RESULTS

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The determination values of LD_{50} :

The determined LD50 values were found to be 5.4 and 0.27 mg/kg b.w. for chlorophacinone and brodifacoum respectively.

The doses used in the present study were 1/30 LD50 of chlorophacinone (0.18 mg / kg b.w.), 1/30 LD50 of brodifacoum (0.0054 mg /kg b.w.) and a mixture of them 1/60 + 1/100 LD50 (0.095 + 0.0027mg/kg b.w.).

Symptoms of Toxicity:

Rats under the influence of rodenticides showed some toxic symptoms manifested by convulsions, excitability, rapid movement and marked reduction of feeding rates. In the second period during recovery the rats began to restore their normal condition and the symptoms which are noted during treatment period began to disappear.

Blood Parameters:

Total erythrocyte count (RBCs):

It is obvious from the present study that chlorophacinone, brodifacoum and a mixture of them after one week of daily gastric administration were implicated in decrease of RBCs count (Table 1 and Fig. 1). The RBCs count was decreased significantly in all treated animal groups compared to the control group. The RBCs count was still significantly low in all treated animal groups after one week of recovery compared to the control group. There were significant differences between all animal groups treated with chlorophacinone, brodifacoum and a mixture of them after one week of daily gastric administration and after one week of recovery.

Table (1): Effect of repeated doses of anticoagulants, chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 +1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on blood picture of adult male albino rats after one week of daily gastric administration and after one week of recovery.

Treatment / Parameter	After one week of daily gastric administration						After one week of recovery					
	Control	Chloro	Brodi	Mix	p	LSD	Control	Chloro	Brodi	Mix	p	LSD
	Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE			Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE		
RBCs Million /mm^3	a 4.30 ±0.31	c 2.30 ±0.61	b 3.01 ±0.94	d 1.43 ±0.19	***	0.13	a 4.06 ±0.20	c 2.62 ±0.55	b 3.10 ±0.35	d 0.97 ±0.68	***	0.33
WBCs Thousand/mm^3	d 11.30 ±0.82	a 13.20 ±0.90	c 16.09 ±0.71	b 17.90 ±1.70	***	0.36	d 10.90 ±0.68	c 12.70 ±0.34	b 14.50 ±0.45	a 15.90 ±0.17	***	0.37
Hb mg/100ml blood	a 17.20 ±0.74	c 14.20 ±0.71	b 16.06 ±0.31	d 12.09 ±1.60	***	0.32	a 17.08 ±0.64	c 15.30 ±0.95	b 17.02 ±0.34	d 12.64 ±1.25	***	0.32
Hct%	a 43.70 ±1.29	c 39.20 ±0.44	b 41.06 ±2.13	d 31.05 ±0.47	***	0.38	a 43.20 ±0.1.08	c 40.08 ±0.92	b 42.01 ±1.21	d 33.02 ±1.02	***	0.49

Chloro.= Chlorophacinone Brodi.= Brodifacoum Mix.= Mixture of chlorophacinone and brodifacoum

***= Significantly different at p< 0.001 SE=Standard error Values are present as mean ± SE

Mean in same column followed by different letters are significantly different at ($P \leq 0.05$).

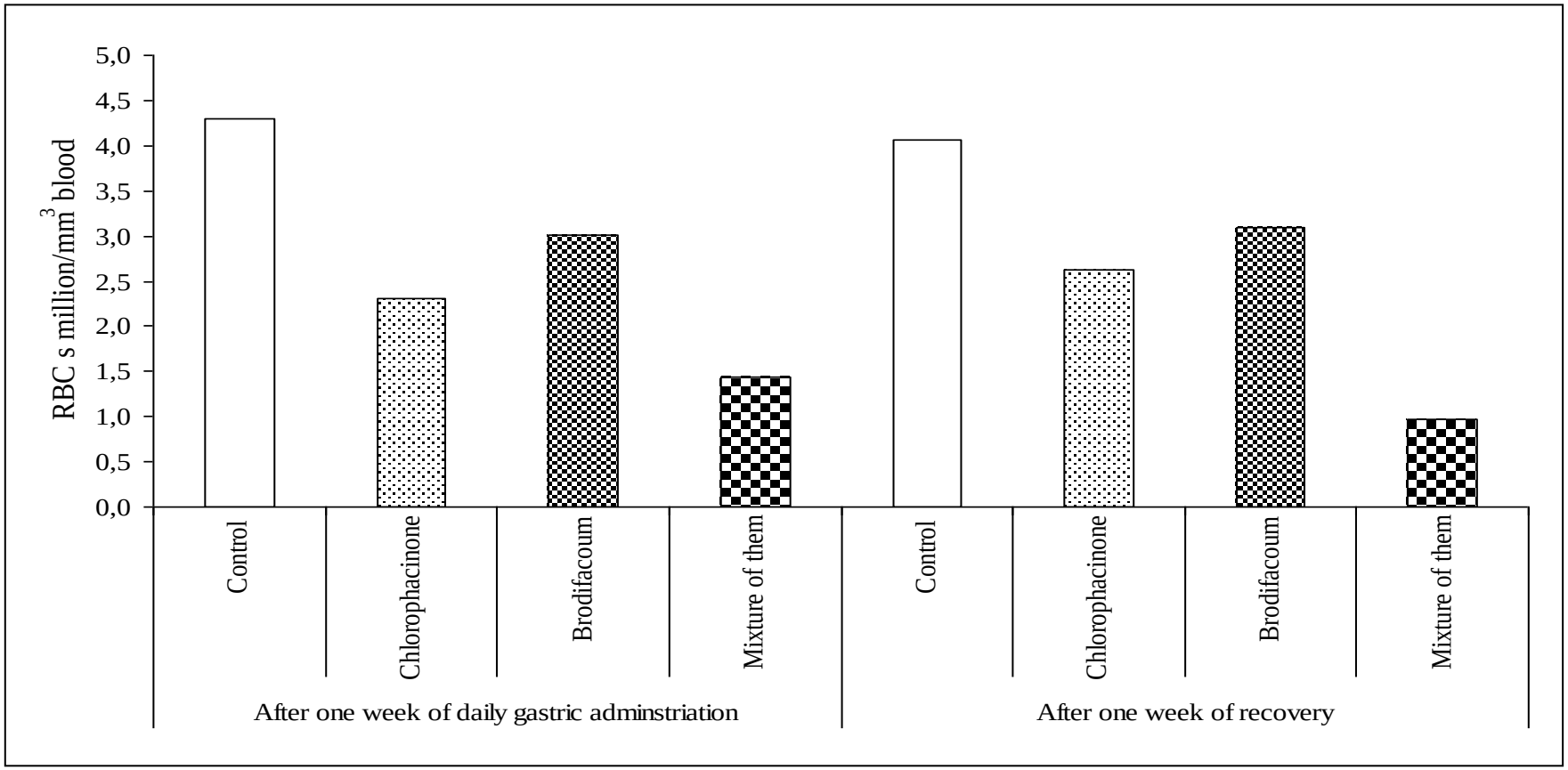

Fig. (1): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027mg/kg b.w. respectively) on RBCs of adult male albino rats after one week of daily gastric administration and after one week of recovery.

Total leucocytes count (WBCs):

The results presented in table (1) and fig. (2) showed that the WBCs were significantly increased in animal groups treated daily with chlorophacinone, brodifacoum and a mixture of them after one week of daily gastric administration and after one week of recovery compared to the control groups. There were significant differences between treated groups after one week of daily gastric administration and after one week of recovery.

Haemoglobin contents (Hb):

The results presented in tables (1) and fig. (3) showed that the haemoglobin contents of the treated animals groups were significantly declined after one week of daily gastric administration with chlorophacinone, brodifacoum and a mixture of them compared to that of the control group. The haemoglobin content were significantly decreased also in animal groups after one week of recovery compared to that of the control groups.

There were significant differences between all treated animal groups after one week of daily gastric administration and after one week of recovery.

Haematocrite value (Hct):

The data presented in table (1) and fig. (4) showed that the haematocrite value was significantly decreased in animal groups treated with chlorophacinone, brodifacoum and a mixture of them after one week of daily gastric administration compared to the control group. The haematocrite value was significantly decreased also in treated animal groups after one week of recovery compared to control group.

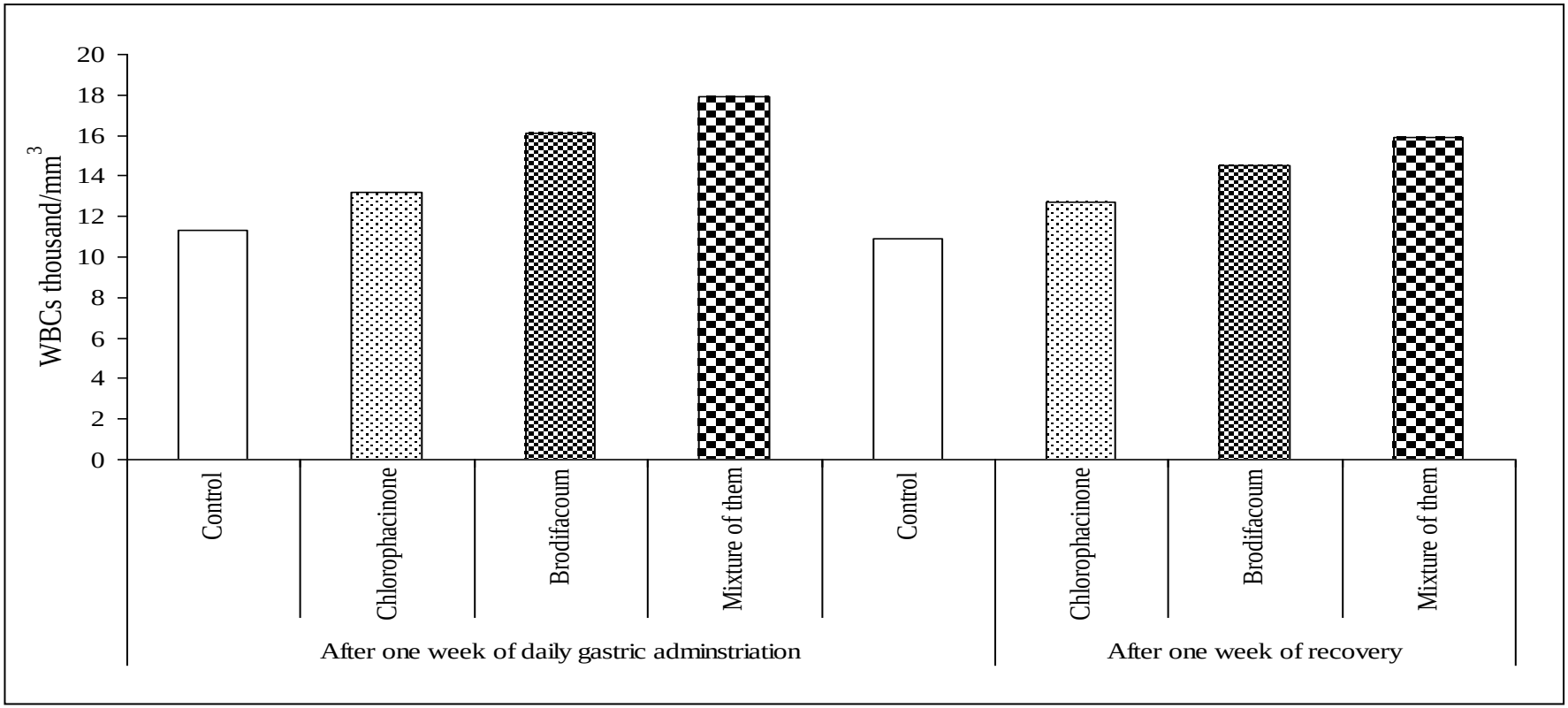

Fig. (2): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50 LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on WBCs of adult male albino rats after one week of daily gastric administration and after one week of recovery.

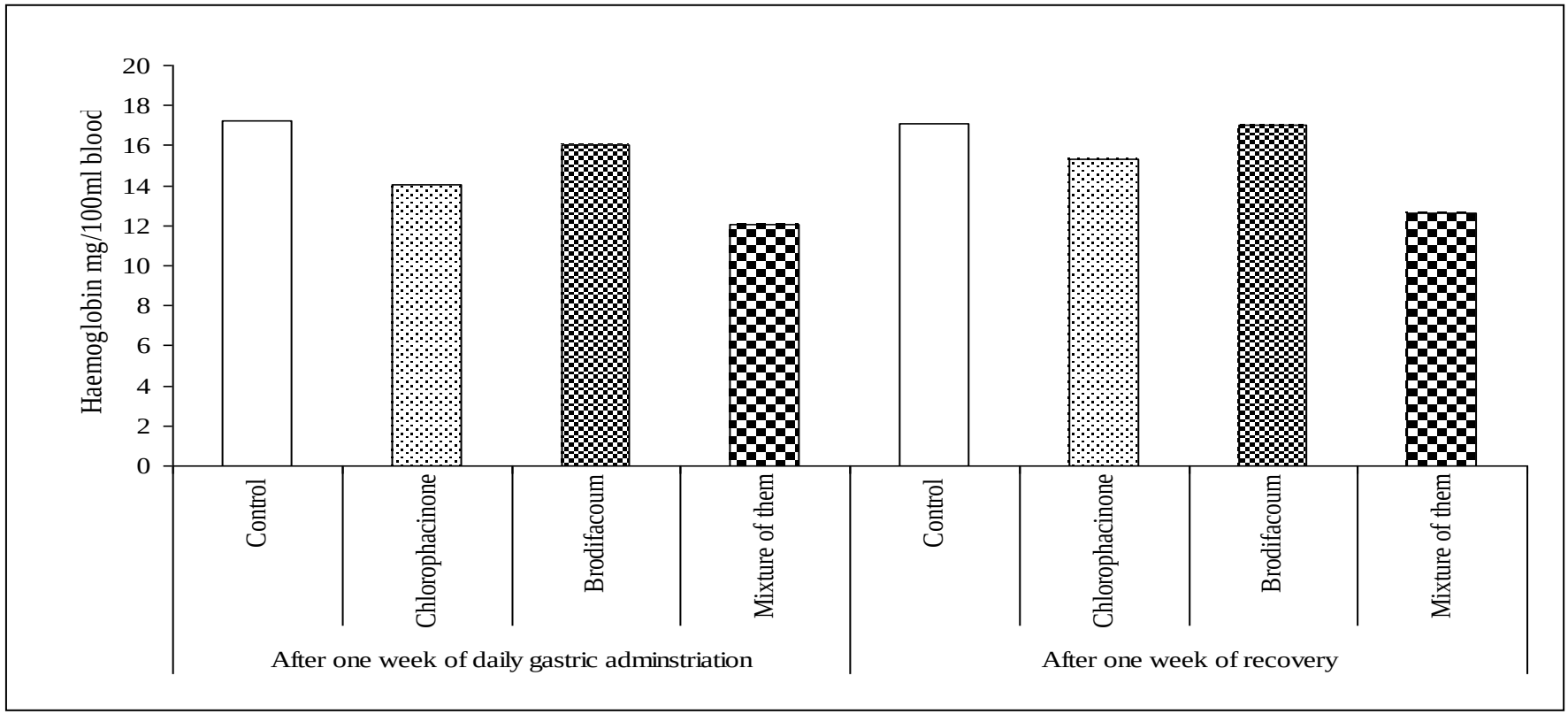

Fig. (3): Effect of repeated doses of anticoagulants; chlorophacinone (1/30 LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50 LD_{50}; 0.0054mg/kg b.w.) and a mixture of them (1/60+1/100 LD_{50}; 0.095+0.0027mg/kg b.w. respectively) on haemoglobin mg/100ml blood of adult male albino rats after one week of daily gastric administration and after one week of recovery.

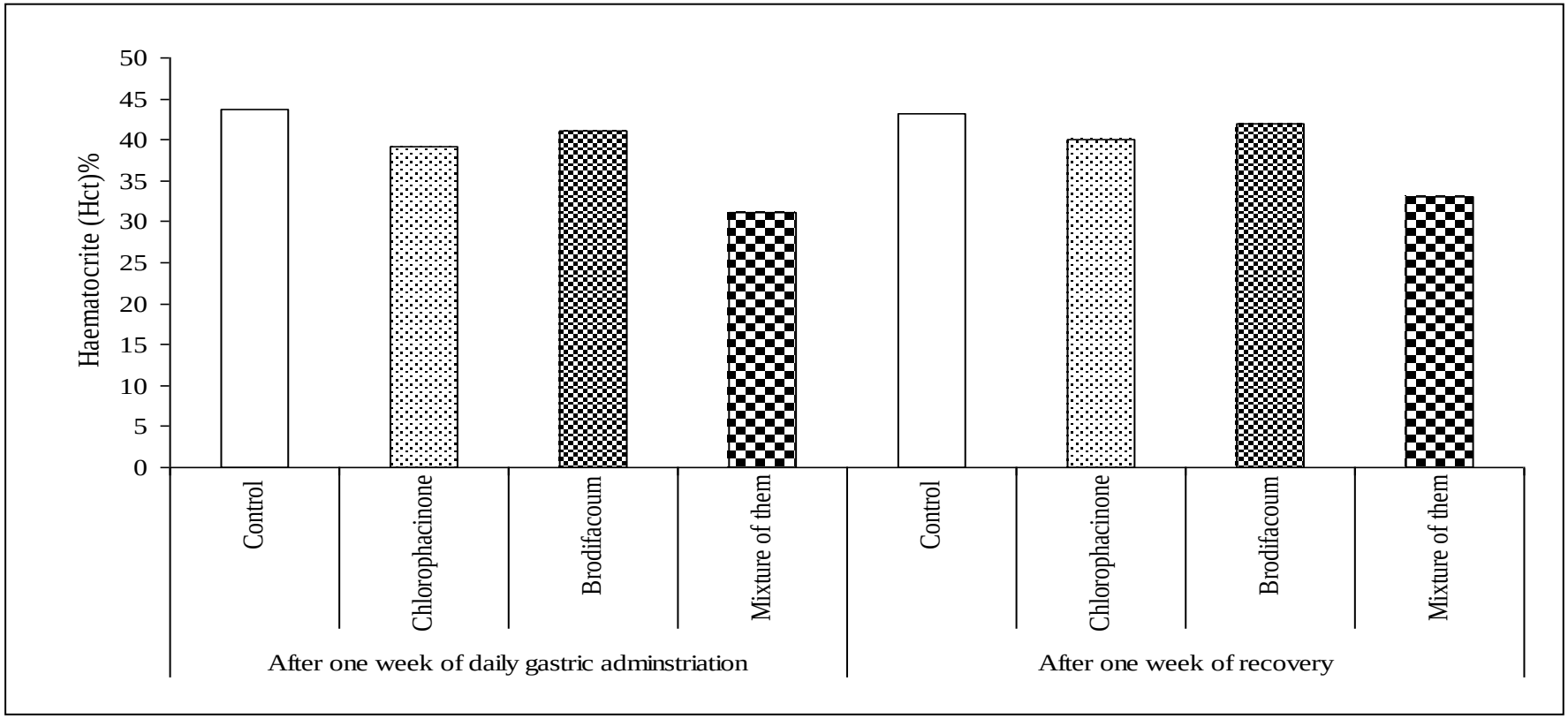

Fig. (4): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50 LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on haematocrite (Hct)% of adult male albino rats after one week of daily gastric administration and after one week of recovery.

There were significant differences between treated groups after one week of daily gastric administration and after one week of recovery.

Respiratory Functions of Blood:

Blood gases parameters:

Oxygen partial pressure (PO_2):

The results presented in table (2) and fig. (5) showed that arterial blood oxygen partial pressure (P_aO_2) in all animals treated with chlorophacinone, brodifacoum and a mixture of chlorophacinone and brodifacoum were significantly decreased after one week of daily gastric administration and after one week of recovery compared to the controls group. There were significant differences between animal groups treated with chlorophacinone, brodifacoum and a mixture of chlorophacinone and brodifacoum after one week of daily gastric administration and after one week of recovery.

Venous blood oxygen partial pressure (P_vO_2) in animals treated with chlorophacinone was significantly decreased but it was non significantly increased in animals treated with brodifacoum and significantly increased in animal group treated with a mixture of chlorophacinone and brodifacoum compared to the control group after one week of daily gastric administration. While it was significantly decreased in animal group treated with chlorophacinone but it was significantly increased in animal group treated with brodifacoum and non significantly decrease in animal group treated with a mixture of them after one week of recovery (Table 2 and Fig. 6). There were significant differences between all animal groups treated with chlorophacinone, brodifacoum and a mixture of chlorophacinone and brodifacoum after one week of daily gastric administration and after one week of recovery.

Table (2): Effect of repeated doses of anticoagulants, chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on blood gases of adult male albino rats after one week of daily gastric administration and after one week of recovery.

Parameter \ Treatment		After one week of daily gastric administration						After one week of recovery					
		Control	Chloro	Brodi	Mix	p	LSD	Control	Chloro	Brodi	Mix	p	LSD
		Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE			Mean ± SE	Mean ± SE	Mean ±SE	Mean ±SE		
PO_2	a	128.00 a ± 0.00	115.67 b ±1.20	100.70 d ±0.88	106.00 c ±1.15	***	3.07	127.00 a ±0.58	113.66 b ±0.33	93.33 d ±1.45	103.66 c ±0.88	***	2.97
	v	43.43 b ±1.45	32.33 c ±1.20	46.00 b ±1.15	51.33 a ±1.45	***	4.31	43.66 b ±1.20	39.00 c ±0.58	51.66 a ±1.86	42.33 bc ±0.88	***	3.99
	a-v	84.66 a ±0.45	83.33 a ±1.20	54.66 b ±0.88	54.66 b ±1.62	***	5.43	83.33 a ±1.45	74.66 b ±0.88	41.00 d ±3.38	61.33 c ±1.76	***	7.10
	A	150.75 ab ±1.10	137.91 c ±1.10	147.08 b ±1.10	152.23 a ±1.43	***	3.73	149.66 a ±1.17	149.58 a ±1.82	141.66 b ±1.82	150.41 a ±1.74	*	5.45
	A-a	23.08 b ±1.75	22.25 b ±1.59	46.41 a ±0.22	45.9 a ±043	***	3.97	22.66 b ±1.48	26.10 b ±1.52	48.33 a ±2.84	46.65 a ±1.58	***	6.26
	Shunt%	21.12 b ±1.15	21.09 b ±1.09	46.95 a ±1.41	45.86 a ±0.76	***	3.42	21.11 b ±1.10	23.12 b ±0.64	48.08 a ±6.63	43.36 a ±1.01	***	11.13
$\%O_2$ sat	a	98.35 ±0.09	98.33 ±0.22	98.60 ±0.50	96.76 ±0.64	ns	–	98.36 a ±0.08	97.13 a ±0.19	94.30 b ±1.85	97.80 a ±0.15	*	3.04
	v	69.91 cd ±0.72	63.03 d ±0.90	74.43 b ±0.90	79.43 a ±2.62	**	4.89	69.90 b ±0.69	67.97 b ±0.92	78.70 a ±0.53	76.53 a ±0.58	***	2.26
	a-v	28.44 b ±0.74	62.03 a ±1.19	23.66 b ±0.80	18.00 c ±2.78	***	5.16	28.46 a ±0.71	31.50 a ±0.56	15.33 c ±1.55	21.30 b ±0.55	***	3.05
PCO_2	a	28.67 bc ±0.88	37.33 a ±0.88	31.33 b ±0.88	27.00 c ±0.64	***	3.64	29.33 b ±0.88	29.66 b ±1.45	35.65 a ±1.45	28.00 b ±2.06	*	4.41
	v	37.66 b ±0.88	46.66 a ±0.88	38.66 b ±1.45	36.00 b ±2.08	**	4.61	48.00 a ±0.58	48.33 a ±0.88	40.33 b ±1.20	40.00 b ±0.58	***	2.77
	a-v	-19.00 a ±1.73	-8.00 b ±1.15	-7.33 b ±1.86	-9.00 b ±1.53	**	5.18	-18.66 a ±1.45	-18.33 a ±2.16	-4.66 c ±0.88	-12.00 b ±1.00	***	4.80

Chloro. = Chlorophacinone Brodi. = Brodifacoum Mix. = Mixture of chlorophacinone and brodifacoum

a= Arterial blood v= Venous blood A= Alveolar blood

*= Significantly different at $p < 0.05$ **= Significantly different at $p < 0.01$ ***= Significantly different at $p < 0.001$

ns= Non significantly different at $p<0.05$ SE= Standard error Values are present as mean ± SE

Mean in same column followed by different letters are significantly different at ($P \leq 0.05$).

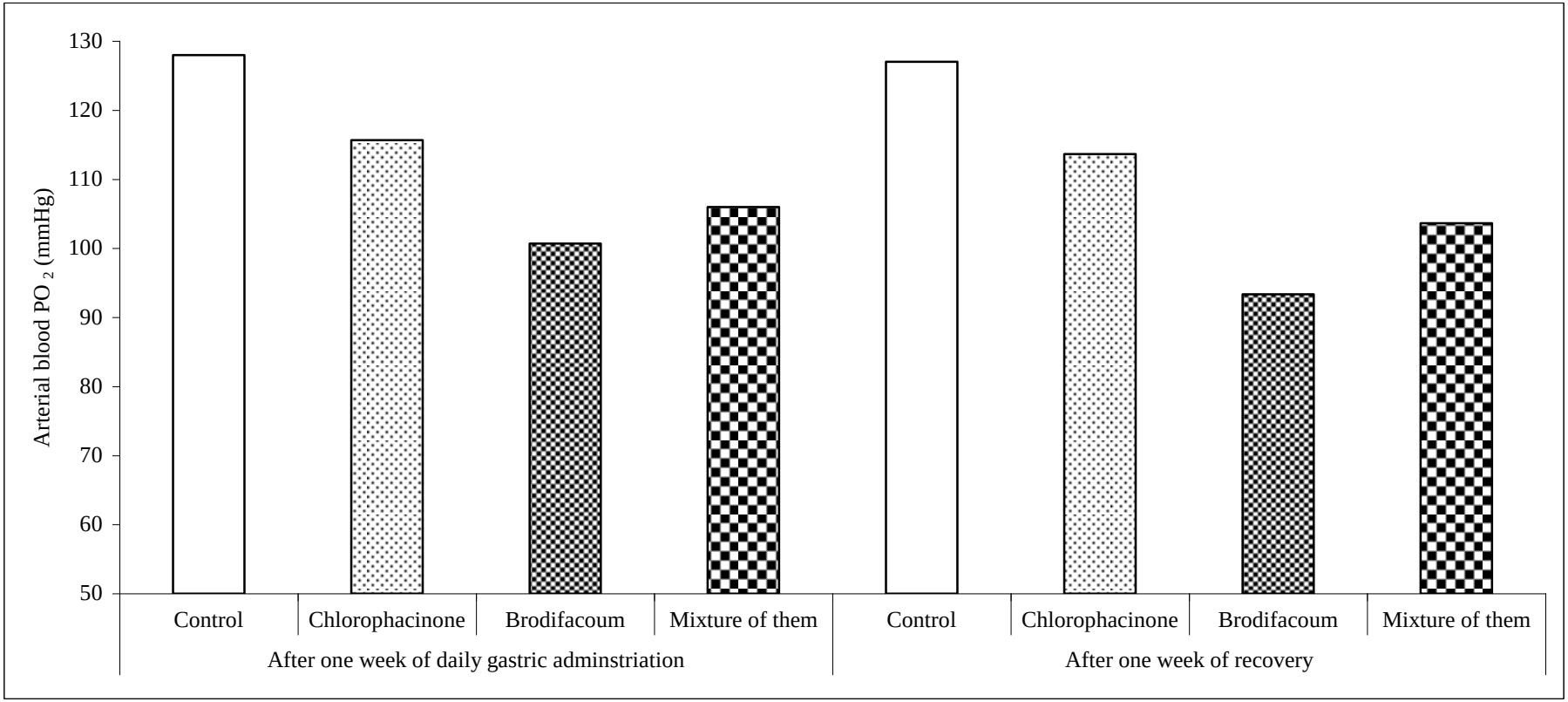

Fig. (5): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027mg/kg b.w. respectively) on arterial blood PO_2 of adult male albino rats after one week of daily gastric administration and after one week of recovery.

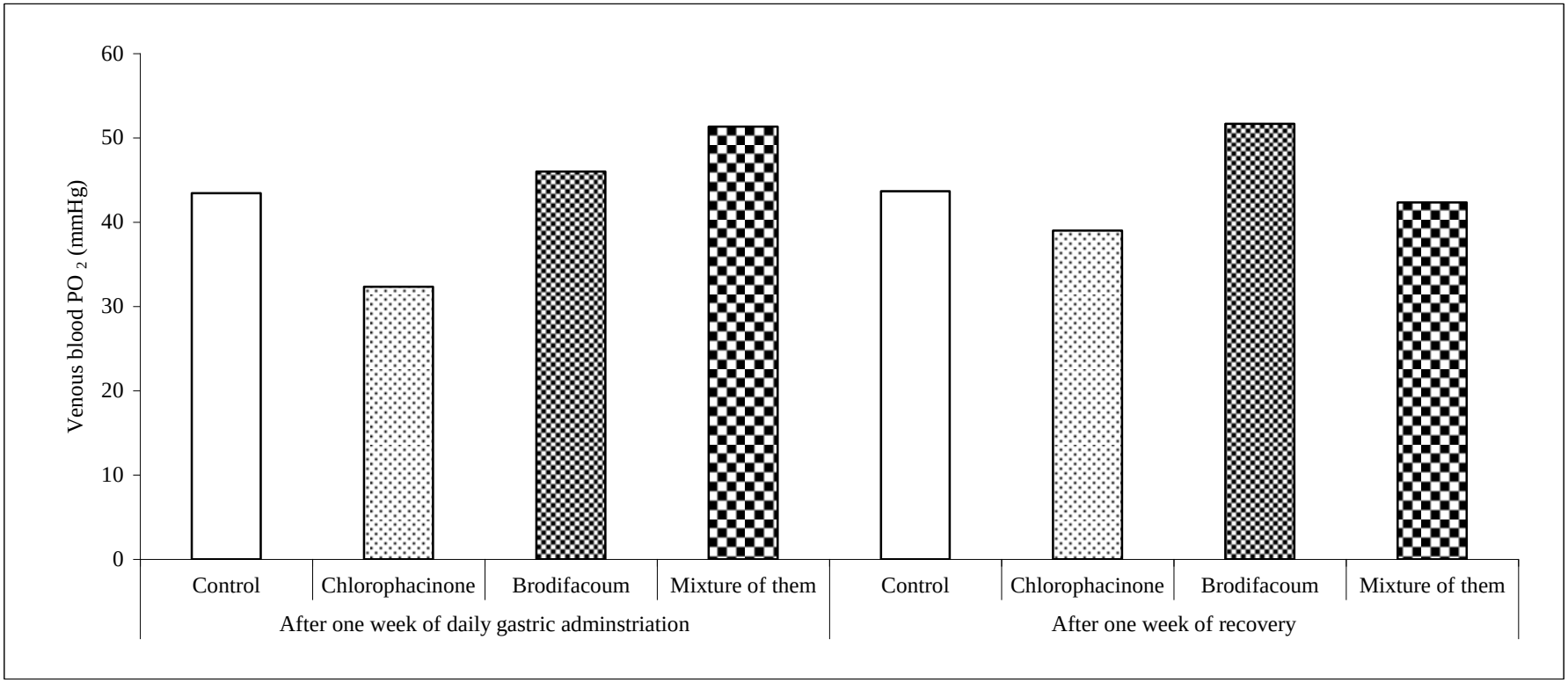

Fig. (6): Effect of repeated doses of anticoagulants; chlorophacinone ($1/30LD_{50}$; 0.18 mg/kg b.w.), brodifacoum ($1/50LD_{50}$; 0.0054 mg/kg b.w.) and a mixture of them ($1/60 + 1/100LD_{50}$; 0.095 + 0.0027 mg/kg b.w. respectively) on venous blood PO_2 of adult male albino rats after one week of daily gastric administration and after one week of recovery.

The arterio-venous blood PO_2 difference ($P_{(a-v)}O_2$) values were significantly decreased in animal groups treated with brodifacoum and a mixture of chlorophacinone and brodifacoum but it was non significantly decreased in animal group treated with chlorophacinone compared to the control groups after one week of daily gastric administration. The arterio-venous blood PO_2 difference ($P_{(a-v)}O_2$) values were significantly decreased in animal groups treated with chlorophacinone, brodifacoum and a mixture of chlorophacinone and brodifacoum compared to the control group after one week of recovery (Table 2 and Fig. 7).

The alveolar blood oxygen partial pressure (P_AO_2) was significantly decreased in animal groups treated with chlorophacinone but it was non significantly changed in animal groups treated with brodifacoum and a mixture of chlorophacinone and brodifacoum after one week of daily gastric administration compared to the control group. It was non significantly changed in animal groups treated with chlorophacinone and a mixture of them and significantly decreased in animal groups treated with brodifacoum after one week of recovery compared to the control group. There were significant differences between all treated animal groups after one week of daily gastric administration. There were non significant differences between animal groups treated with chlorophacinone and a mixture of chlorophacinone and brodifacoum. There were significant differences between the two groups treated with (chlorophacinone and a mixture of chlorophacinone and brodifacoum) and animals group treated with brodifacoum after one week of recovery (Table 2 and Fig. 8).

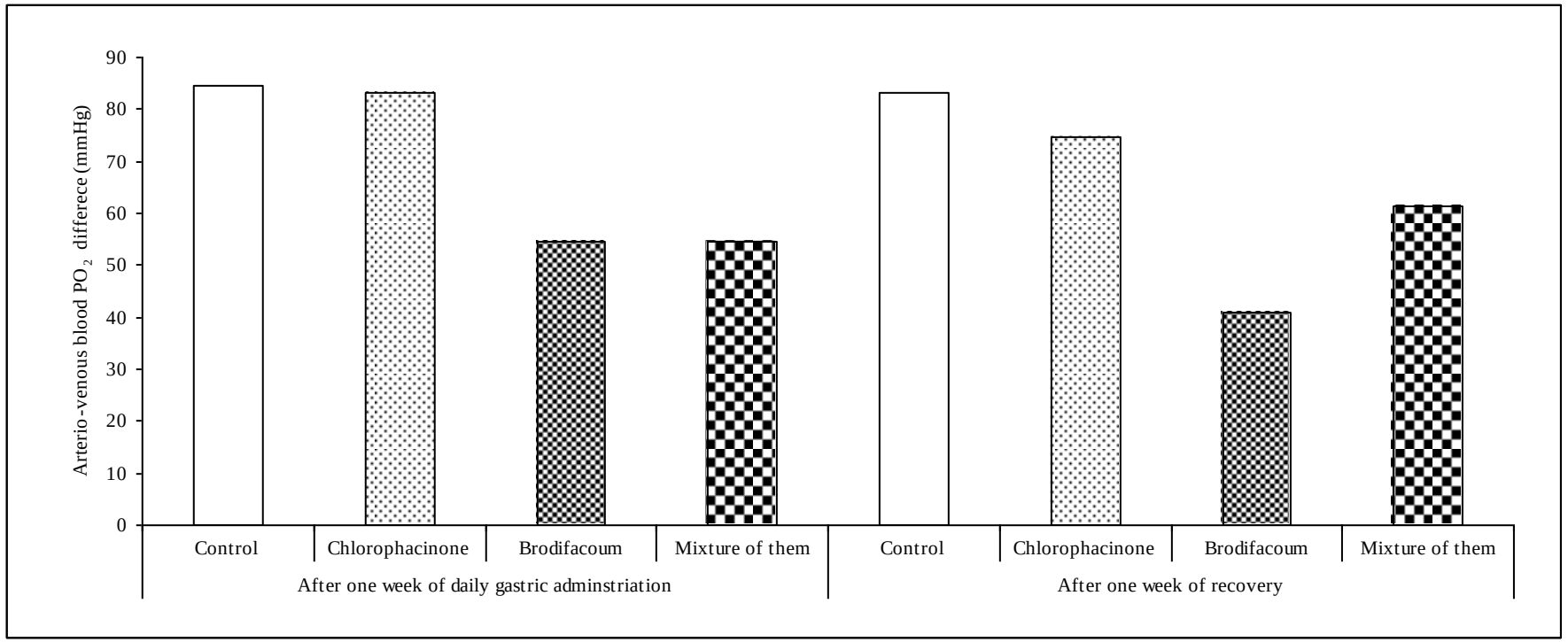

Fig. (7): Effect of repeated doses of anticoagulants; chlorophacinone ($1/30LD_{50}$; 0.18 mg/kg b.w.), brodifacoum ($1/50LD_{50}$; 0.0054 mg/kg b.w.) and a mixture of them ($1/60 + 1/100LD_{50}$; 0.095 + 0.0027 mg/kg b.w. respectively) on blood arterio-venous PO_2 differenceof adult male albino rats after one week of daily gastric administration and one week after recovery.

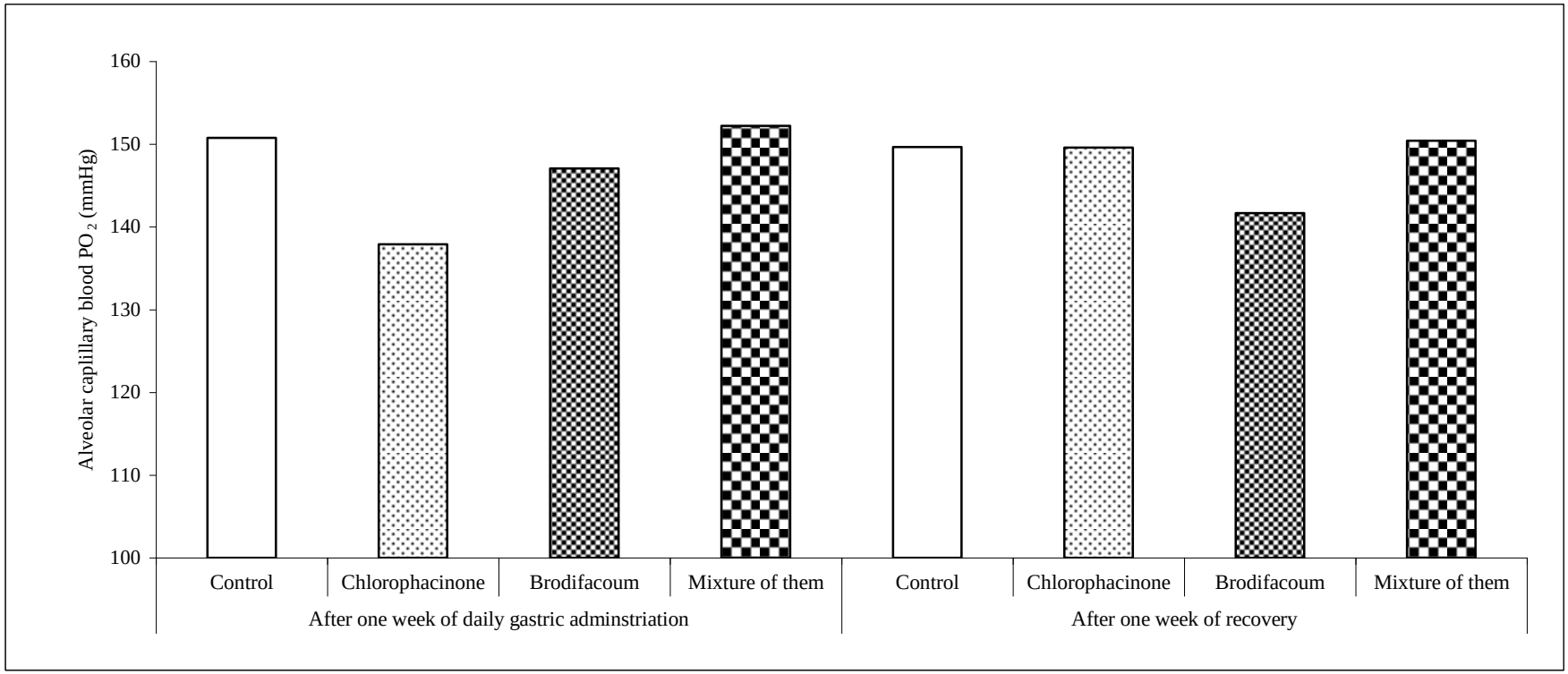

Fig. (8): Effect of repeated doses of anticoagulants; chlorophacinone ($1/30LD_{50}$; 0.18 mg/kg b.w.), brodifacoum ($1/50LD_{50}$; 0.0054 mg/kg b.w.) and a mixture of them ($1/60 + 1/100LD_{50}$; 0.095 + 0.0027 mg/kg b.w. respectively) on blood alveolar caplillary PO_2 of adult male albino rats after one week of daily gastric administration and after one week of recovery.

The alveolar-arterial oxygen partial pressure difference ($P_{A-a}O_2$) was non significantly decreased in animals treated with chlorophacinone, but it was significantly increased in animal groups treated with brodifacoum and a mixture of chlorophacinone and brodifacoum after one week of daily gastric administration. It was non significantly increased in animal group treated with chlorophacinone and significantly increased in group treated with brodifacoum and a mixture of them after one week of recovery compared to the control group. There were a non significant difference between animals groups treated with brodifacoum and a mixture of chlorophacinone and brodifacoum after one week of daily gastric administration and after one week of recavery. While there was a significant difference between animal groups treated with chlorophacinone and the two groups (brodifacoum and a mixture of them) after one week of gastric administration and after one week of recovery (Table 2 and Fig. 9).

The percentage of venous admixture (% shunt) values for animals treated with brodifacoum and a mixture of chlorophacinone and brodifacoum after one week of daily gastric administration and after one week of recovery was significantly increased compared to the control groups. While it was non significantly change in animal group treated with chlorophacinone. There were non significant differences between % shunt of brodifacoum and mixture of chlorophacinone and brodifacoum treated groups but there was a significant difference between the two groups and chlorophacinone treated group after one week of gastric administration and after one week of recovery (Table 2 and Fig. 10).

Percentage oxygen saturation (% O_2 sat):

The results presented in table (2) and fig. (11) showed that After one week of daily gastric administration there were non significantly changed in all treated group compared to the control group significantly decreased of arterial blood %O_2 saturation pressure values (% O_2 sat) in animal groups treated with

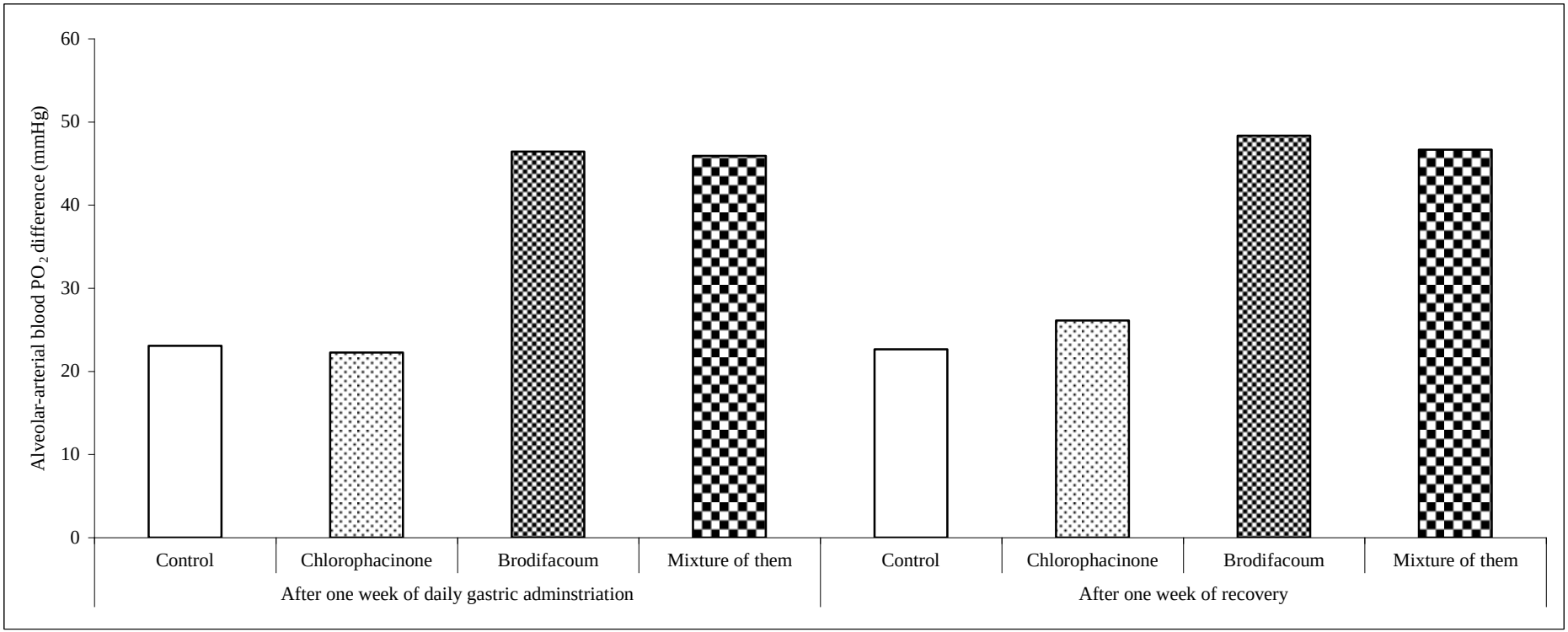

Fig. (9): Effect of repeated doses of anticoagulants; chlorophacinone ($1/30LD_{50}$; 0.18 mg/kg b.w.), brodifacoum ($1/50LD_{50}$; 0.0054 mg/kg b.w.) and a mixture of them ($1/60 + 1/100LD_{50}$; 0.095 + 0.0027 mg/kg b.w. respectively) on blood alveolar-arterial PO_2 difference of adult male albino rats after one week of daily gastric administration and after one week of recovery.

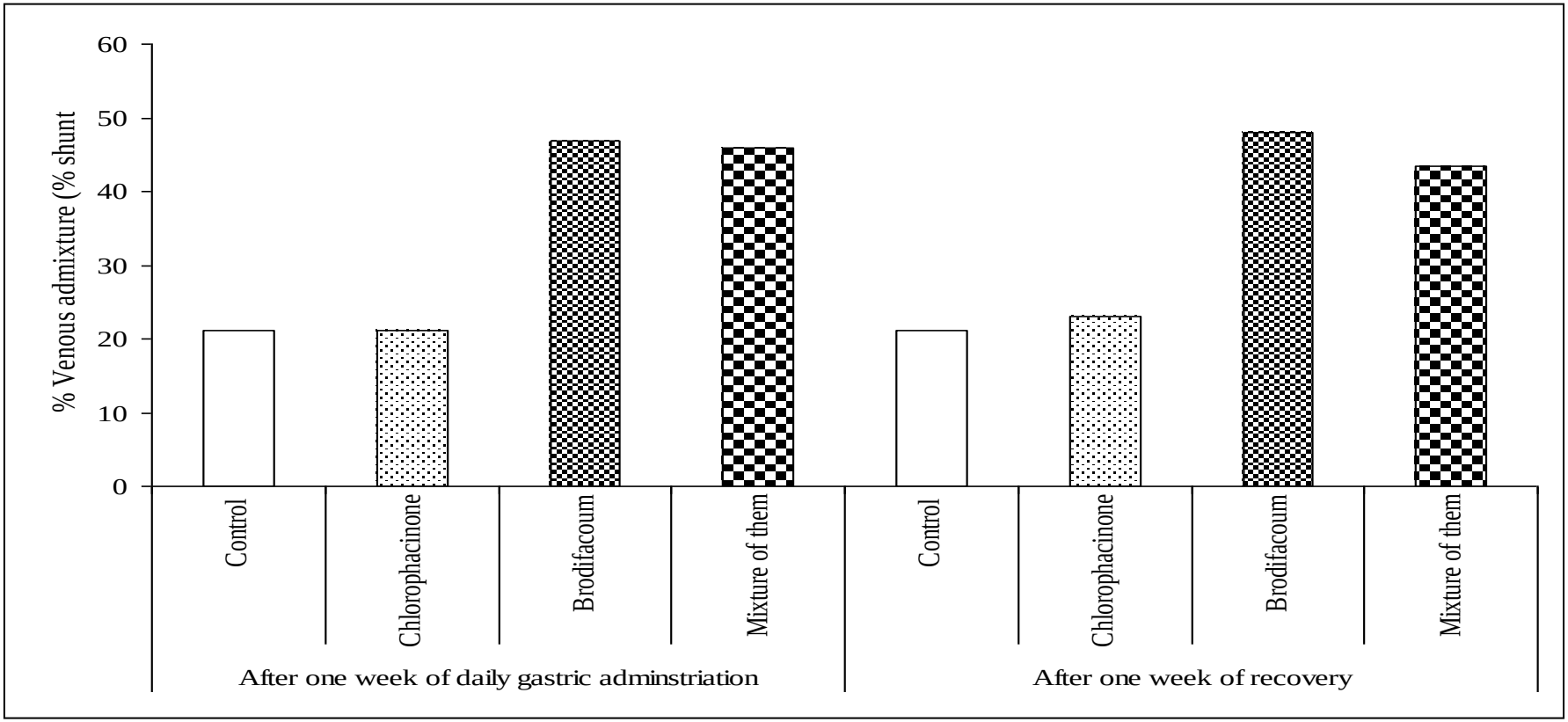

Fig. (10): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on % venous admixture (% shunt) of adult male albino rats after one week of daily gastric administration and after one week of recovery.

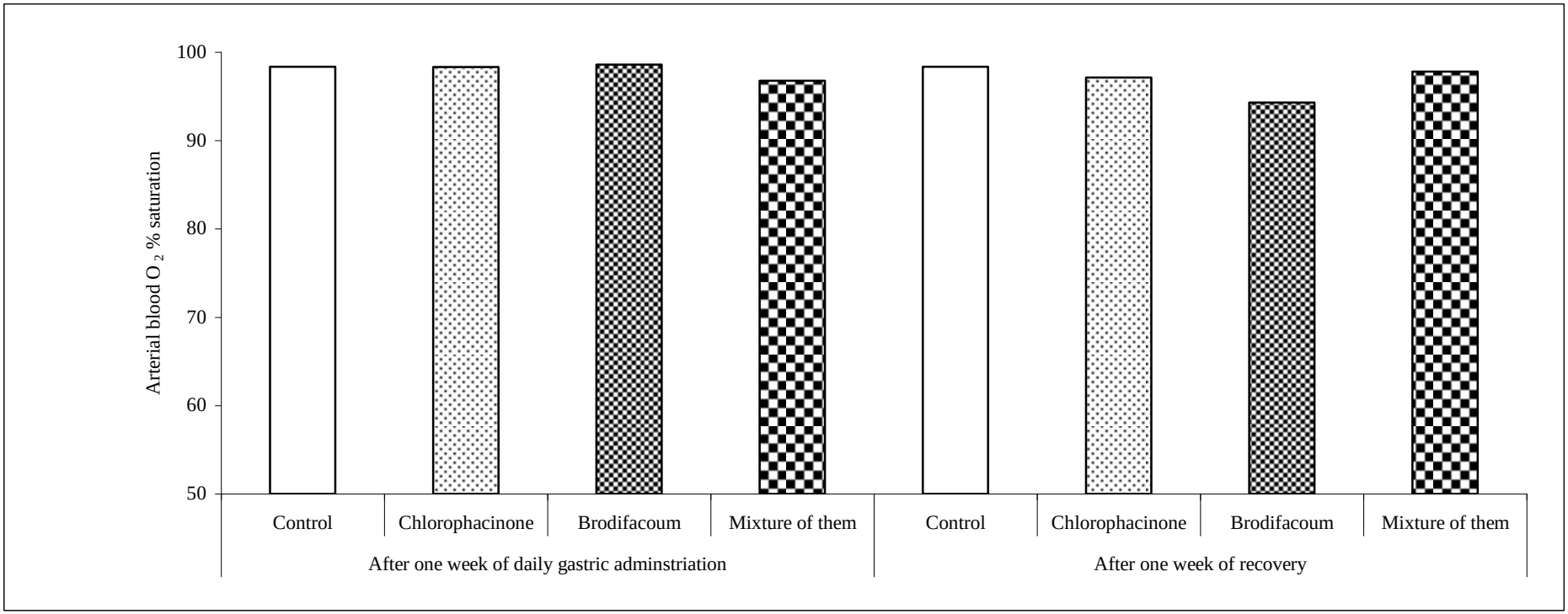

Fig. (11): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on arterial blood % O_2 saturation of adult male albino rats after one week of daily gastric administration and after one week of recovery.

brodifacoum and there were non significantly decreased in animal group treated with chlorophacinone and a mixture of chlorophacinone and brodifacoum compared to control group after one week of recovery. There were non significant differences between animal group treated with chlorophacinone and a mixture of chlorophacinone and brodifacoum but there were significant differences between animals groups treated with chlorophacinone and the animal groups treated with brodifacoum after one week of gastric administration and after one week of recovery.

Venous blood % O_2 sat values of animal groups treated with brodifacoum and a mixture of chlorophacinone and brodifacoum were significantly increased but it was significantly decreased in animal group treated with chlorophacinone compared to the control groups after one week of daily gastric administration. After one week of recovery it was significantly increased in animal groups treated with brodifacoum and a mixture but it was non significantly decreased in animal group treated with chlorophacinone compared to control groups. There were significant differences between chlorophacinone, brodifacoum and a mixture of them after one week of daily gastric administration. After one week of recovery there were significant difference between chlorophacinone treated group and the two other treated groups but there were n on significant between brodifacoum and a mixture of them groups (Table 2 and Fig. 12).

The (a-v) difference of % O_2 sat was significantly decreased in animal group treated with brodifacoum and a mixture of chlorophacinone and brodifacoum but it was significantly increased in animals group treated with chlorophacinone compared to the control groups after one week of gastric administration. After one week of recovery it was non significantly increased in animal group treated with chlorophacinone but it was significantly decreased in animal group treated with brodifacoum and a mixture of them compared to the control. There were significant differences between all animal groups treated with chlorophacinone, brodifacoum and a mixture of them after one week of daily gastric administration and after one week of recovery (Table 2 and Fig. 13).

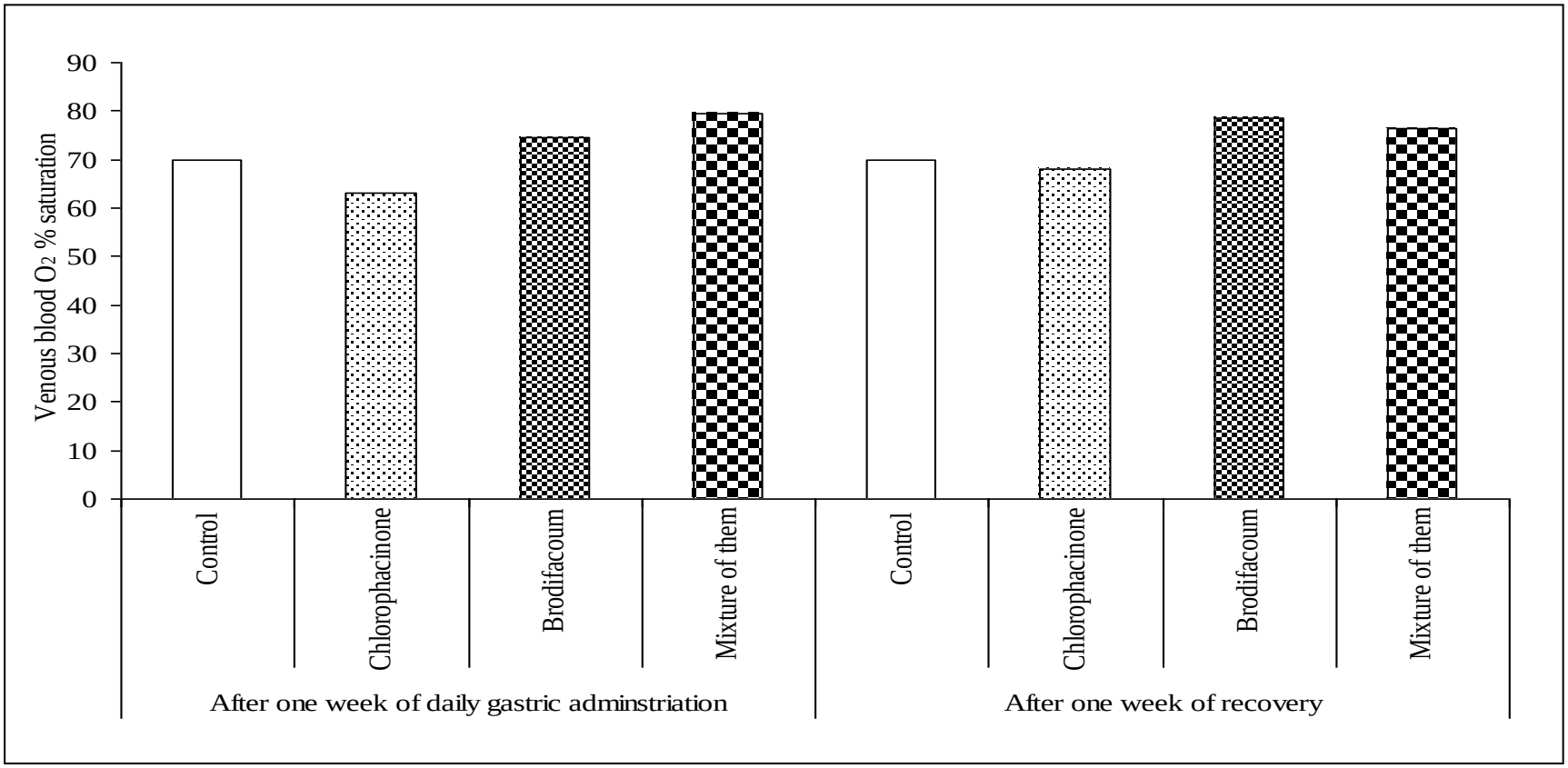

Fig. (12): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on venous blood % O_2 saturation of adult male albino rats after one week of daily gastric administration and after one week of recovery.

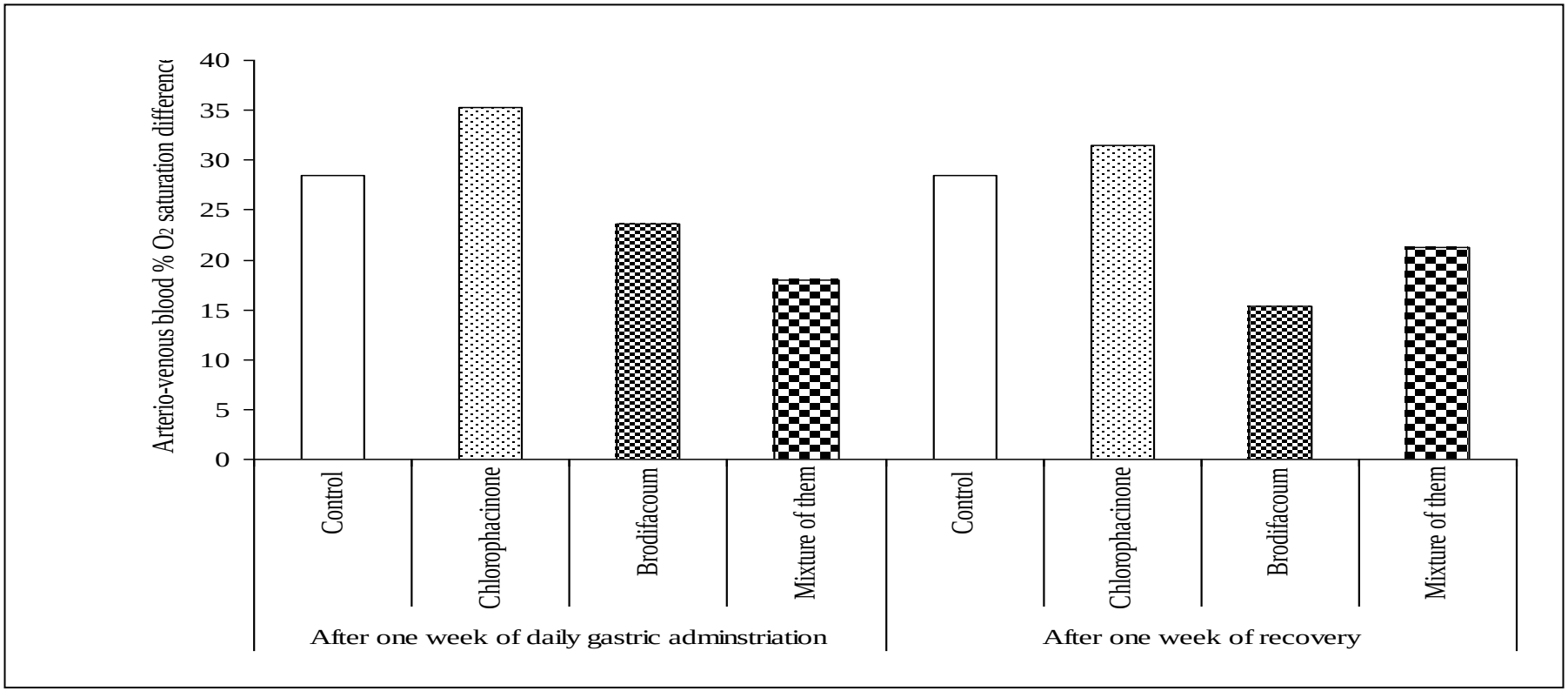

Fig. (13): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on arterio-venous blood % O_2 saturation of adult male albino rats after one week of daily gastric administration and after one week of recovery.

Carbon dioxide partial pressure (PCO_2):

The results present in table (2) and fig. (14) showed that significantly increased in arterial blood PCO_2 (P_aCO_2) in animal groups treated with chlorophacinone but it was non significantly changed in the animal groups treated with brodifacoum and a mixture of chlorophacinone and brodifacoum after one week of daily gastric administration. It was significantly increased in animal groups treated with brodifacoum but it was non significantly increased and decreased in the animal groups treated with chlorophacinone and a mixture respectively after one week of recovery. There were significant differences between all animal groups treated with chlorophacinone, brodifacoum and a mixture of them after one week of daily gastric administration. There were non significant differences between animal groups treated with chlorophacinone and a mixture of them but there were significant differences between animal groups treated with brodifacoum and the two groups after one week of recovery.

The venous blood PCO_2 (P_vCO_2) values were significantly increased in all animal groups treated with chlorophacinone and but it was non significantly changed in animal group treated with brodifacoum and a mixture of them after one week of daily gastric administration compared to the control group. While it was significantly decreased in animal groups treated with brodifacoum and a mixture of chlorophacinone and brodifacoum and non significantly changed in animal group treated with chlorophacinone after one week of recovery compared to control group. There were non significant differences between animal groups treated with brodifacoum and a mixture groups but there were significant differences between Chlorophacinone treated

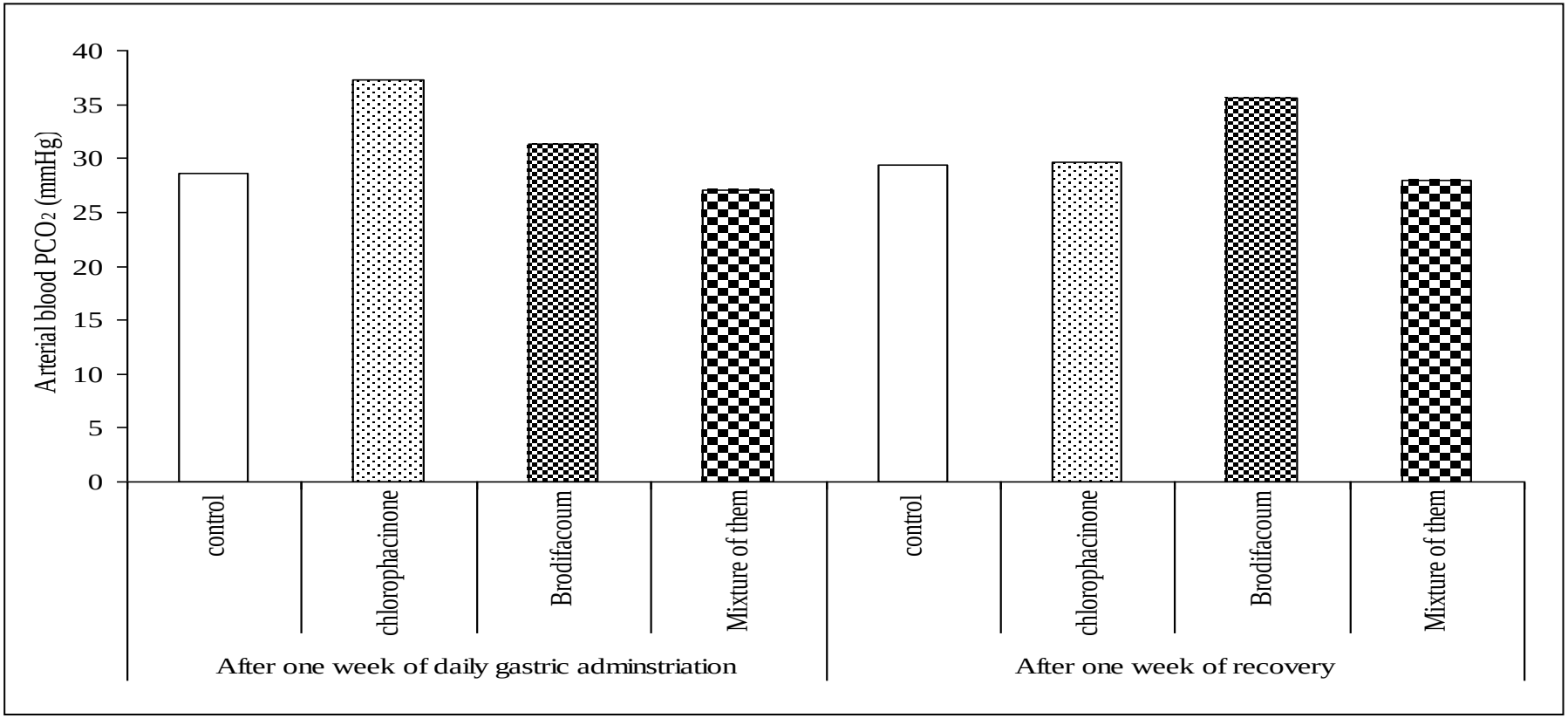

Fig. (14): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on arterial blood PCO_2 of adult male albino rats after one week of daily gastric administration and after one week of recovery.

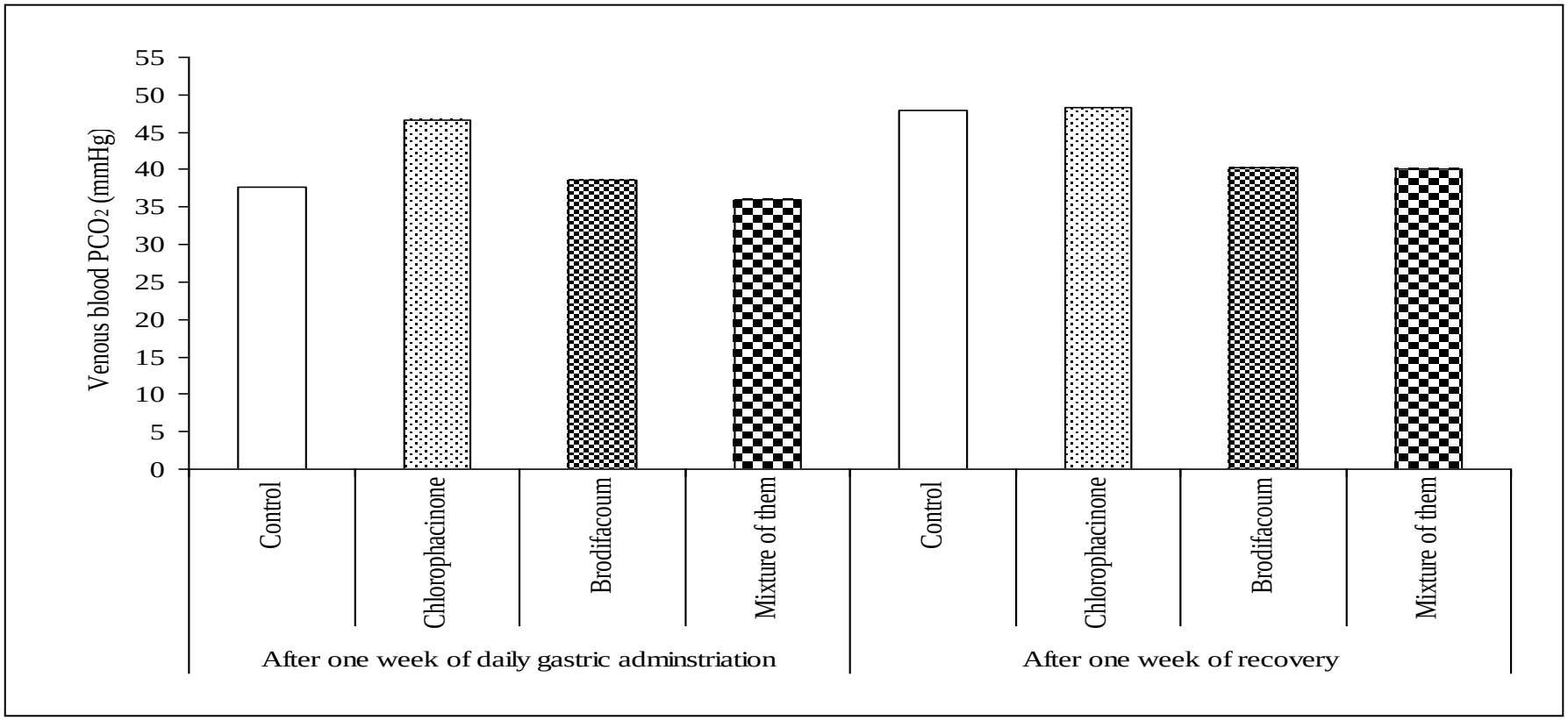

Fig. (15): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on venous blood PCO_2 of adult male albino rats after one week of daily gastric administration and after one week of recovery.

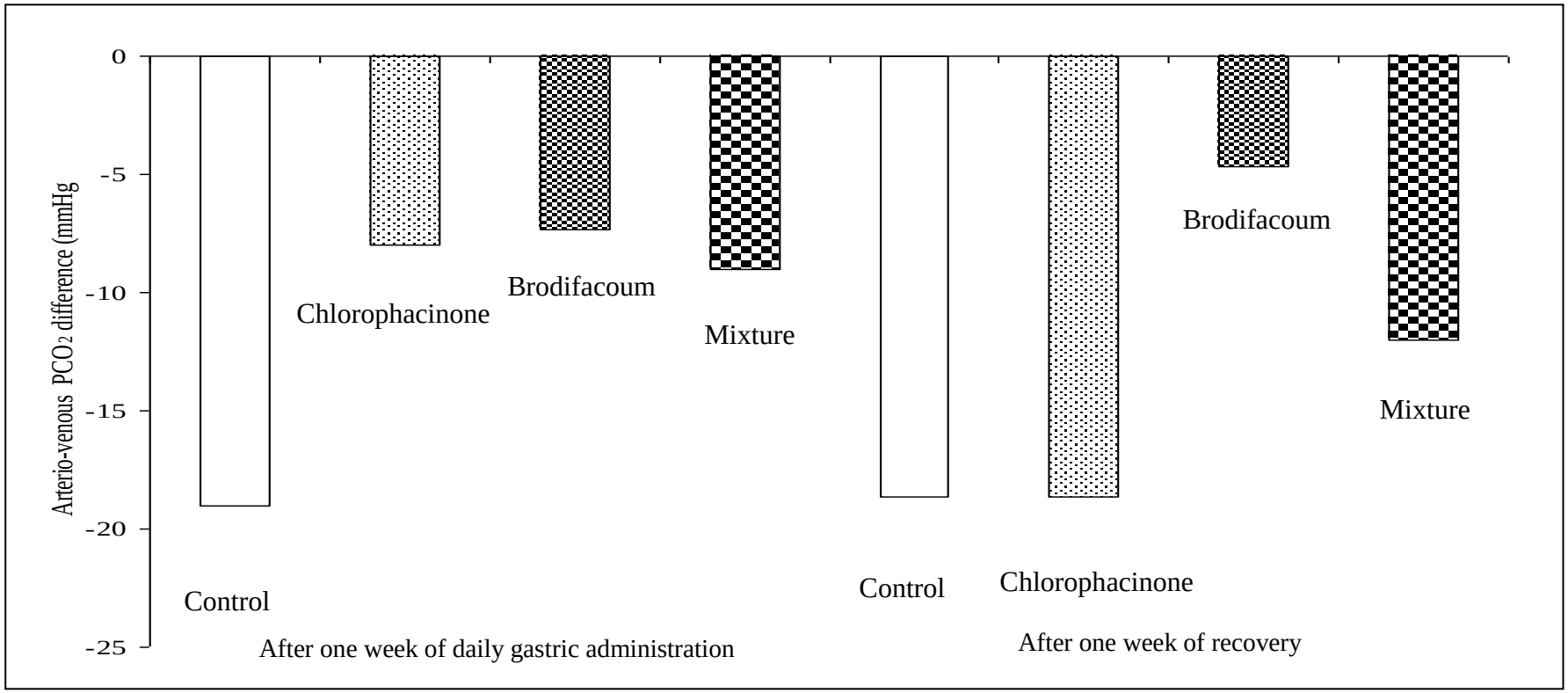

Fig. (16): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on arterio-venous blood PCO_2 of adult male albino rats after one week of daily gastric administration and after one week of recovery.

group and two other groups after one week of daily gastric administration and after one week of recovery (Table 2 and Fig 15).

The arterio-venous blood (a-v) difference of PCO_2 significantly increased in the animal groups treated with chlorophacinone, brodifacoum and a mixture of chlorophacinone and brodifacoum after one week of daily gastric administration and after one week of recovery compared to the control groups. There were non significant difference between all in animal groups after one week of daliy gastric administration, while after one week of recovery and significant differences between all treated animal groups (Table 2 and Fig. 16).

Blood acid-base status parameters:

Table (3) and figs. (17-28) illustrated the effect of sublethal dose of chlorophacinone, brodifacoum and a mixture of them on acid-base status parameters of male albino rats.

The pH value:

The data presented in table (3) and fig. (17) showed non significantly changed in arterial blood pH value in the animal groups treated with brodifacoum and a mixture of chlorophacinone and brodifacoum but it was significantly increased in animal group treated with chlorophacinone compared to the control group after one week of daily gastric administration. There were non significant changes between treated animal group and control group after one week of recovery.

Table (3): Effect of repeated doses of anticoagulants, chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on acid-base status of adult male albino rats after one week of daily gastric administration and after one week of recovery.

Parameter \ Treatment		Control	After one week of daily gastric administration					After one week of recovery					
			Chloro	Brodi	Mix	p	LSD	Control	Chloro	Brodi	Mix	p	LSD
		Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE			Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE		
pH	a	7.28 b ±0.04	7.36 a ±0.07	7.14 b ±0.03	7.19 b ±0.03	*	0.15	7.28 ±0.05	7.27 ±0.05	7.19 ±0.02	7.33 ±0.03	ns	–
	v	7.20 a ±0.01	7.25 a ±0.04	7.06 b ±0.06	7.06 b ±0.02	**	0.127	7.20 a ±0.02	7.11 bc ±0.08	7.01 c ±0.06	7.22 ab ±0.02	*	0.17
	a-v	0.08 ±0.03	0.06 ±0.12	0.07 ±0.06	0.13 ±0.4	ns	–	0.08 ±0.03	0.13 ±0.03	0.11 ±0.26	0.11 ±0.03	ns	–
HCO_3^-	a	24.60 b ±0.16	20.70 c ±0.47	16.60 d ±0.51	27.00 a ±0.69	***	2.41	24.60 a ±0.57	18.73 c ±0.19	15.90 d ±0.21	20.96b ±1.05	***	1.99
	v	18.66 a ±0.69	18.10 a ±0.46	18.55 a ±0.34	15.73 b ±1.13	**	2.34	18.76 a ±0.64	16.93 ab ±0.24	19.26 a ±0.67	14.80 b ±1.45	***	2.82
	a-v	6.60 a ±0.06	2.26 b ±.76	2.03 b ±0.17	1.90 b ±1.35	**	2.24	6.34 a ±0.06	1.86 b ±0.41	-3.36 c ±0.87	8.17 a ±0.91	**	2.37
TCO_2	a	28.50 a ±0.93	25.50 ab ±1.33	23.47 bc ±0.66	22.20 bc ±0.65	***	3.06	28.83 a ±1.21	21.00 c ±0.40	24.50 b ±0.68	25.86 b ±0.38	***	2.50
	v	18.20 a ±0.16	17.40 a ±0.69	19.23 b ±0.66	18.20 a ±0.36	***	1.98	18.93 ±0.55	19.96 ±1.13	16.90 ±0.70	20.00 ±0.59	ns	–
	a-v	9.60 a ±0.45	8.10 a ±1.78	4.23 b ±1.13	4.06 b ±0.49	**	3.60	9.90 a ±0.70	1.70 c ±0.67	7.40 ab ±1.69	5.86 b ±0.28	**	3.12
BE	a	-17.40 a ±-0.46	-11.37 b ±-0.58	-18.83 a ±-0.62	-11.37 b ±-0.78	***	2.03	-17.46 a ±-0.34	-11.96 b ±-0.48	-13.83 b ±-0.77	-8.30 d ±-0.93	***	-2.22
	v	-9.73 b ±-0.69	-7.43 b ±-0.54	-13.26 a ±-1.16	-13.26 a ±-0.79	**	3.27	-9.80 b ±-0.64	-16.13 a ±-0.84	-9.83 b ±-0.64	-5.56 c ±-0.59	***	-2.32
	a-v	-7.66 a ±-0.48	-3.90 bc ±-0.79	-5.23 ab ±-1.16	-1.90 c ±-0.32	**	2.47	-7.66 a ±-0.43	-4.16 b ±-.066	-4.13 b ±-0.98	-2.40 b ±-0.10	**	-2. 06

Chloro.= Chlorophacinone Brodi.= Brodifacoum Mix.= Mixture of chlorophacinone and brodifacoum

a= Arterial blood v= Venous blood A= Alveolar blood

*= Significantly different at $p < 0.05$ **= Significantly different at $p < 0.01$ ***= Significantly different at $p < 0.001$

ns= Non significantly different at $p<0.05$ SE= Standard error

Values are present as mean ± SE

Mean in same column followed by different letters are significantly different at ($P \leq 0.05$).

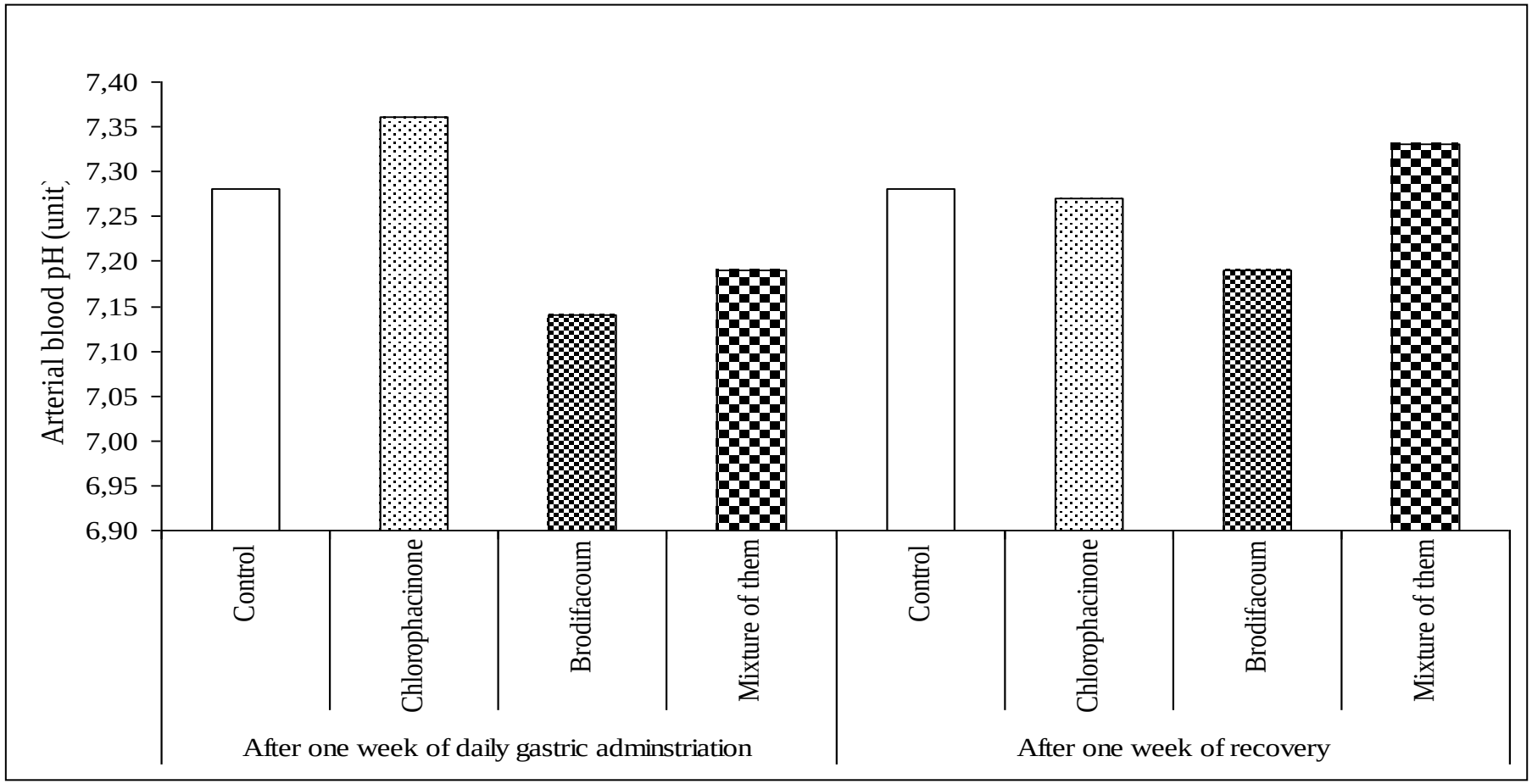

Fig. (17): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on arterial blood pH of adult male albino rats after one week of daily gastric administration and after one week of recovery.

There was a significant difference between animal group treated with brodifacoum and the other two treated groups after one week of daily gastric administration.

The venous blood pH values were significantly decreased in animal groups treated with brodifacoum and a mixture of chlorophacinone and brodifacoum but it was non significantly decreased in the animal groups treated with chlorophacinone after one week of daily gastric administration. It was significantly decreased in all animal groups treated with chlorophacinone, brodifacoum and a mixture of them compared to the control group after one week of recovery. There were significant differences between animals groups treated with chlorophacinone and the other two groups after one week of daily gastric administration and there were significant differences between all treated animal groups after one week of recovery (Table 3 and Fig. 18).

The arterio-venous blood (a-v) difference of pH values of the animal groups treated with anticoagulant rodenticides, chlorophacinone, brodifacoum and a mixture of them were non significantly changed compared to the control groups after one week of daily gastric administration and after one week of recovery. There were non significant differences between all animal groups treated with chlorophacinone, brodifacoum and a mixture of them after one week of daily gastric administration and after one week of recovery (Table 3 and Fig. 19)

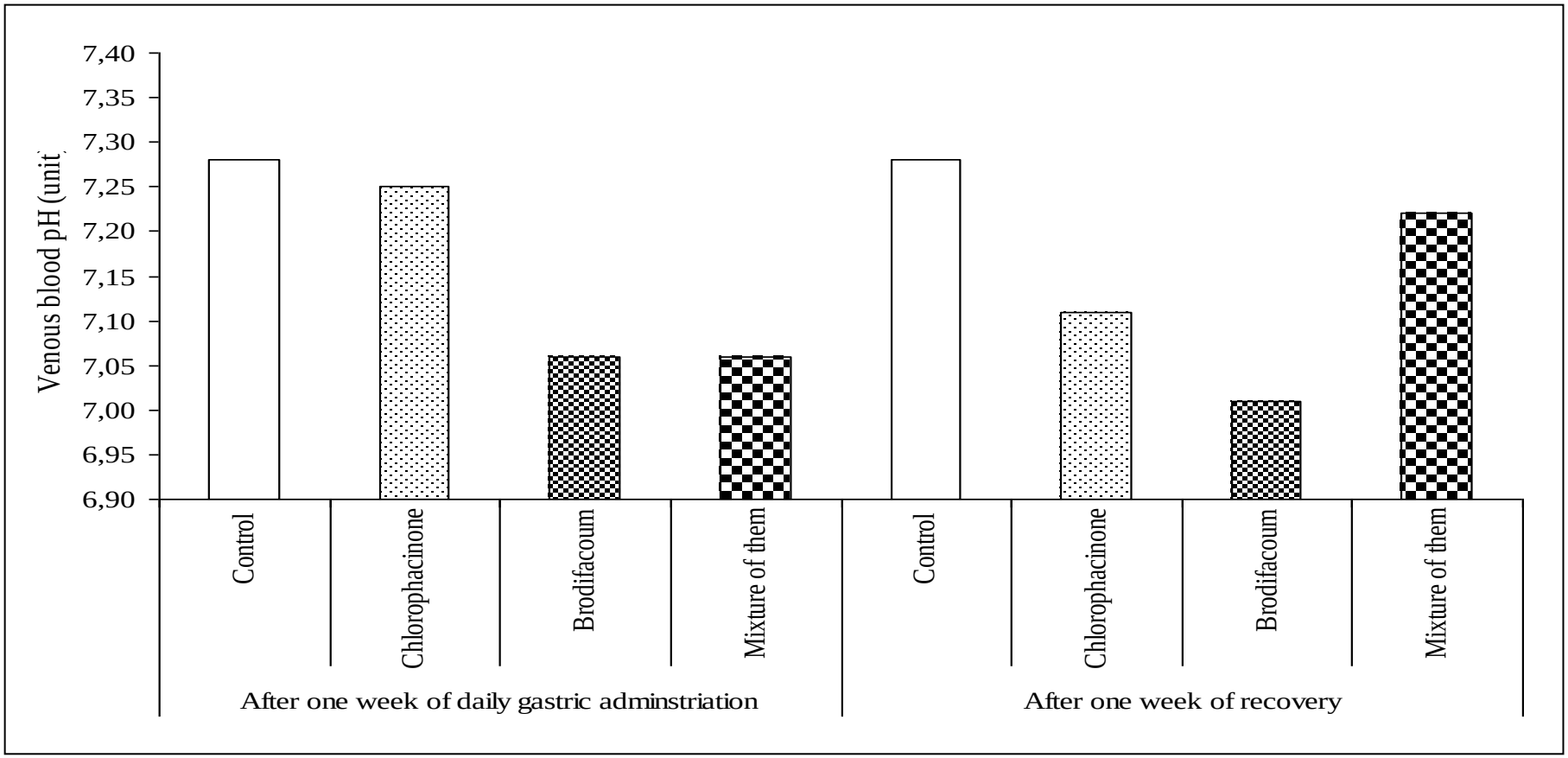

Fig. (18): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on venous blood pH of adult male albino rats after one week of daily gastric administration and one week after recovery.

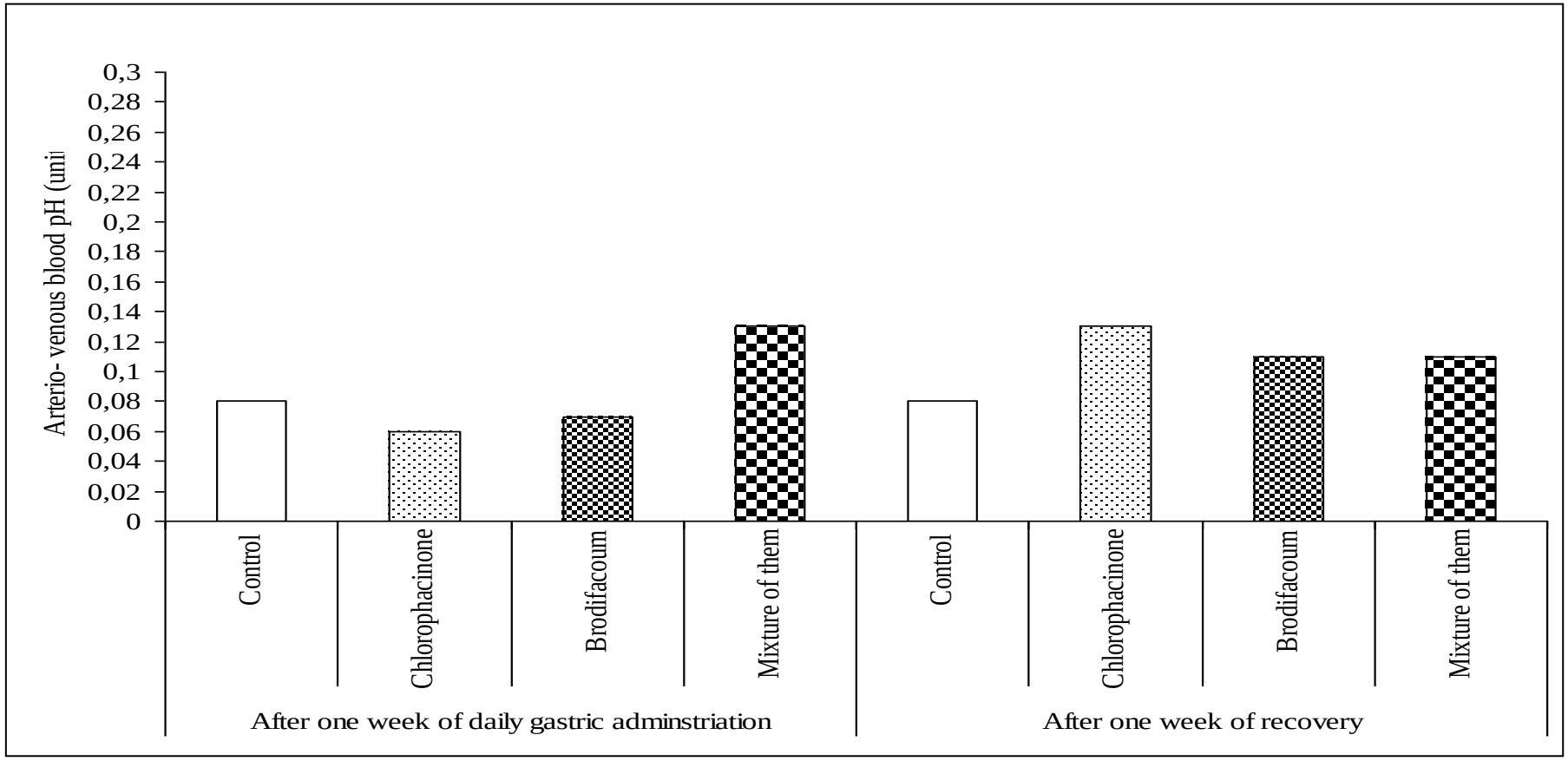

Fig. (19): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on arterio-venous blood of adult male albino rats after one week of daily gastric administration and after one week of recovery.

Biocarbonate concentration (HCO_3^-):

The result presented in table (3) and fig.(20) showed that arterial blood HCO_3^-concentration value was significantly decreased in animal groups treated with chlorophacinone and brodifacoum but it was significantly increased in animal group treated with a mixture of chlorophacinone and brodifacoum after one week of daily gastric administration**.** It was significantly decreased in the animal groups treated with chlorophacinone, brodifacoum and a mixture of chlorophacinone and brodifacoum after one week of recovery compared to the control group.

There were significant differences between all animal groups after one week of daily gastric administration and after one week of recovery.

The venous blood HCO_3^-concentration values were significantly decreased in animal groups treated with a mixture of chlorophacinone and brodifacoum but it was non significantly decreased in animal groups treated with chlorophacinone and brodifacoum after one week of daily gastric administration compared to the control group. The venous blood HCO_3^- concentration values were non significantly change in animal groups treated with chlorophacinone, brodifacoum but it was significantly decreased in group treated with a mixture of chlorophacinone and brodifacoum after one week of recovery compared to the control group.

There were significant differences between treated animal groups after one week of gastric administration and after one week of recovery (Table 3 and Fig. 21).

The arterio-venous blood (a-v) values of HCO_3^-concentration were significantly decreased in animal groups treated with chlorophacinone,

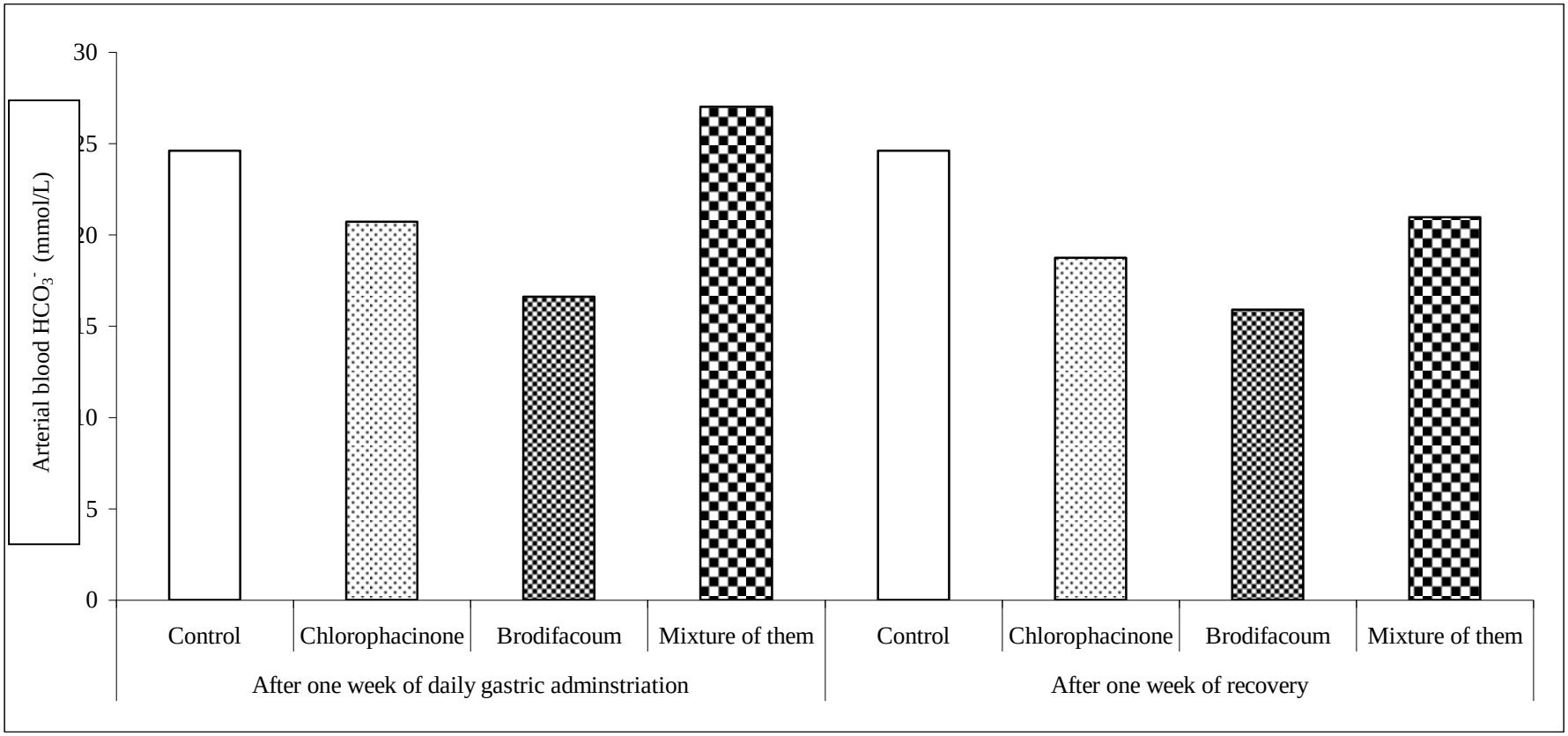

Fig. (20): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on arterial blood HCO_3^- of adult male albino rats after one week of daily gastric administration and after one week of recovery.

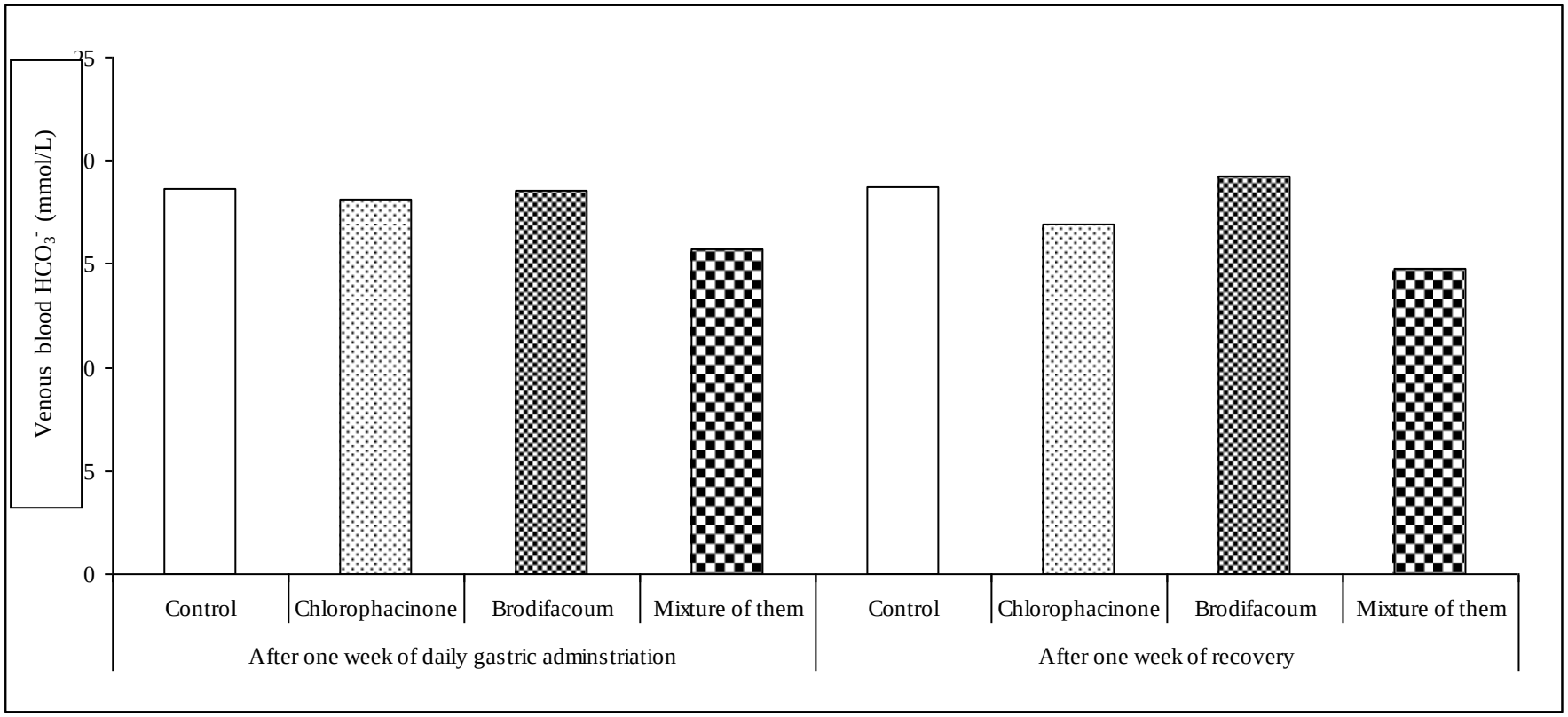

Fig. (21): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on venous blood HCO_3^- of adult male albino rats after one week of daily gastric administration and after one week of recovery.

brodifacoum and a mixture of chlorophacinone and brodifacoum after one week of daily gastric administration. The arterio-venous blood (a-v) values of HCO_3^- concentration were non significant changed in animal groups treated with a mixture of chlorophacinone and brodifacoum but it was decreased significantly in animal group treated with brodifacoum and chlorophacinone after one week of recovery. There were non significant differences between all animals groups treated with chlorophacinone, brodifacoum and a mixture of chlorophacinone and brodifacoum treated group after one week of daily gastric administration. There were significant differences between all animals groups treated with chlorophacinone, brodifacoum and a mixture of chlorophacinone and brodifacoum after one week of recovery (Table 3 and Fig. 22).

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Total carbon dioxide (TCO_2):

Table (3) and fig. (23) showed that arterial blood TCO_2 values were significantly decreased in animal groups treated with brodifacoum and a mixture of chlorophacinone and brodifacoum after one week of daily gastric administration and after one week of recovery compared to the control groups. There was significant difference between all animal groups treated with chlorophacinone, brodifacoum and a mixture of them after one week of daily gastric administration and after one week of recovery.

The venous blood (TCO_2) values in all animal groups treated with chlorophacinone, brodifacoum and a mixture of chlorophacinone and brodifacoum were non significantly change compared to the control group after one week of daily gastric administration. There was non significant difference between animal groups treated with chlorophacinone, brodifacoum and a mixture of them after one week of recovery.

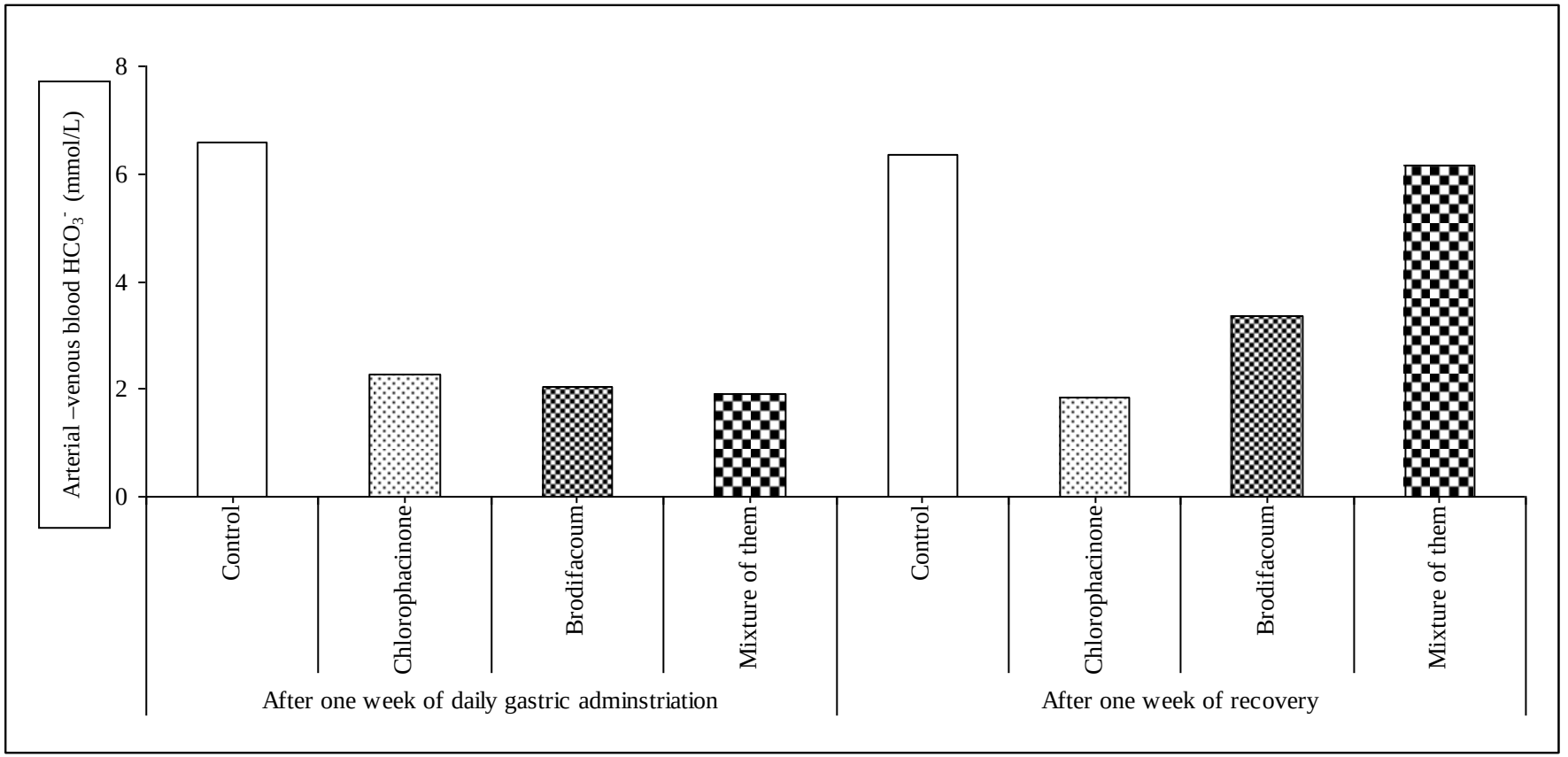

Fig. (22): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on arterio-venous blood HCO_3^- of adult male albino rats after one week of daily gastric administration and after one week of recovery.

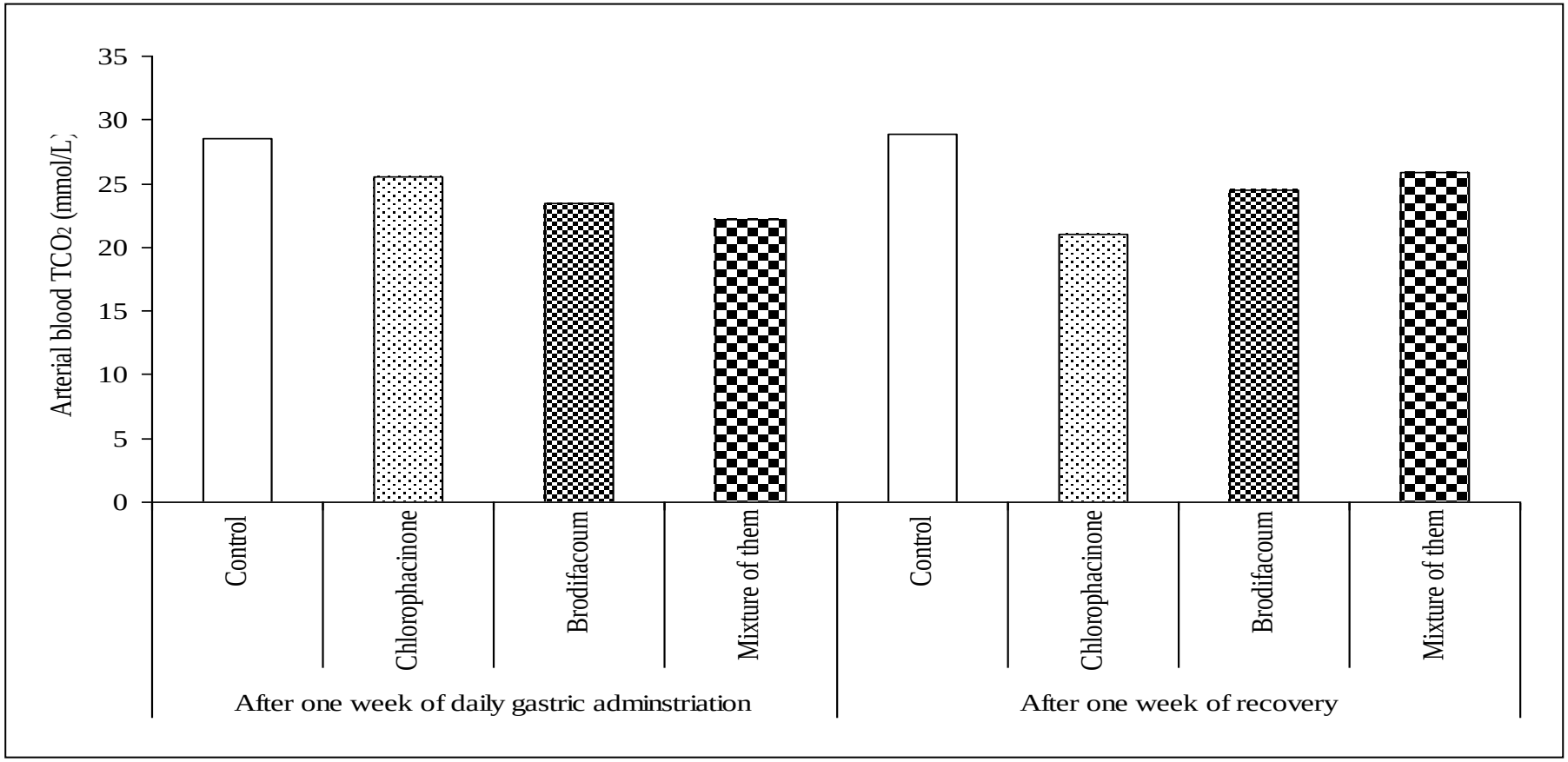

Fig. (23): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on arterial blood TCO_2 of adult male albino rats after one week of daily gastric administration and after one week of recovery.

There were non significant differences between animal groups treated with chlorophacinone, brodifacoum and a mixture of them after one week of daily gastric administration (Table 3 and Fig. 24)

The arterio-venous blood (a-v) values of TCO_2 in all animal groups treated with brodifacoum and a mixture were significantly decreased but it was non significantly changed in group treated with chlorophacinone compared to that of the control groups after one week of daily gastric administration. There were significantly decreased in all treated groups compared to the control after one week of recovery.

There were non significant differences between animal groups treated with brodifacoum and a mixture of them but there were significant differences between the two groups and treated group chlorophacinone after one week of daily gastric administration and after one week of recovery (Table 3 and Fig. 25).

Base excess (BE):

Table (3) and fig. (26) showed that arterial blood base excess value of animal groups treated with chlorophacinone and a mixture of chlorophacinone and brodifacoum were significantly higher than that of the control groups but it was non significantly decreased in animal group treated with brodifacoum after one week of daily gastric administration. While it was significantly increased in all animal groups treated with chlorophacinone, brodifacoum and a mixture of them after one week of recovery.

The venous blood base excess values were significantly decreased in animal groups treated with brodifacoum and a mixture of chlorophacinone and brodifacoum, while it was non significantly

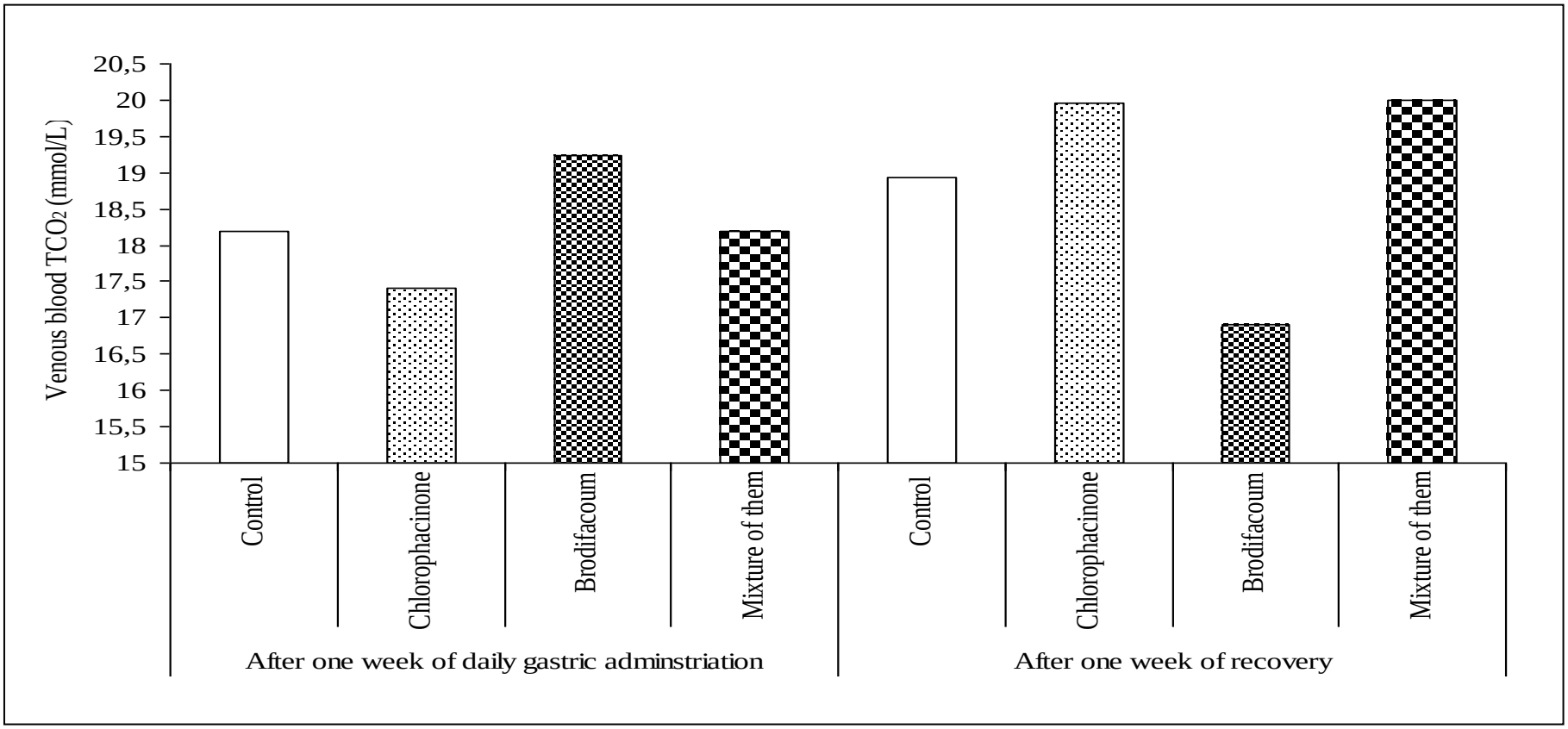

Fig. (24): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on venous blood TCO_2 of adult male albino rats after one week of daily gastric administration and after one week of recovery.

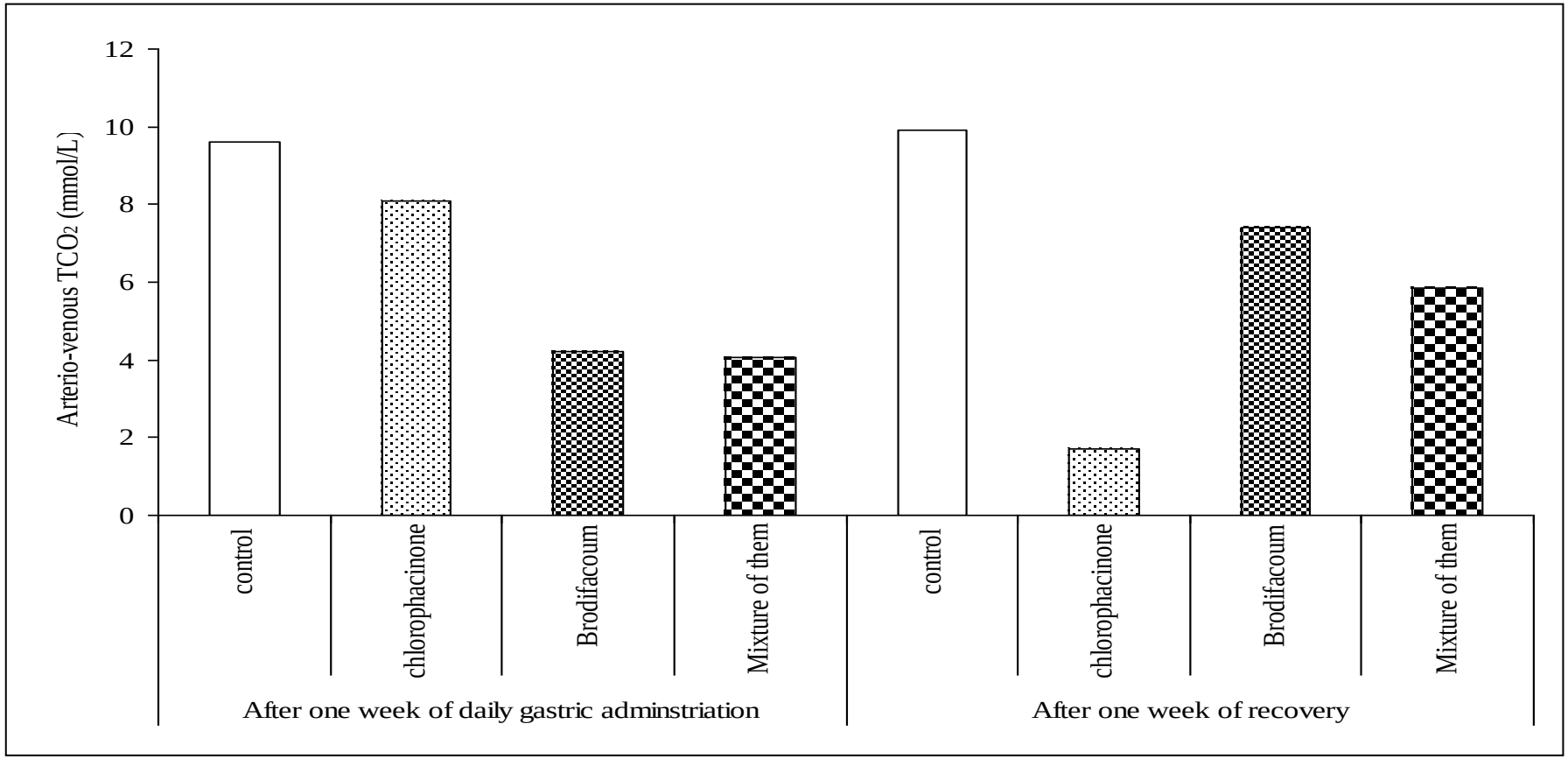

Fig. (25): Effect of repeated doses of anticoagulant; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on arterio-venous blood TCO_2 of adult male albino rats after one week of gastric administration and after one week of recovery.

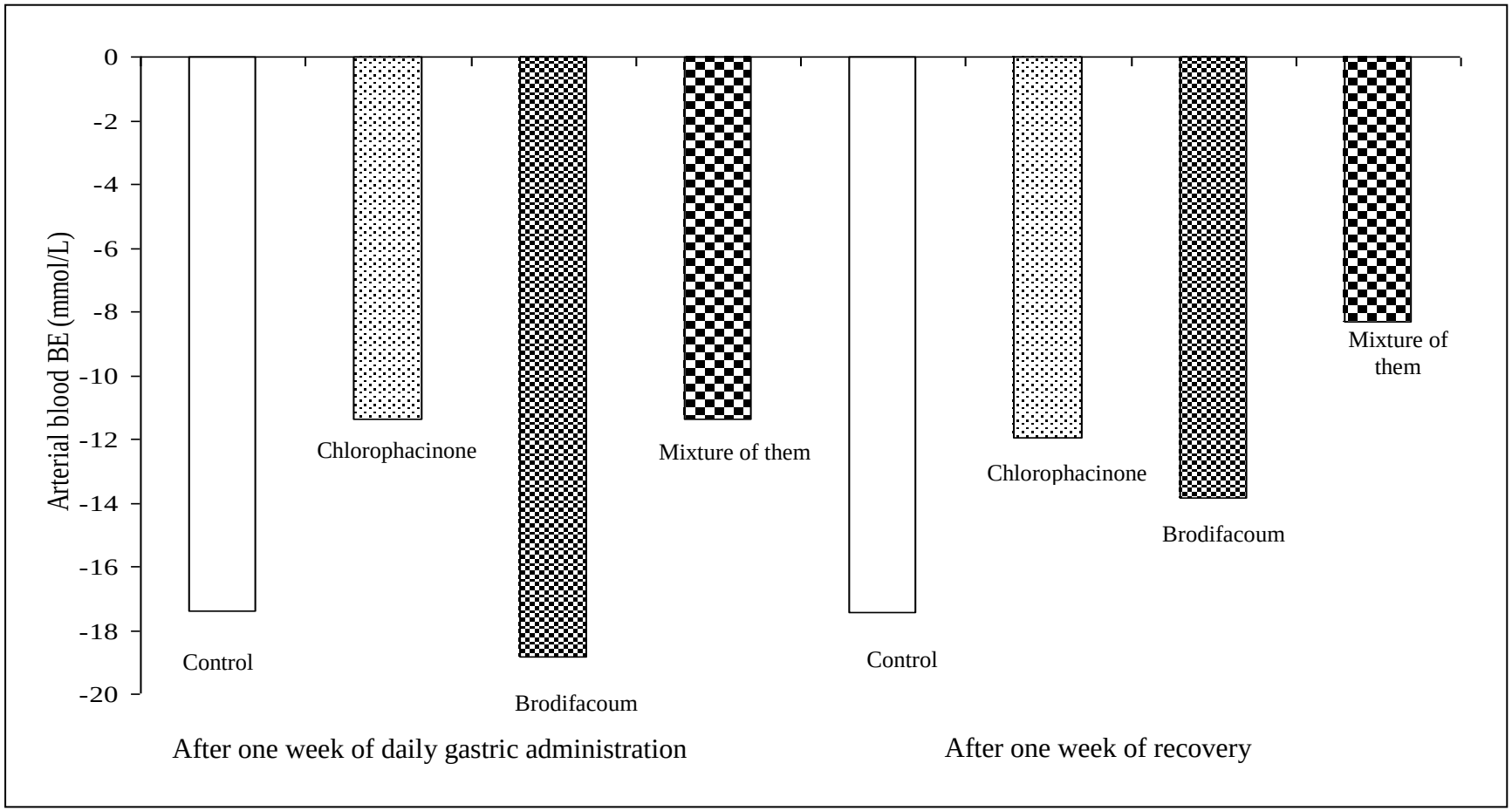

Fig. (26): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on arterial blood BE of adult male albino rats after one week of daily gastric administration and after one week of recovery.

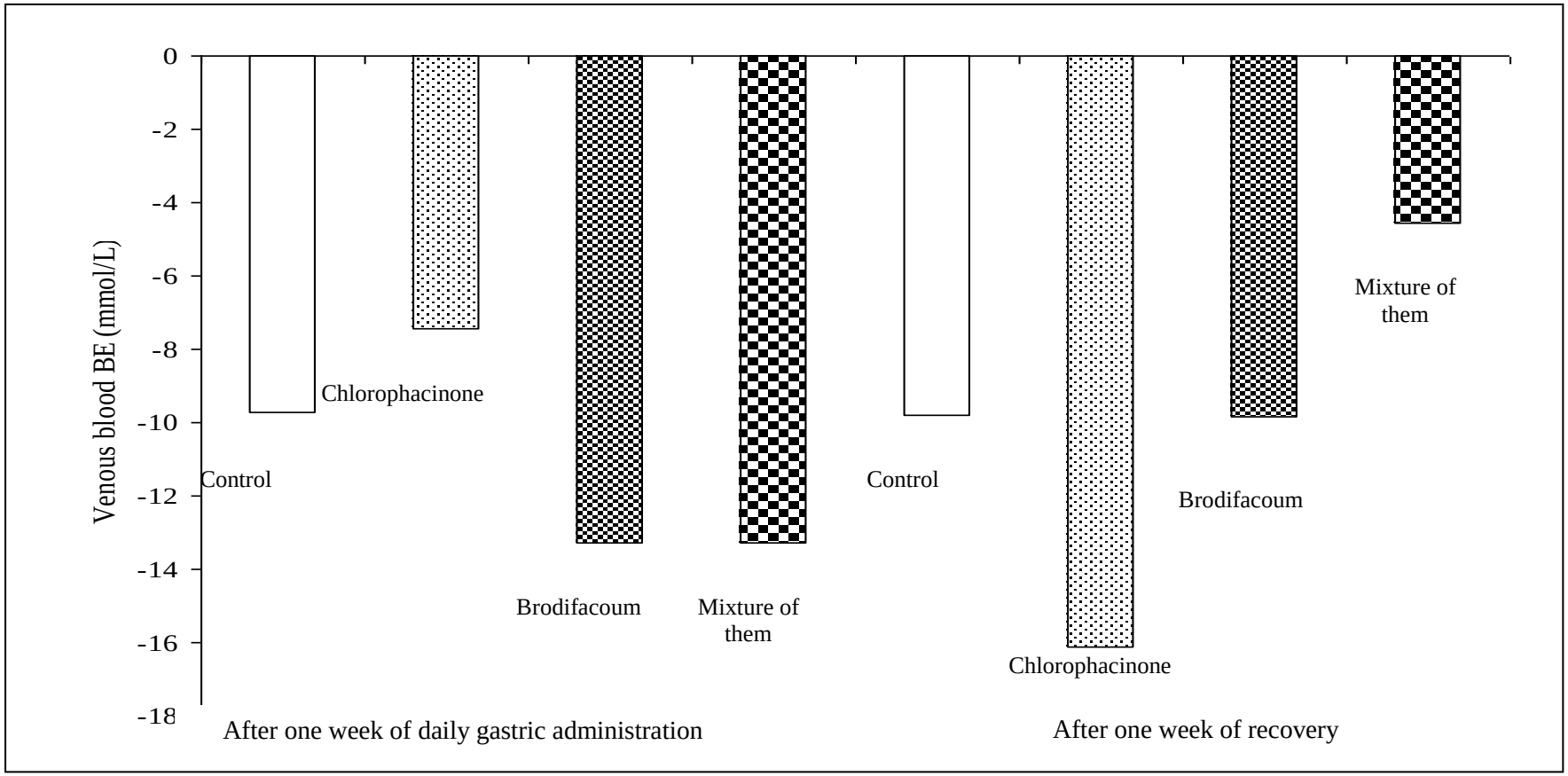

Fig. (27): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on venous blood BE of adult male albino rats after one week of daily gastric administration and after one week of recovery.

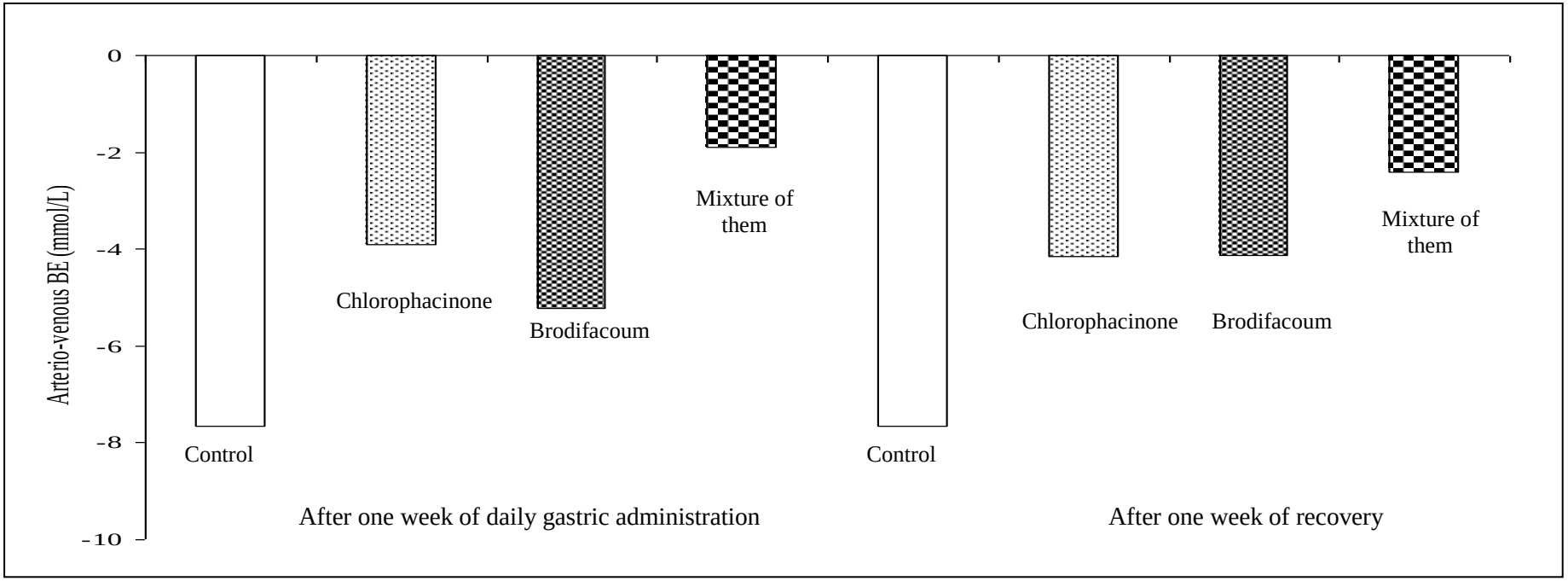

Fig. (28): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on arterio-venous blood BE of adult male albino rats after one week of daily gastric administration and after one week of recovery.

increased in animal group treated with chlorophacinone compared to the control group after one week of daily gastric administration. It was non significantly increased in animal group treated with brodifacoum, it was significantly decreased in animal group treated with chlorophacinone and it was significantly increased in animal group treated with a mixture of chlorophacinone and brodifacoum compared to the control group after one week of recovery (Table 3 and fig. 27).

The arterio-venous blood (a-v) BE value in all treated animal groups were significantly increased compared to the control group after one week of daily gastric administration and after one week of recovery. There were significant differences between all treated animal groups after one week of daily gastric administration. There were non significant differeance between treated animal groups after one week of recovery.

Blood oxygen equilibrum curve (OEC):

Table (4) and figs. (29-30) the oxygen equilibrium curves **(**OEC**)** of the animal groups treated with chlorophacinone, brodifacoum and a mixture of them were found to be shifted to the right in relation to that of the control group. The value of blood oxygen half saturation presser (P_{50}); as a measure of blood oxygen affinity was found to be (30.0 ±0.2), (34.0 ±0.2), (36.0 ±0.3) and (37.0 ±0.4) for control, chlorophacinone, brodifacoum and a mixture of them treated groups after one week of daily gastric administration. The P50 values were significantly different after one week of recovery the p_{50} value was found to be (30.0 ±0.2), (40.4 ±1.0), (35.7±0.5) and (37.0±0.5) for control, chlorophacinone, brodifacoum and a mixture of them animal groups respectively (Fig. 29 and 30 and Table 4).

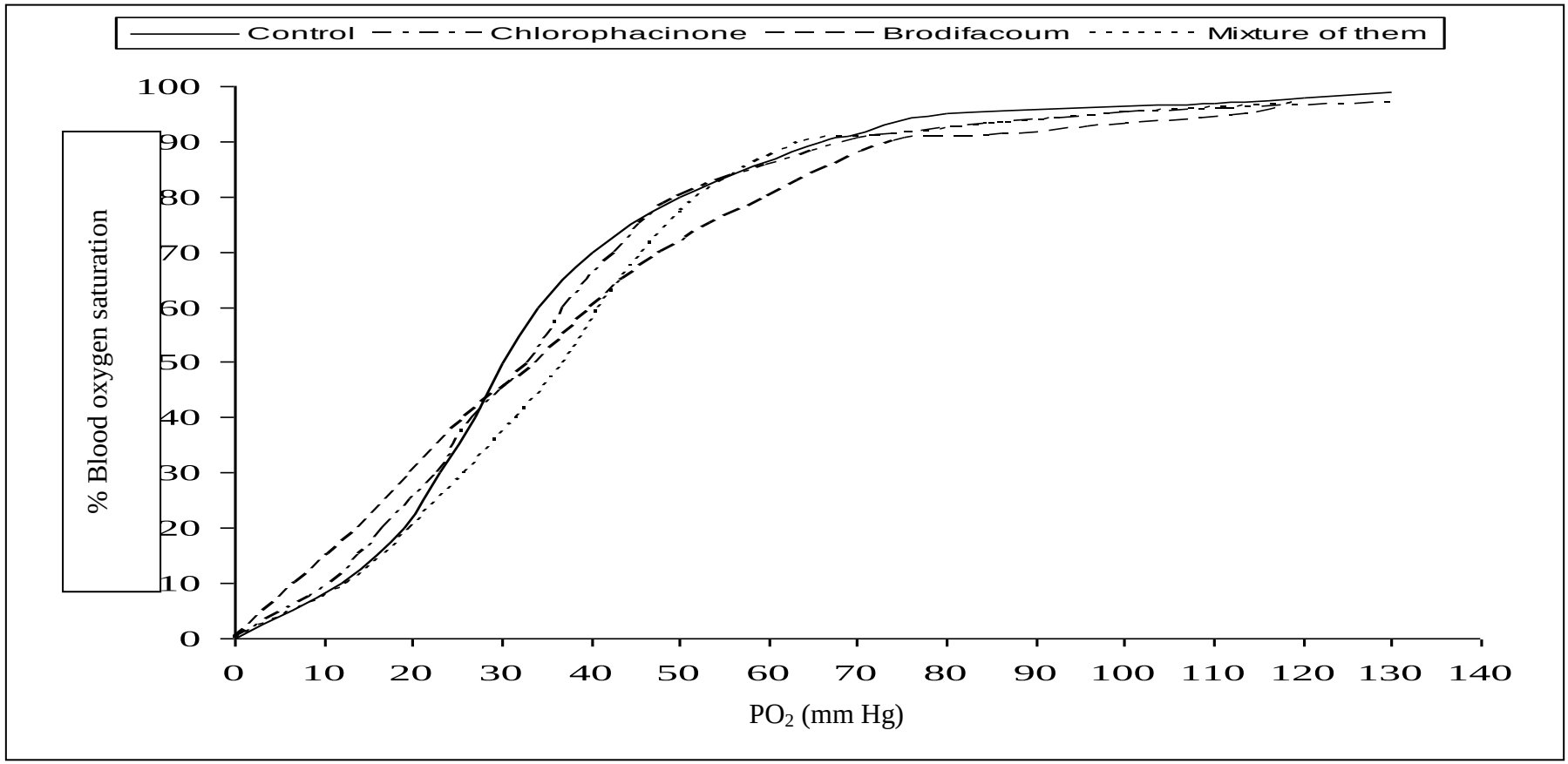

Fig. (29): Blood oxygen curves of male Albino ruttus treated with repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) after one week of daily gastric administration.

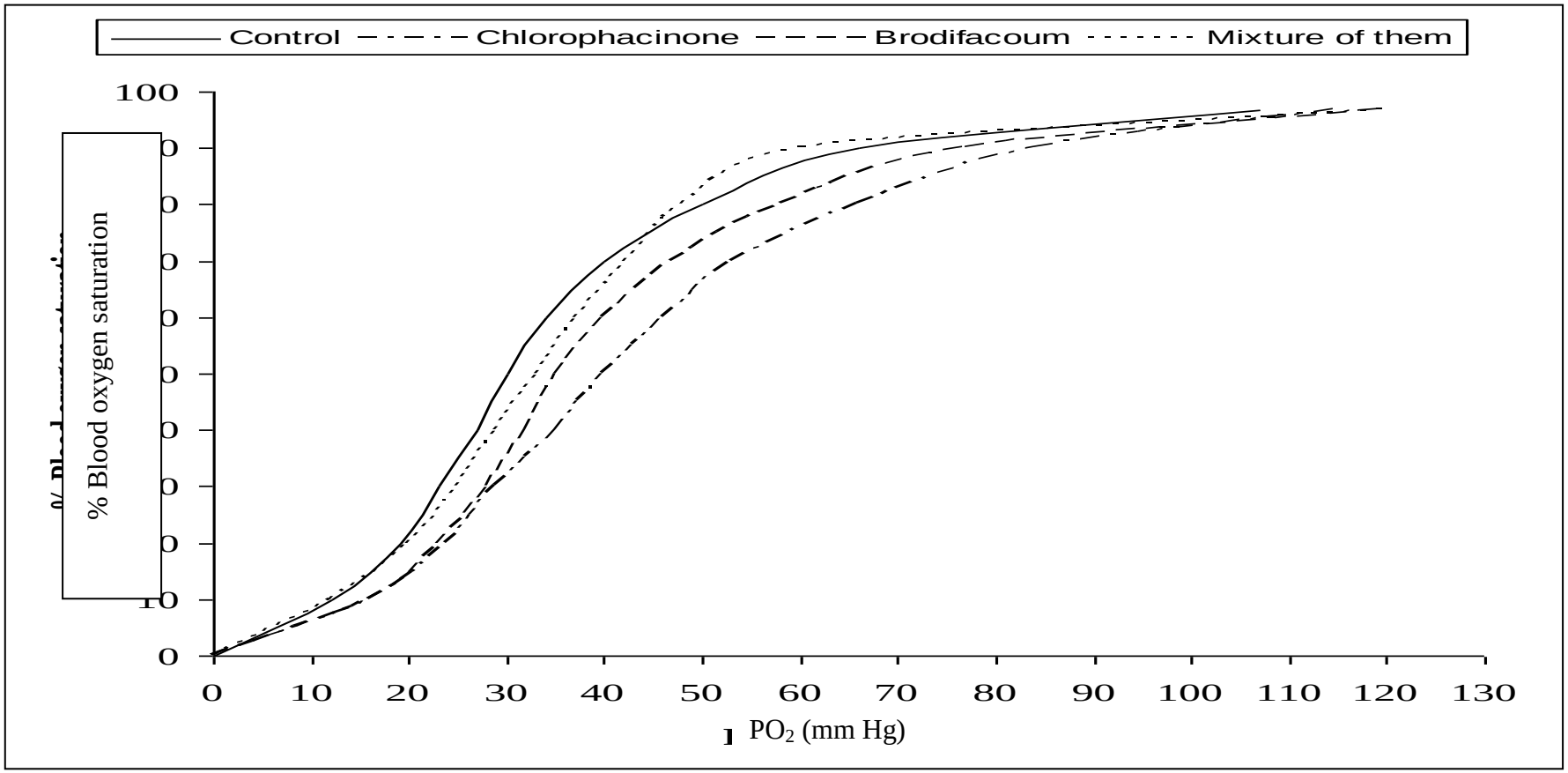

Fig. (30): Blood oxygen curves of male Albino ruttus treated with repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) after one week of recovery.

Table (4): Effect of repeated doses of anticoagulants, chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on blood oxygen half saturation pressure (P_5o) of adult male albino rats after one week of daily gastric administration and after one week of recovery.

Treatment / Parameters	After one week of daily gastric administration						After one week of recovery					
	Control Mean ±SE	Chloro. Mean ±SE	Brodi. Mean ±SE	Mix. Mean ±SE	P	LSD	Control Mean ±SE	Chloro. Mean ±SE	Brodi. Mean ±SE	Mix. Mean ±SE	P	LSD
P_{50}	c 30.00 ±0.02	b 34.00 ±0.20	a 36.00 ±0.30	a 37.40 ±0.40	**	1.88	c 30.04 ±0.02	a 40.00 ±1.00	b 35.70 ±0.50	b 37.00 ±.050	**	1.92

Values expressed as mean ± standard error (SE).

Chloro.= Chlorophacinone Brodi.= Brodifacoum Mix.= Mixture of chlorophacinone and brodifacoum

**= Significantly different at p< 0.01 Values are present as mean ± SE

Mean in same column followed by different letters are significantly different at (P ≤ 0.05).

Biochemical Parameters:

Plasma alanine aminotransferase (ALT):

The results presented in table (5) and fig. (31) showed that plasma ALT level was significantly increased in animal groups treated with chlorophacinone, brodifacoum and a mixture of them after one week of daily gastric administration and after one week of recovery compared to the control groups. There were non significant differences between treated groups after one week of daily gastric administration and one week of recovery.

Plasma aspartate aminotransferase (AST):

The results presented in table (5) and fig. (32) showed that plasma AST level was significantly increased in all animal groups treated with chlorophacinone, brodifacoum and a mixture of them after one week of daily gastric administration. While it was significantly decreased in animal group treated with chlorophacinone and significantly increased in animal group treated with brodifacoum and a mixture of them after one week of recovery compared to the control group. There were significant differences between treated groups after one week of daily gastric administration and after one week of recovery.

Plasma total bilirubin:

The data presented in table (5) and fig. (33) showed that the plasma level of total bilirubin in animal groups treated with a mixture was significantly increased after one week of daily gastric administration compared to the control groups. After one week of recovery in all treated groups were significantly increased compared to the control groups. There were significant differences between treated groups after one week of daily gastric administration and after one week of recovery.

Table (5): Effect of repeated doses of anticoagulant; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on plasma alanine aminotransferase (ALT), asprtate aminotransferase (AST), bilirubin and Vitamin –K- epoxide reductase of adult male albino rats after one week of daily gastric administration and after one week of recovery.

Treatment / Parameter	After one week of daily gastric administration						After one week of recovery					
	Control	Chloro	Brodi	Mix	p	LSD	Control	Chloro	Brodi	Mix	p	LSD
	Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE			Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE		
ALT (U/L)	b 35.00 ±2.23	a 56.00 ±4.10	a 50.00 ±3.90	a 53.20 ±5.10	***	7.41	b 35.30 ±2.20	ab 40.60 ±2.20	a 45.80 ±4.10	a 47.00 ±4.70	***	6.40
AST (U/L)	d 23.00 ±0.10	c 30.20 ±3.00	b 36.00 ±4.30	a 78.60 ±5.80	***	6.05	c 22.90 ±0.10	d 11.80 ±1.60	b 38.00 ±2.70	a 60.60 ±0.40	***	10.52
BILIRUBIN (g/dl)	b 0.81 ±0.03	b 1.15 ±0.04	b 1.11 ±0.04	a 2.05 ±0.05	***	0.67	d 0.82 ±0.03	a 1.42 ±0.02	c 1.21 ±0.02	b 1.33 ±0.03	***	0.04
Vitamin –K- epoxide reductase (nmol K/min/g liver)	a 27.90 ±0.08	ab 26.80 ±0.03	b 25.36 ±0.15	c 19.36 ±0.36	***	1.80	a 28.10 ±0.33	b 26.10 ±0.05	c 23.80 ±0.41	d 21.20 ±1.08	***	1.90

Chloro.= Chlorophacinone Brodi.= Brodifacoum Mix.= Mixture of chlorophacinone and brodifacoum

***= Significantly different at p< 0.001 SE=Standard error

Values are present as mean ± SE

Mean in same column followed by different letters are significantly different at ($P \leq 0.05$).

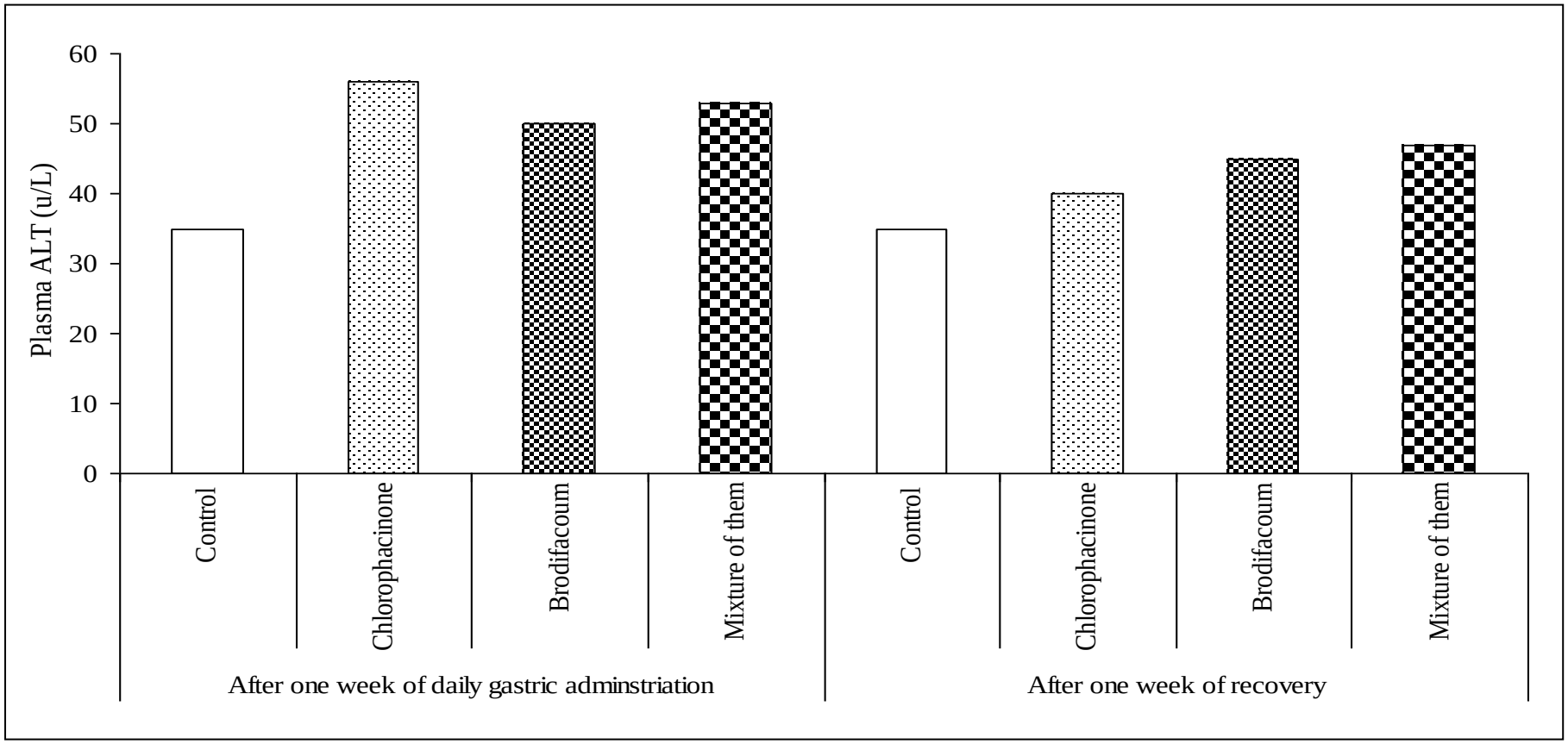

Fig. (31): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on plasma alanin aminotransferase (ALT) (u/l) of adult male albino rats after one week of daily gastric administration and after one week of recovery.

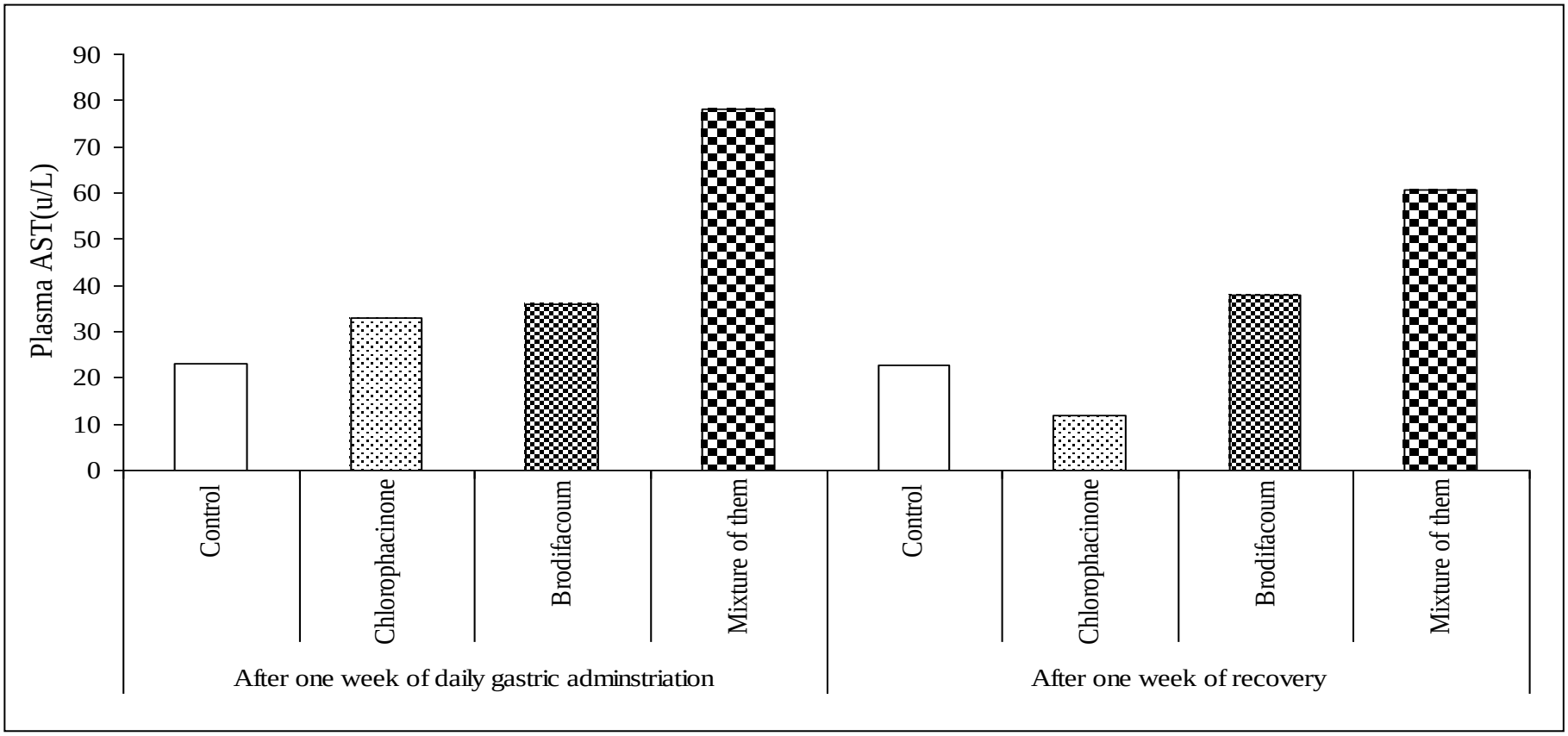

Fig. (32): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on plasma aspartate aminotranferase (AST) (u/l) of adult male albino rats after one week of daily gastric administration and after one week of recovery.

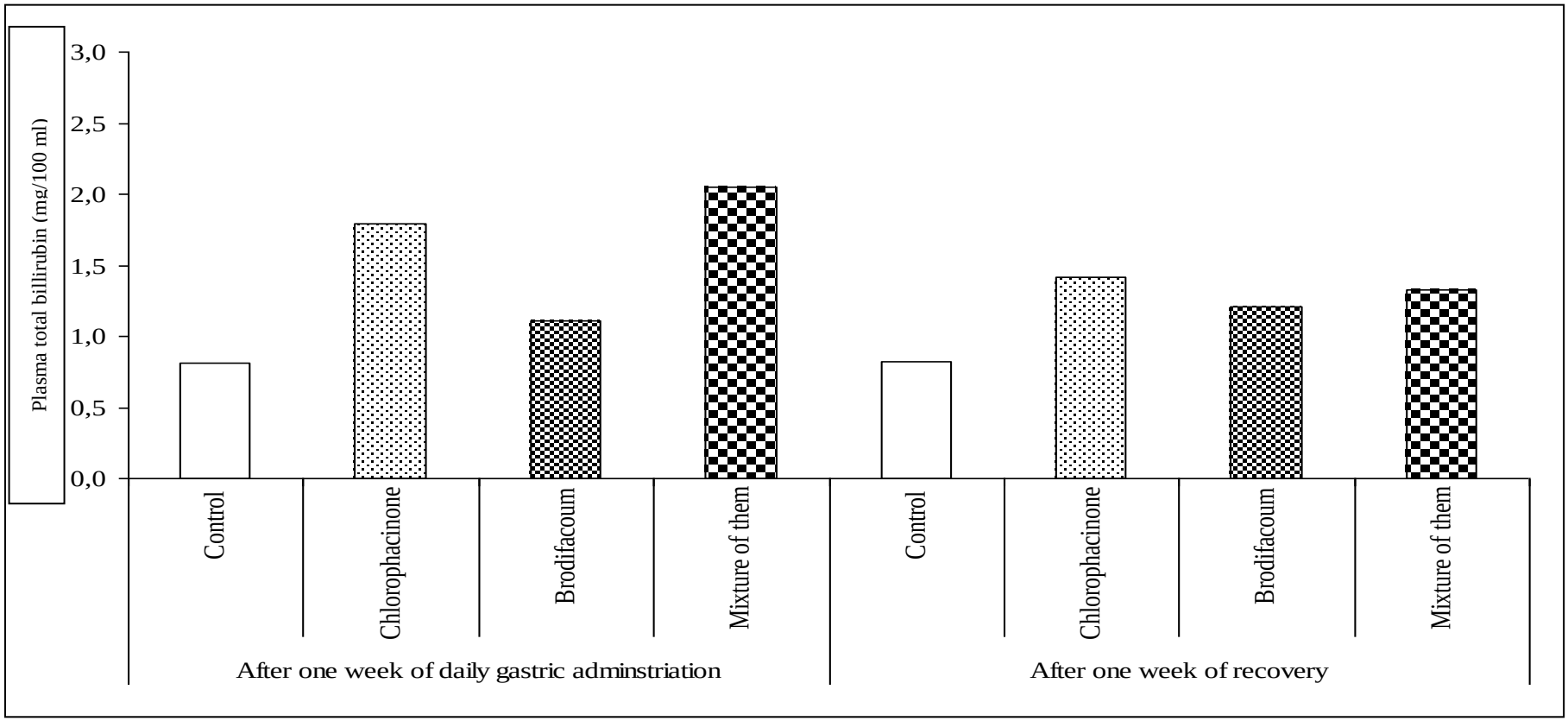

Fig. (33): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on plasma total billirubin (mg/100ml) of adult male albino rats after one week of daily gastric administration and after one week of recovery.

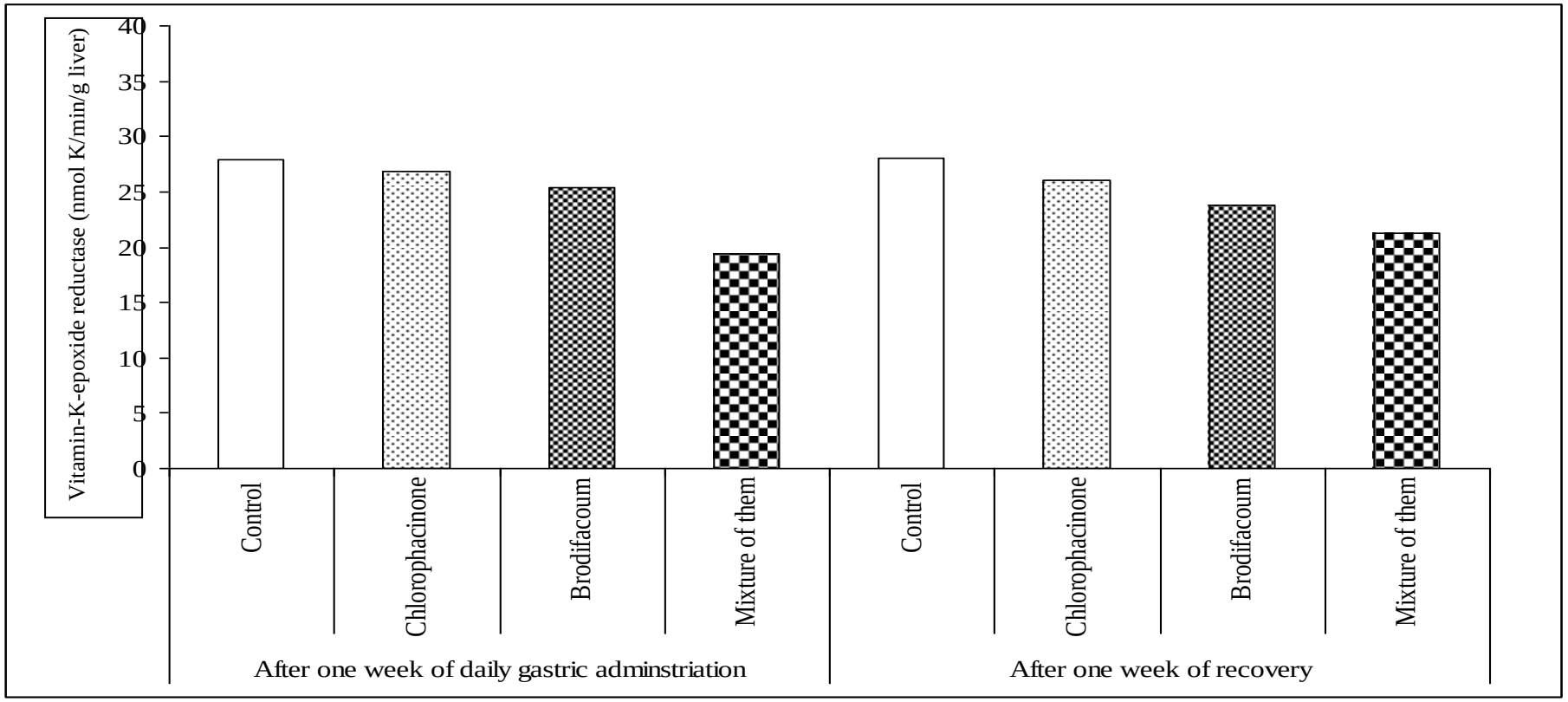

Fig. (34): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on plasma vitamin-k-epoxide reductase in liver of adult male albino rats after one week of daily gastric administration and after one week of recovery.

Vitamin K 2,3 epoxide reductase in liver microsomes:

The results presented in table (5) and fig. (34) showed that vitamin k epoxide reductase in microsomes of the liver of animal groups treated with brodifacoum, and a mixture of chlorofacinone and brodifacoum were significantly decreased and it was non significantly decreased in animal group treated with chlorophacinone compared to the control group after one week of daily gastric administration. The levels were significantly decreased in all animal groups treated with chlorophacinone, brodifacoum and a mixture of them after one week of recovery. There were significant differences between all treated animal groups after one week of daily gastric administration and after one week of recovery.

Plasma total protein:

The data presented in table (6) and fig. (35) showed that the plasma levels of total protein of animal group treated with chlorophacinone was significantly decreased and also after recovery compared to that of the control group. While other animal groups treated with brodifacoum and a mixture of chlorophacinone and brodifacoum were significantly increased after one week of daily gastric administration and after one week of recovery compared to that of the control group. There were significant differences between treated groups after one week of daily gastric administration and after one week of recovery.

Plasma total lipid:

The data presented in table (6) and fig. (36) showed that the plasma levels of total lipid in animal group treated with chlorophacinone was non significantly increased but it was significantly increased in animal groups treated with brodifacoum and a mixture of chlorophacinone and brodifacoum compared to control group after one week of daily gastric administration.

Table (6): Effect of repeated doses of anticoagulant; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on plasma total protein, total lipid and glucose of adult male albino rats after one week of daily gastric administration and after one week recovery.

Treatment / Parameter	After one week of daily gastric administration						After one week of recovery					
	Control	Chloro	Brodi	Mix	p	LSD	Control	Chloro	Brodi	Mix	p	LSD
	Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE			Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE		
Total protein (g/dl)	c 3.46 ±0.46	d 1.64 ±0.21	b 6.39 ±0.02	a 10.10 ±0.70	***	0.66	c 3.27 ±0.08	d 1.0 ±0.01	a 10.2 ±0.04	b 6.90 ±0.10	***	0.01
Total lipid (g/dl)	b 0.91 ±0.08	b 1. 07 ±0.03	a 1.37 ±0.12	a 1.55 ±0.33	**	0.23	0.93 ±0.08	1.29 ±0.01	0.89 ±0.33	1.23 ±0.45	ns	-
Glucose (mg/dl)	c 103.23 ±1.40	d 97.40 ±0.90	a 197.90 ±0.40	b 143.03 ±1.80	***	2.40	c 103.23 ±1.40	d 86.04 ±5.61	a 195.40 ±2.00	b 119.40 ±1.30	***	5.80

Chloro.= Chlorophacinone Brodi.= Brodifacoum Mix.= Mixture of chlorophacinone and brodifacoum

= Significantly different at p< 0.01 *= Significantly different at p< 0.001 ns= Non significantly different at p<0.05

SE=Standard error

Values are present as mean ± SE

Mean in same column followed by different letters are significantly different at ($P \leq 0.05$).

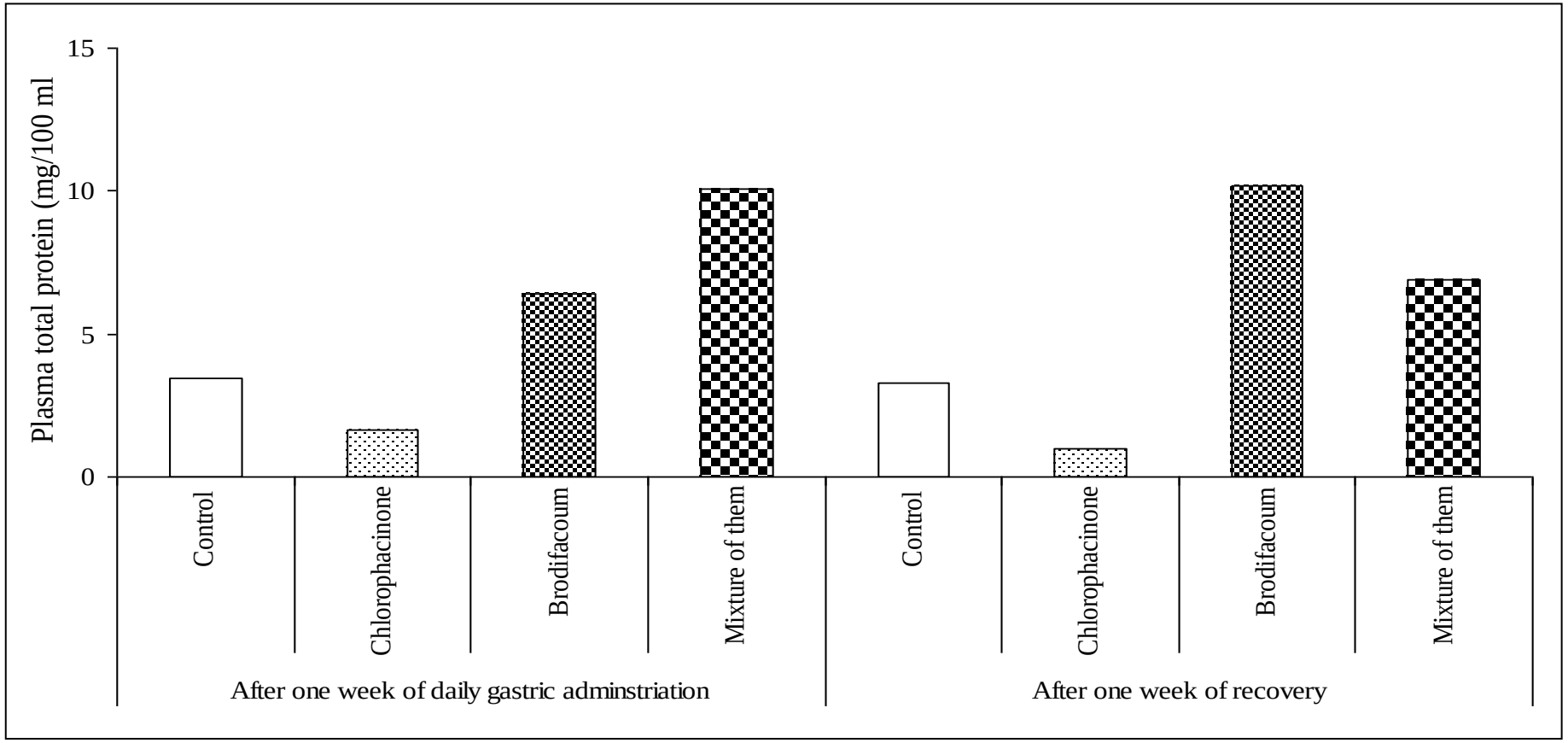

Fig. (35): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on plasma total protein (mg/100 ml) of adult male albino rats after one week of daily gastric administration and after one week of recovery.

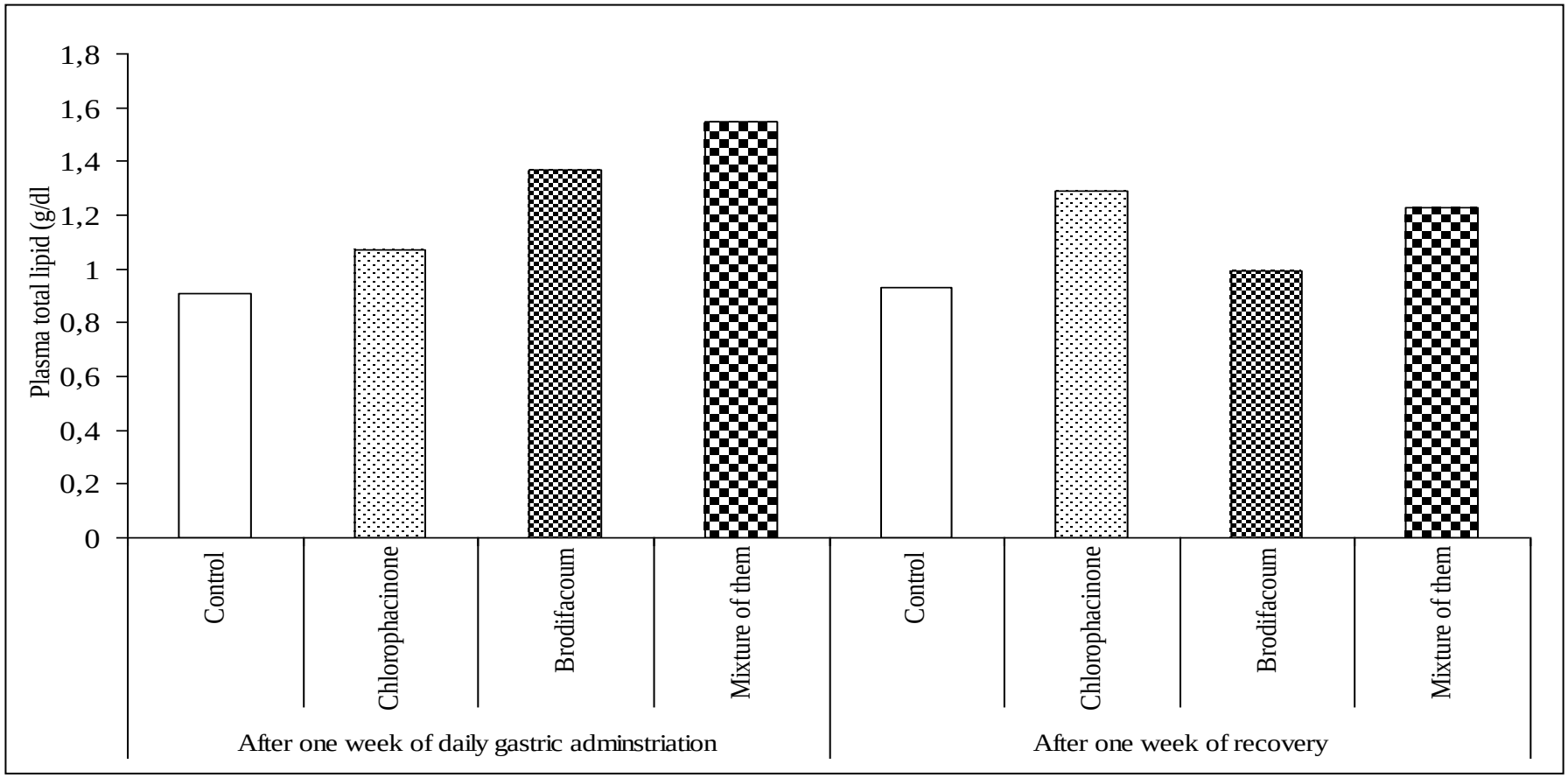

Fig. (36): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on plasma total lipid (g/dl) of adult male albino rats after one week of daily gastric administration and after one week of recovery.

Animal group treated with chlorophacinone was significantly different from other treated groups after one week of daily gastric administration. The levels after one week of recovery were non significantly increased compared to control group.

Blood glucose:

Data presented in table (6) and fig. (37) showed that the blood glucose level in animal group treated with chlorophacinone was significantly decreased after one week of daily gastric administration and after one week of recovery compared to those of the control groups. The level was increased significantly in the other two groups treated with brodifacoum and a mixture of chlorophacinone and brodifacoum after one week of daily gastric administration and after one week of recovery compared to those of the control groups. There were significant differences between treated groups after one week of daily gastric administration and after one week of recovery.

Antioxidant enzymes:

Total glutathione (GSH):

The data presented in table (7) and fig. (38) showed that the plasma levels of total glutathione were significantly increased in all treated animal groups after one week of daily gastric administration and after one week of recovery compared to that of the control groups. There was a non significant difference between animal groups treated with chlorophacinone and a mixture of chlorophacinone and brodifacoum while there were significant differences between animal groups treated with brodifacoum and both chlorophacinone and a mixture of chlorophacinone and brodifacoum treated groups after one week of daily gastric administration. After one week of recovery there were significant differences between chlorophacinone group and both brodifacoum group and mixture group but there were non significant differences between brodifacoum group and a mixture group.

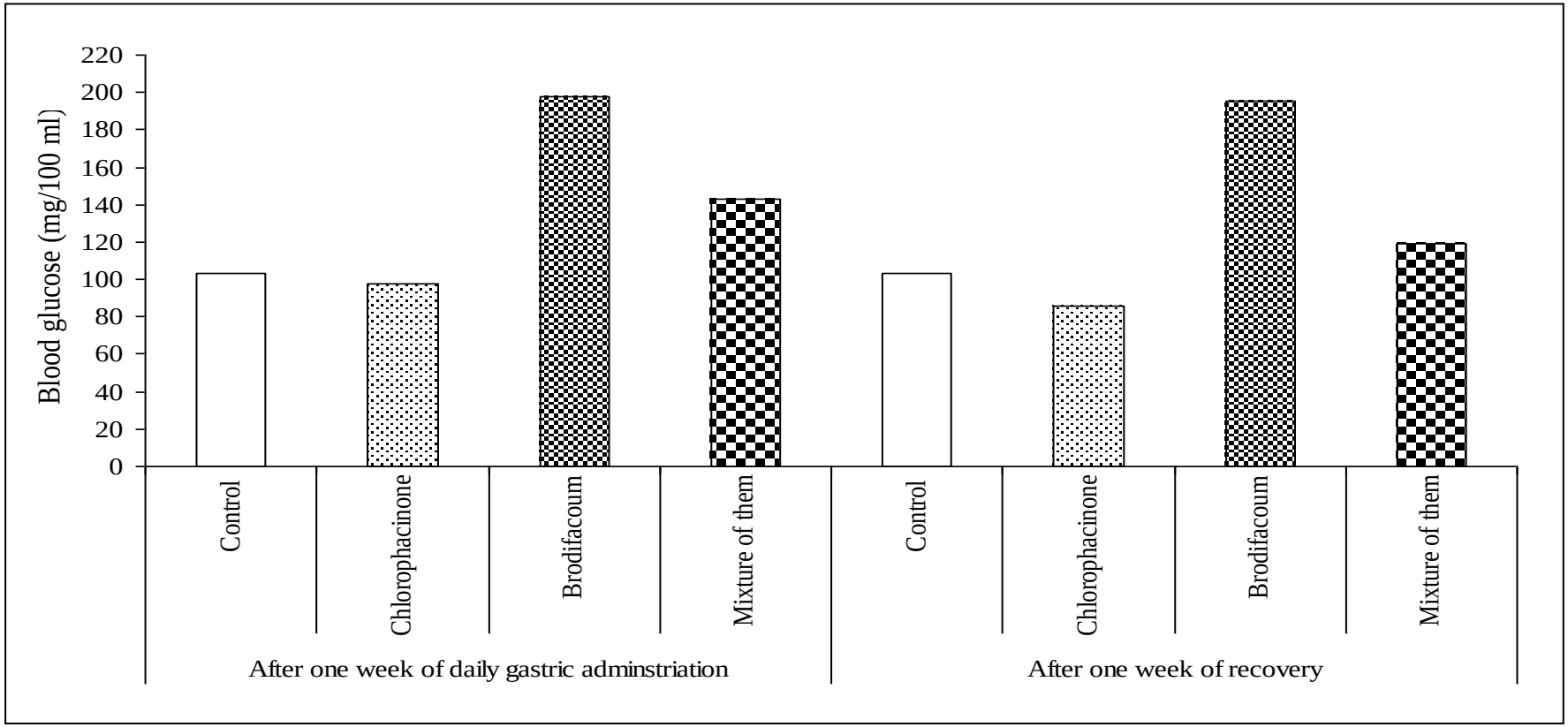

Fig. (37): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on blood glucose (mg/100ml) of adult male albino rats after one week of daily gastric administration and after one week of recovery.

Table (7): Effect of repeated doses of anticoagulant; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on plasma antioxidant enzymes of adult male albino rats after one week of daily gastric administration and after one week of recovery.

Treatment / Parameter	After one week of daily gastric administration						After one week of recovery					
	Control	Chloro	Brodi	Mix	p	LSD	Control	Chloro	Brodi	Mix	p	LSD
	Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE			Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE		
Total glutathion (µmole/g)	c 20.72 ±1.60	a 99.18 ±1.90	b 34.02 ±1.80	a 98.80 ±5.00	***	5.00	c 20.50 ±1.60	b 53.60 ±2.50	a 59.60 ±0.20	a 60.60 ±1.20	***	2.80
Glutathione – s- transferase (µmol/min/mg protein)	b 0. 53 ±0.001	a 1.76 ±0.10	c 0.19 ±0.001	b 0.54 ±1.40	***	0.10	b 0.55 ±0.001	a 1.90 ±1.9	d 0.29 ±0.01	c 0.32 ±0.01	***	.02
Catalase (µmol/g)	a 63.00 ±1.82	b 36.95 ±0.90	b 42.40 ±0.80	a 69.30 ±7.80	***	20.10	a 63.00 ±1.73	c 30.95 ±1.10	c 30.40 ±1.90	b 45.50 ±2.50	***	9.90

Chloro.= Chlorophacinone Brodi.= Brodifacoum Mix.= Mixture of chlorophacinone and brodifacoum

***= Significantly different at p< 0.001 SE=Standard error

Values are present as mean ± SE

Mean in same column followed by different letters are significantly different at (P ≤ 0.05).

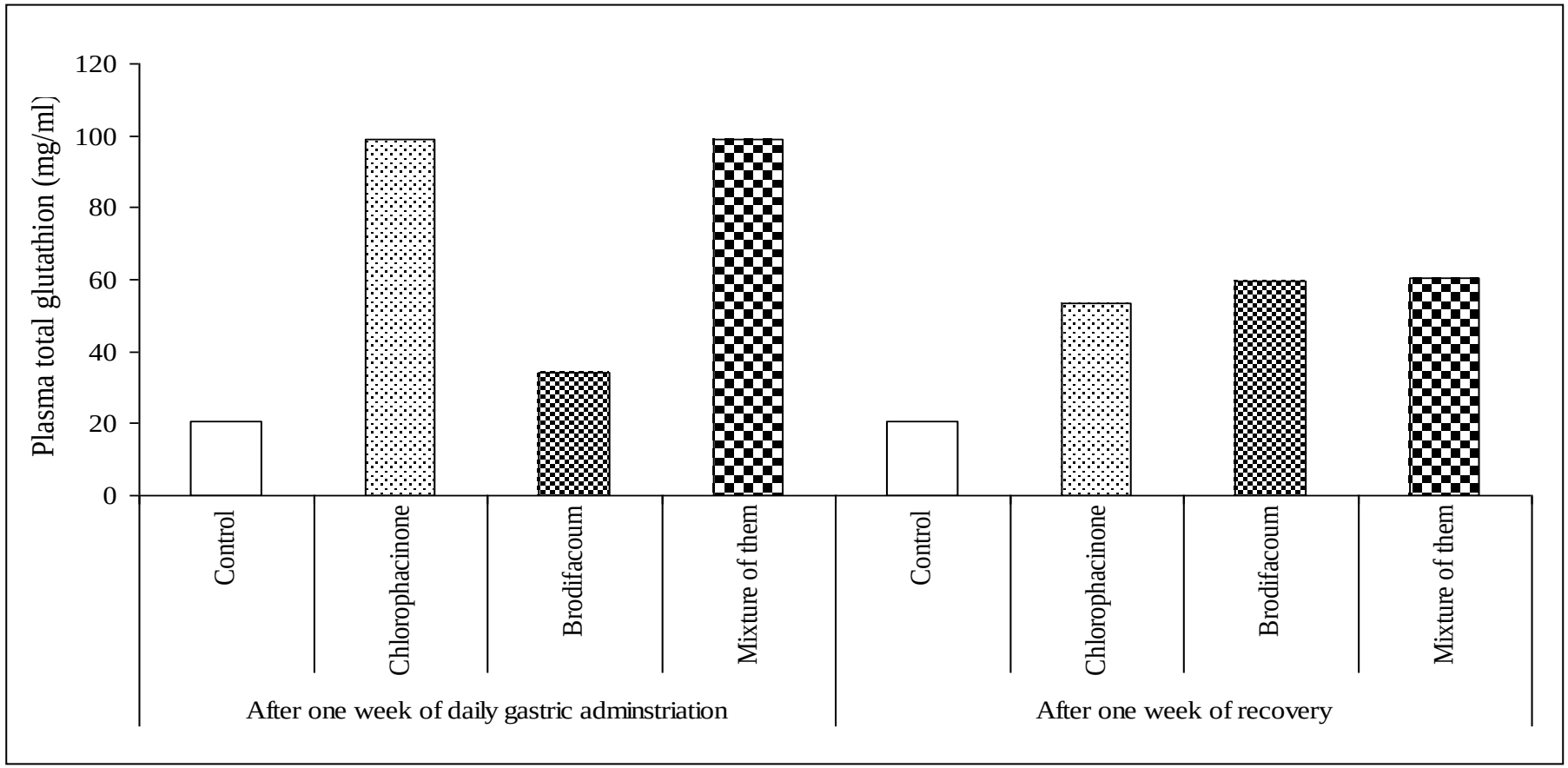

Fig. (38): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w.

respect ively) on plasma total glutathion mg/ml of adult male albino rats after one week of daily gastric administration and after one week of recovery.

glutathione-s-transferase (GST):

The data presented in table (7) and fig. (39) showed that the plasma level of glutathione-s-transferase were significantly increased in animal groups treated with chlorophacinone and the increase was non significant in a mixture of chlorophacinone and brodifacoum group. The level was significantly decreased in animal group treated with brodifacoum after one week of daily gastric administration compared to that of the control group. After recovery the level was significantly decreased in animal groups treated with brodifacoum and a mixture of chlorophacinone and brodifacoum and significantly increased in animal groups treated with chlorophacinone. There were significant differences between all treated animal group after one week of daily gastric administration and after one week of recovery.

catalase:

The results presented in table (7) and fig. (40) showed that plasma catalase activity of animal groups treated with chlorophacinone and brodifacoum were significantly decreased and non significantly increased in animal groups treated with a mixture of chlorophacinone and brodifacoum compared to that of the control group after one week of daily gastric administration. The level was significantly decreased in all animal groups treated with chlorophacinone, brodifacoum and a mixture of chlorophacinone and brodifacoum compared to that of the control group after one week of recovery. There were non significant differences between chlorophacinone and brodifacoum treated animals group after one week of recovery.While, there were significant differences between a mixture of chlorophacinone and brodifacoum treated group and the other treated groups.

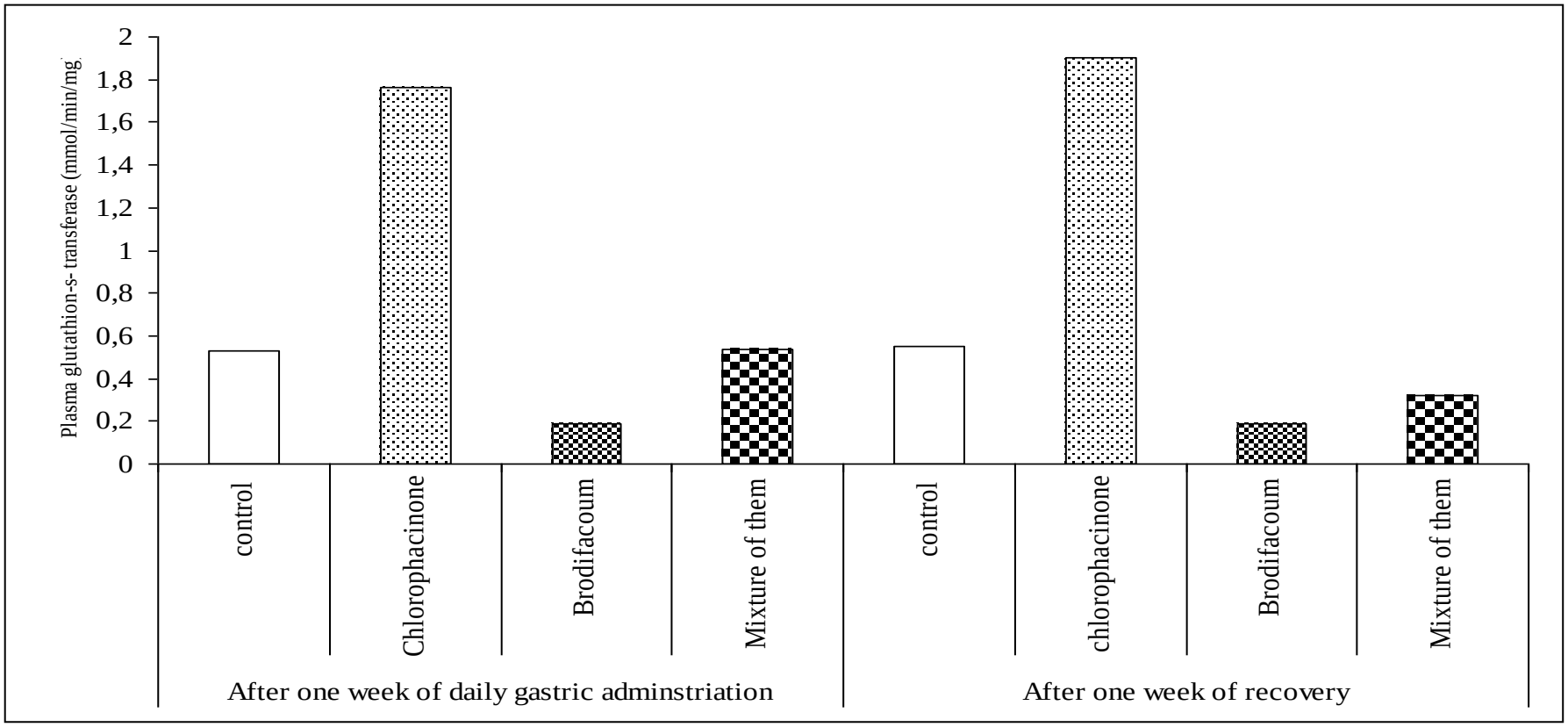

Fig. (39): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on plasma glutathione-s-transferase (mmol/min/mg) of adult male albino rats after one week of daily gastric administration and after one week of recovery.

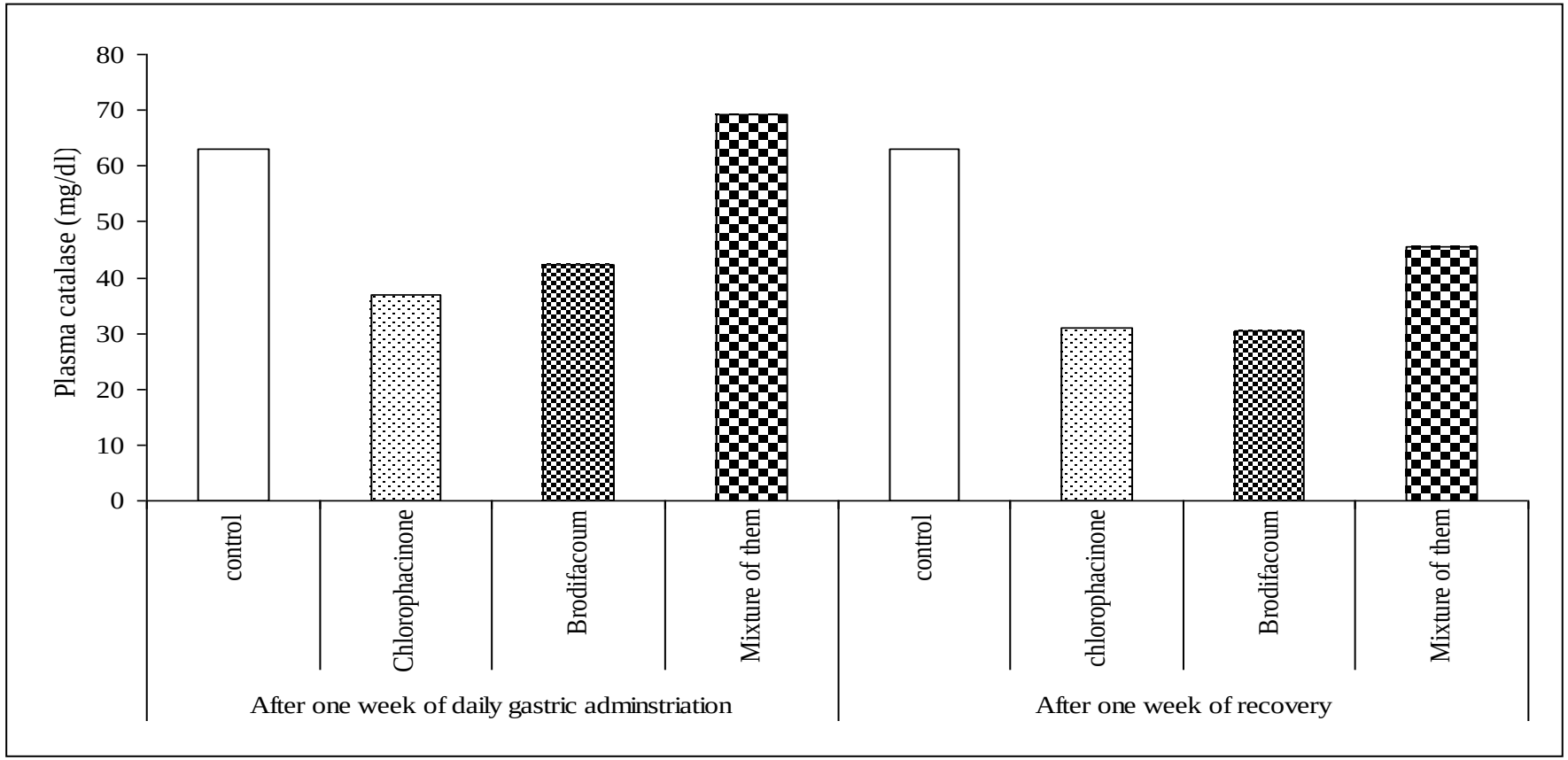

Fig. (40): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on catalase activity of adult male albino rats after one week of daily gastric administration and after one week of recovery.

Plasma insulin like growth factor -1 hormone (IGF-1):

The results presented in table (8) and fig. (41) showed that plasma insulin like growth factor 1 (IGF-1) of animal groups treated with chlorophacinone, brodifacoum and a mixture of them were significantly decreased compared to the control groups after one week of daily gastric administration and after one week of recovery. There were significant differences between all treated animal groups after one week of daily gastric administration and after one week of recovery.

Table (8): Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on plasma insulin-like-growth factor 1 of adult male albino rats after one week of daily gastric administration and after one week of recovery.

Treatment / Parameter	After one week of daily gastric administration						After one week of recovery					
	Control	Chloro	Brodi	Mix	p	LSD	Control	Chloro	Brodi	Mix	p	LSD
	Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE			Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE		
Insulin-like-growth factor 1 (mg/ml)	a 407.66 ±1.52	b 307.66 ±2.00	c 278.33 ±1.50	d 273 ±3.00	***	4.15	a 407.64 ±1.31	b 339.00 ±1.15	c 280.00 ±1.72	d 273.00 ±4.72	***	5.12

Chloro.= Chlorophacinone Brodi.= Brodifacoum Mix.= Mixture of chlorophacinone and brodifacoum

***= Significantly different at p< 0.001 SE=Standard error

Values are present as mean ± SE

Mean in same column followed by different letters are significantly different at ($P \leq 0.05$).

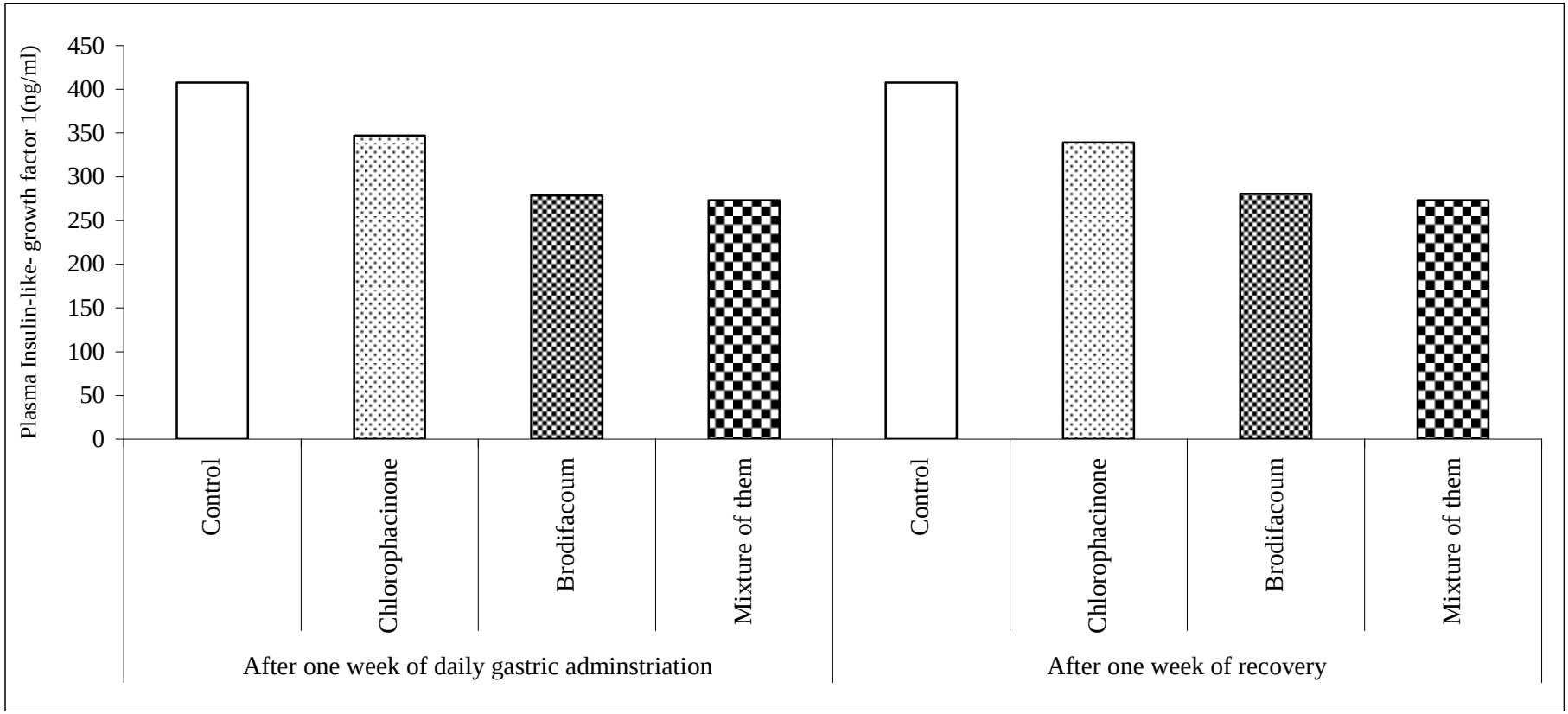

Fig. (41):Effect of repeated doses of anticoagulants; chlorophacinone (1/30LD_{50}; 0.18 mg/kg b.w.), brodifacoum (1/50LD_{50}; 0.0054 mg/kg b.w.) and a mixture of them (1/60 + 1/100LD_{50}; 0.095 + 0.0027 mg/kg b.w. respectively) on plasma insulin-like-growth factor 1 of adult male albino rats after one week of daily gastric administration and after one week of recovery.