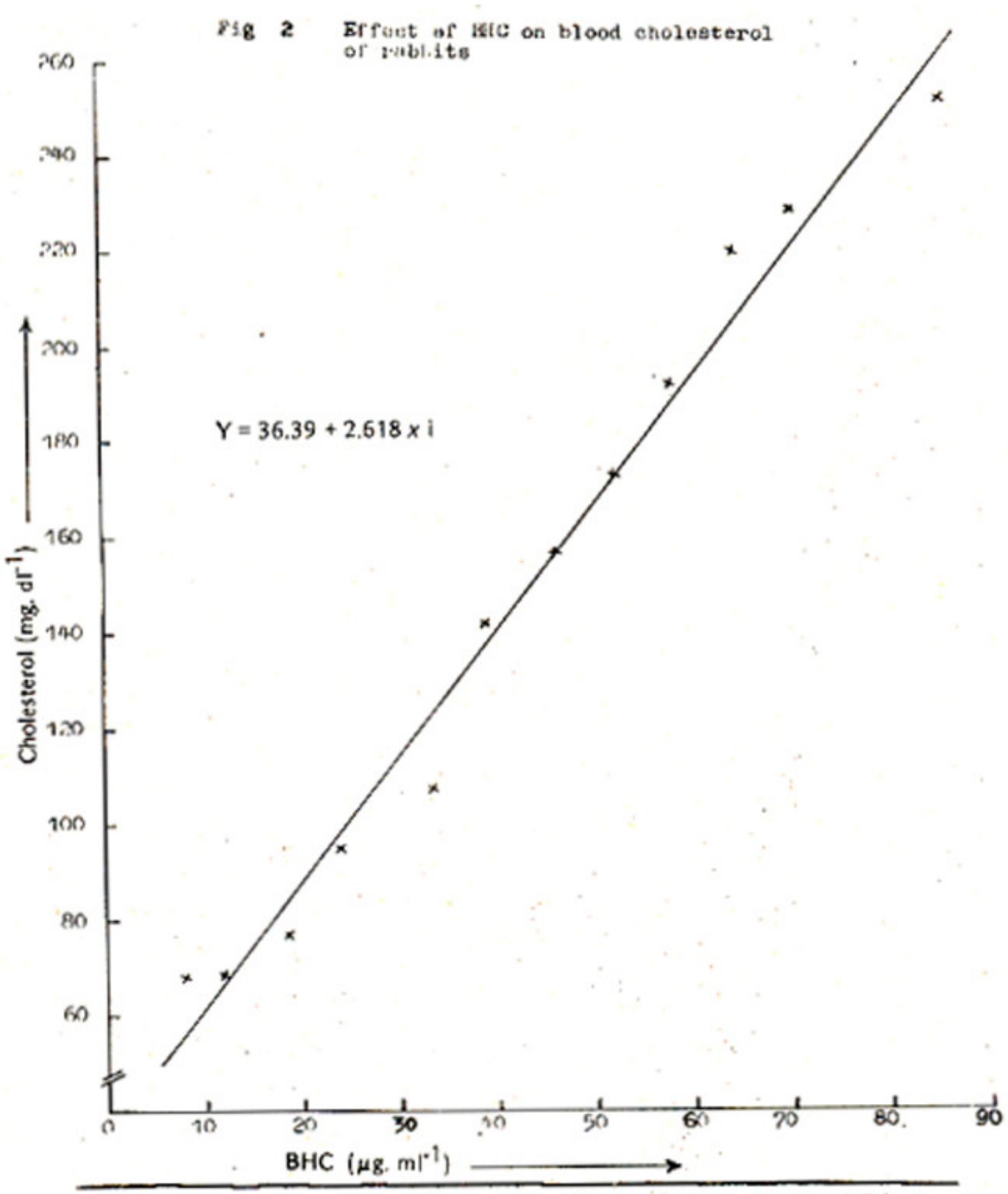

Figure 2. Effect of BHC on blood cholesterol of rabbits.

which revealed that for every one microgram per ml accumulation of BHC in the blood, a corresponding 2.6 18 mg/dl of blood cholesterol was increased. These changes are in line with those reported in the literature[8]. Total blood proteins of the treated group increased from 7.62 to 9.10 g/dl while those of the control group remained steady 7-8 g/dl). This increase was statistically significant.

The increased values of total proteins, when fitted in the regres¬sion line (Figure 3)

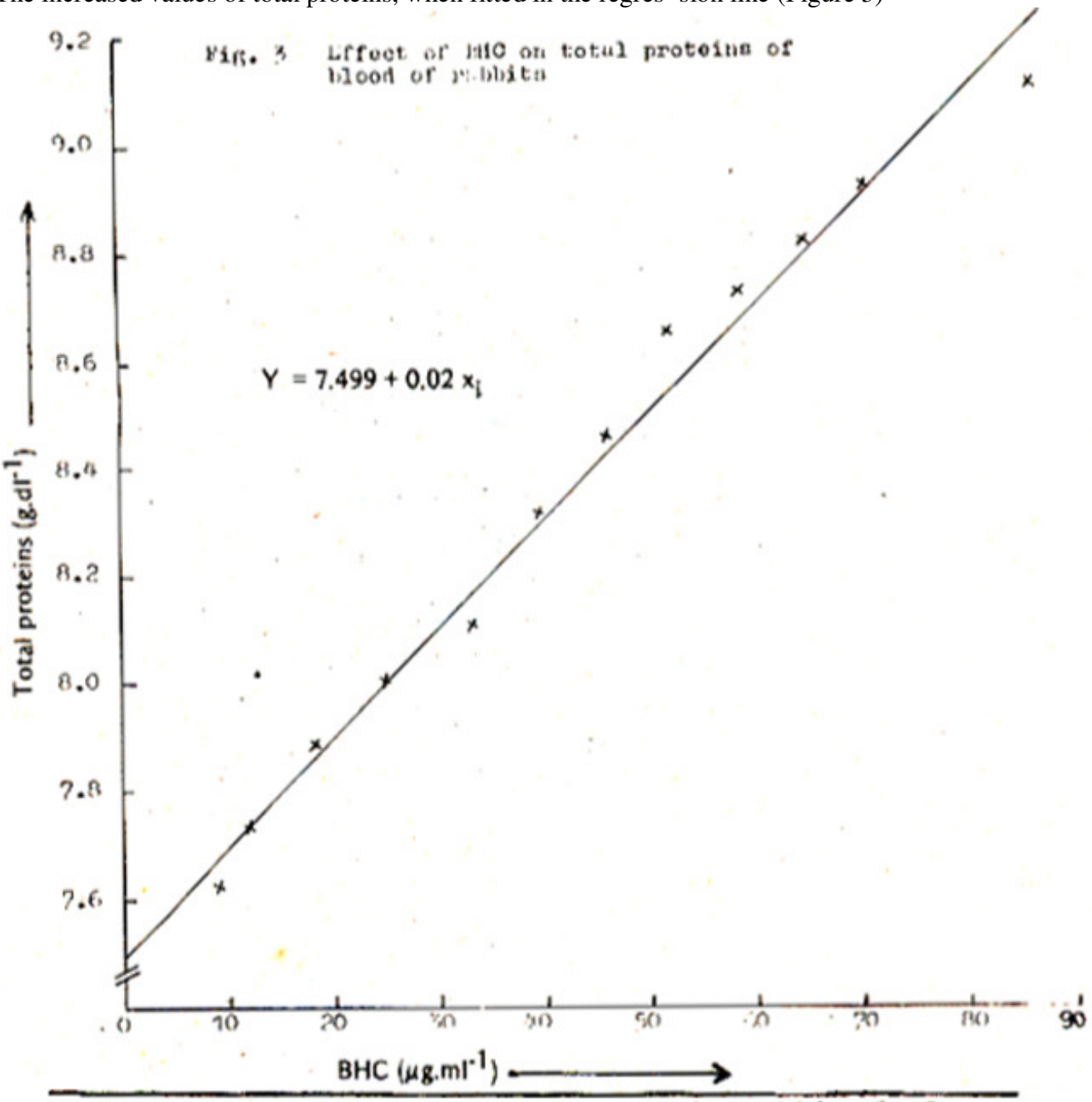

Figure 3. Effect of BHC on total proteins of blood of Rabbits.

revealed that for every one microgram per ml accumulation of BHC in the blood, a corresponding 0.02 g/dl of total proteins increased in the blood. The hyperproteinemia has also been reported by other workers[6-8]. The blood urea of group A remained fairly constant (24.8 to 25.1 mgf dl) while that of the group B decreased from 253 to 17.3 mg/dl in twelve weeks. Statistically this difference between control and treated was highly significant (P<0.Ol). The correlation analysis between the accumulated BHC and urea levels in the blood of treated rabbits, revealed a highly significant negative correlation (n —0.95). The regression analysis (Figure 4)

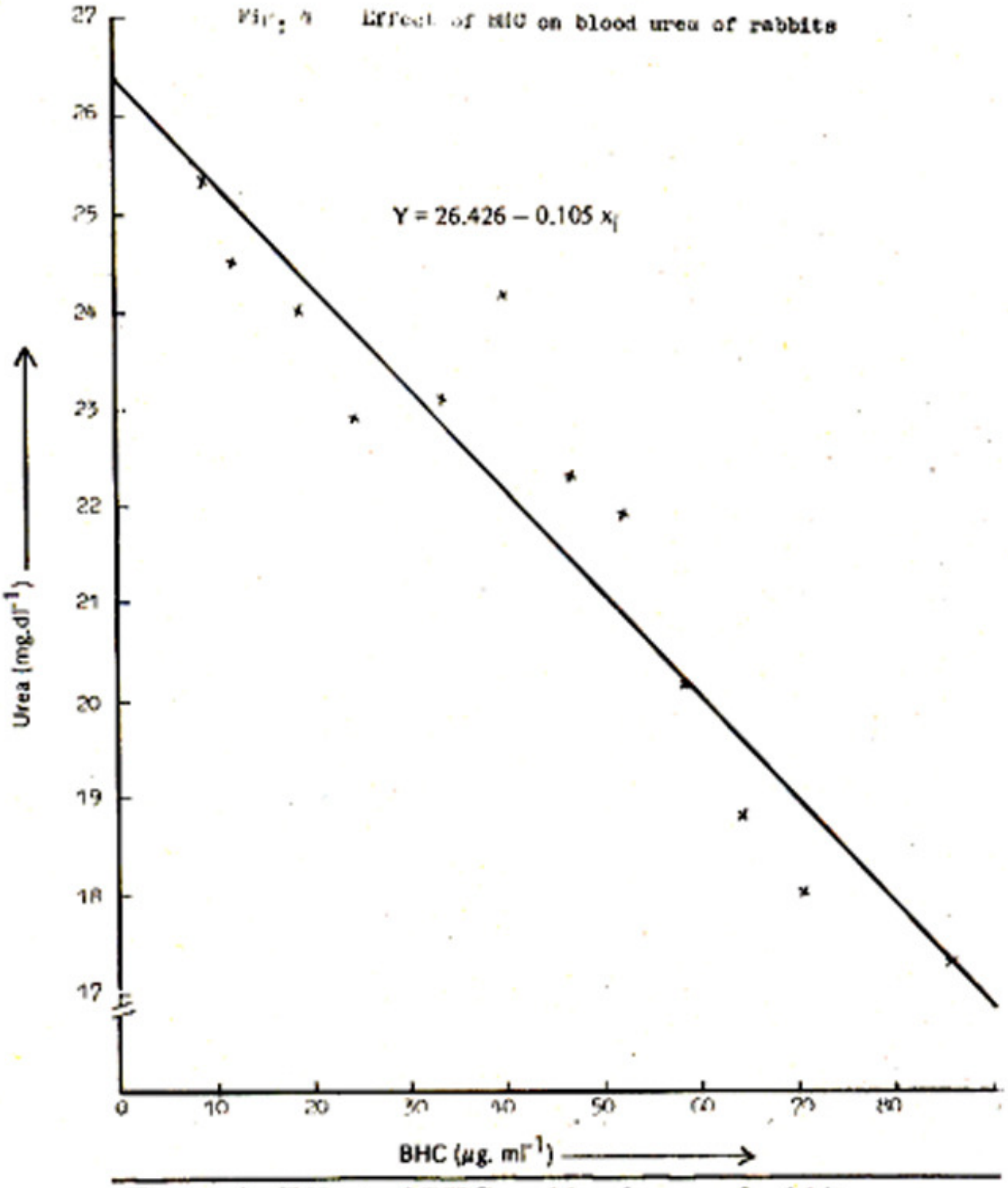

Figure 4. Effect of BHC on blood urea of rabbits.

indicated that for every one microgram per ml accumulation of BHC in the blood, a corresponding 0.105 mg/dl of blood urea was decreased. Other workers[9] reported a non significant decrease of urea in the blood of workers exposed to BHC. The analysis of blood for creatinine indicated almost constant values (1.95 to 2.1 mg/dl) in the control group, whereas those of treated group increased from 2.9 to 13.6 mg/dl in twelve weeks, showing a highly significant difference in the two groups. The increased

values of blood creatinine due to the accumulation of BHC in the blood, were used to fit regression line (Figure 5)

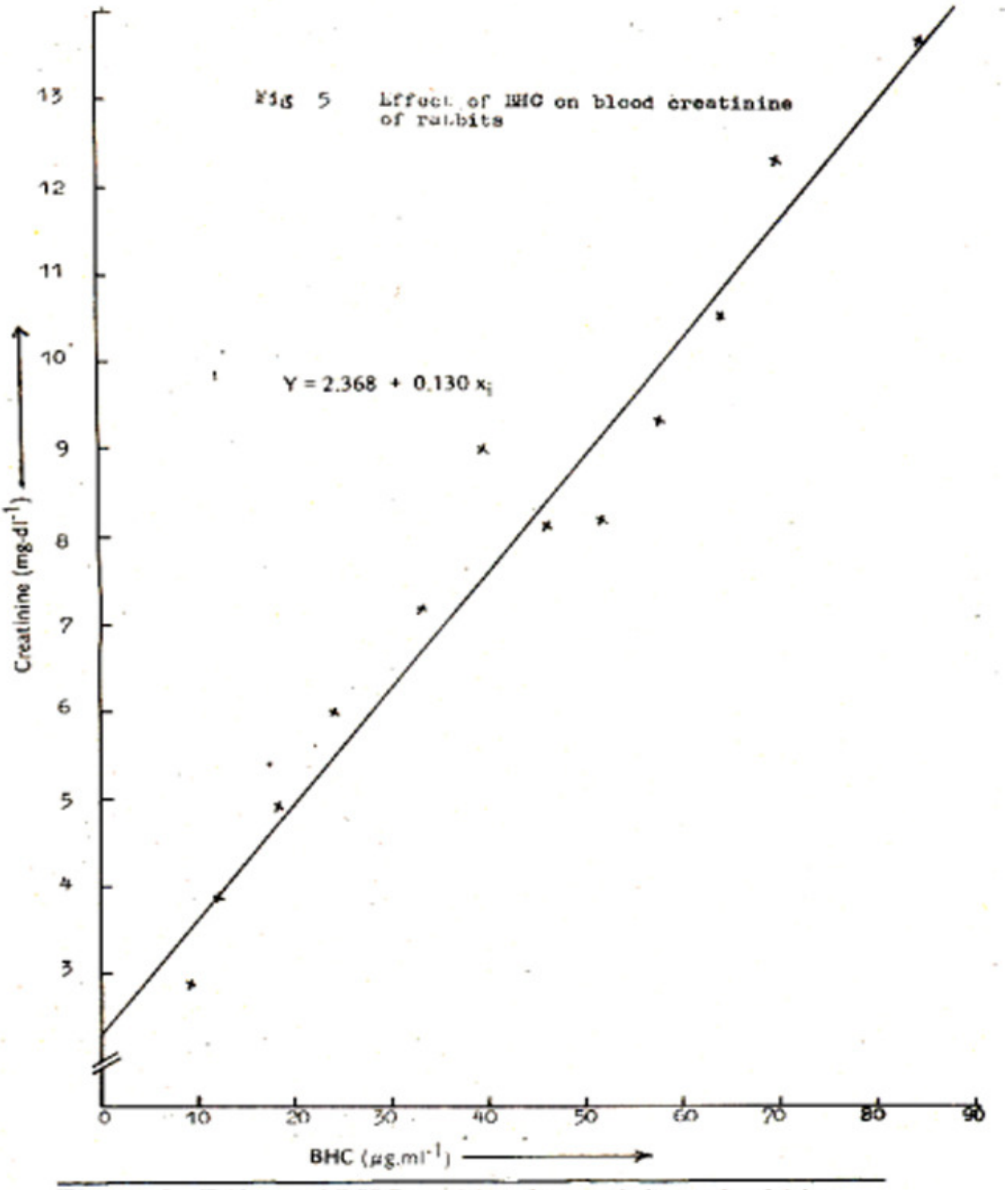

Figure 5. Effect of BHC on blood creatinine of rabbits.

which revealed that for every one microgram per ml accumulation of BHC in the blood, a corresponding 0.13 mg/dl of blood creatinine was increased.

DISCUSSION

The onset of hyperglycemia due to the accumulation of BHC in the blood, might be attributed to the increased glycogenolysis in liver. Other studies[6,7] on Indian field mouse and Indian crab, have revealed similar results.

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