

ABSTRACT

The laboratory toxicologist frequently faces challenges of selecting the appropriate vehicle for testing in repeated dose oral toxicity studies. The objective of this study was to evaluate the effect of dosing with reverse osmosis water (ROW), corn oil (CO) or 0.5% carboxymethylcellulose (CMC) on body weight, body weight gain and feed consumption of Wistar rats when administered via oral gavage for 13 week. The age of animals at initiation of treatment was 5-6 weeks. Each group consisted of 70 male and 70 female rats. Comparison of cumulative body weight gains were evaluated for weeks 2, 4, 8 and 13 weeks study. During the first 2 weeks, the CO and ROW treated male rats showed body weight increase of approximately 35% while the CMC treated male showed body weight increase of approximately 25%. Similarly, CO and ROW treated females showed 24% increase in body weight over the first two weeks while 13% increase was noted in CMC treated female rats. Cumulative body weight increase over the entire study for CO and ROW treated rats were approximately 120% for male and 80-100% for female. The cumulative body weight increase over 13 weeks for CMC treated rats was 77% for male rats and 39% for female rats. Significantly, less average feed consumption was noted for CO (13.05g) and CMC (16.05g) treated rats compared to ROW (23.05g) treated rats. Based on the results, it could be concluded that the selection of vehicle plays a vital role in toxicity studies. The results of this study show that vehicle selection may play a significant role on growth rate and food consumption in repeated dose oral toxicity studies and the variation in data could be considered for assessment of chemical effect more precisely.

OBJECTIVE

The objective of this study was to assess the growth and food pattern of wistar rats, when treated with different vehicles like reverse osmosis water (ROW), corn oil (CO) and 0.5% carboxymethylcellulose (CMC) via oral gavage for a period of 90 consecutive days.

EXPERIMENTAL DESIGN		
Test System	Wistar Rats	
Age	5-6 week old	
Duration of Treatment	13 weeks	
Vehicles	Reverse osmosis water	
	Corn Oil	
	0.5% carboxymethylcellulose	
Route of Administration	Oral through Gavage	
Body Weight	Performed at pre-treatment and at weekly interval	
Feed Consumption	At weekly interval	

Table: 1		
Week N	Mean Body Weight (g) and Body Weight Gain of Male Rats - RO Water	
	Mean Body Weight (g)	Body Weight Gain (g)/week
PT	218.23	-
1	259.26	41.03
2	294.56	35.30
3	324.39	29.83
4	350.41	26.03
5	371.47	21.06
6	391.64	20.17
7	407.93	16.29
8	421.39	13.45
9	431.03	9.64
10	444.00	12.97
11	456.60	12.60
12	463.87	7.28
13	469.64	5.77

Table: 2		
Week N	Mean Body Weight (g) and Body Weight Gain of Female Rats - RO Water	
	Mean Body Weight (g)	Body Weight Gain (g)/week
PT	167.14	-
1	185.67	18.53
2	203.41	17.74
3	217.34	13.93
4	226.80	9.45
5	236.07	9.27
6	243.53	7.46
7	249.15	5.61
8	251.64	2.49
9	254.50	2.86
10	260.88	6.38
11	264.70	3.82
12	267.12	2.42
13	269.13	2.01

Table: 3		
Week N	Mean Body Weight (g) and Body Weight Gain of Female Rats - Corn Oil	
	Mean Body Weight (g)	Body Weight Gain (g)/week
PT	199.19	-
1	236.52	37.33
2	270.89	34.36
3	298.56	27.67
4	324.75	26.19
5	346.17	21.42
6	366.44	20.28
7	384.08	17.63
8	399.50	15.43
9	411.70	12.20
10	424.80	13.10
11	434.30	9.50
12	445.08	10.78
13	454.65	9.57

Table: 4		
Week N	Mean Body Weight (g) and Body Weight Gain of Female Rats - Corn Oil	
	Mean Body Weight (g)	Body Weight Gain (g)/week
PT	147.63	-
1	168.84	21.21
2	187.75	18.91
3	202.40	14.66
4	212.96	10.56
5	223.48	10.52
6	233.72	10.24
7	241.77	8.05
8	246.49	4.72
9	251.89	5.40
10	257.17	5.29
11	260.91	3.74
12	265.02	4.11
13	268.75	3.72

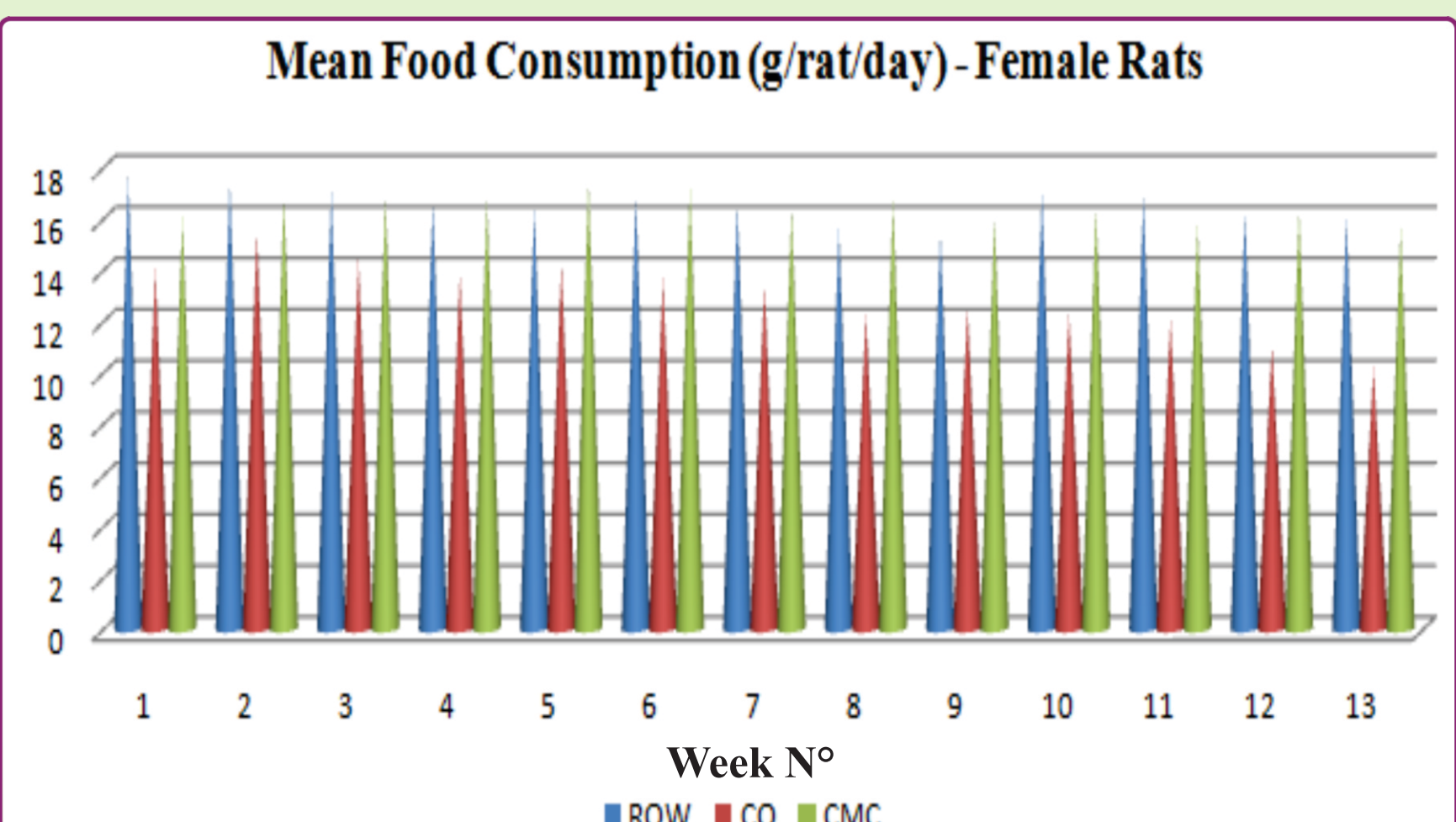
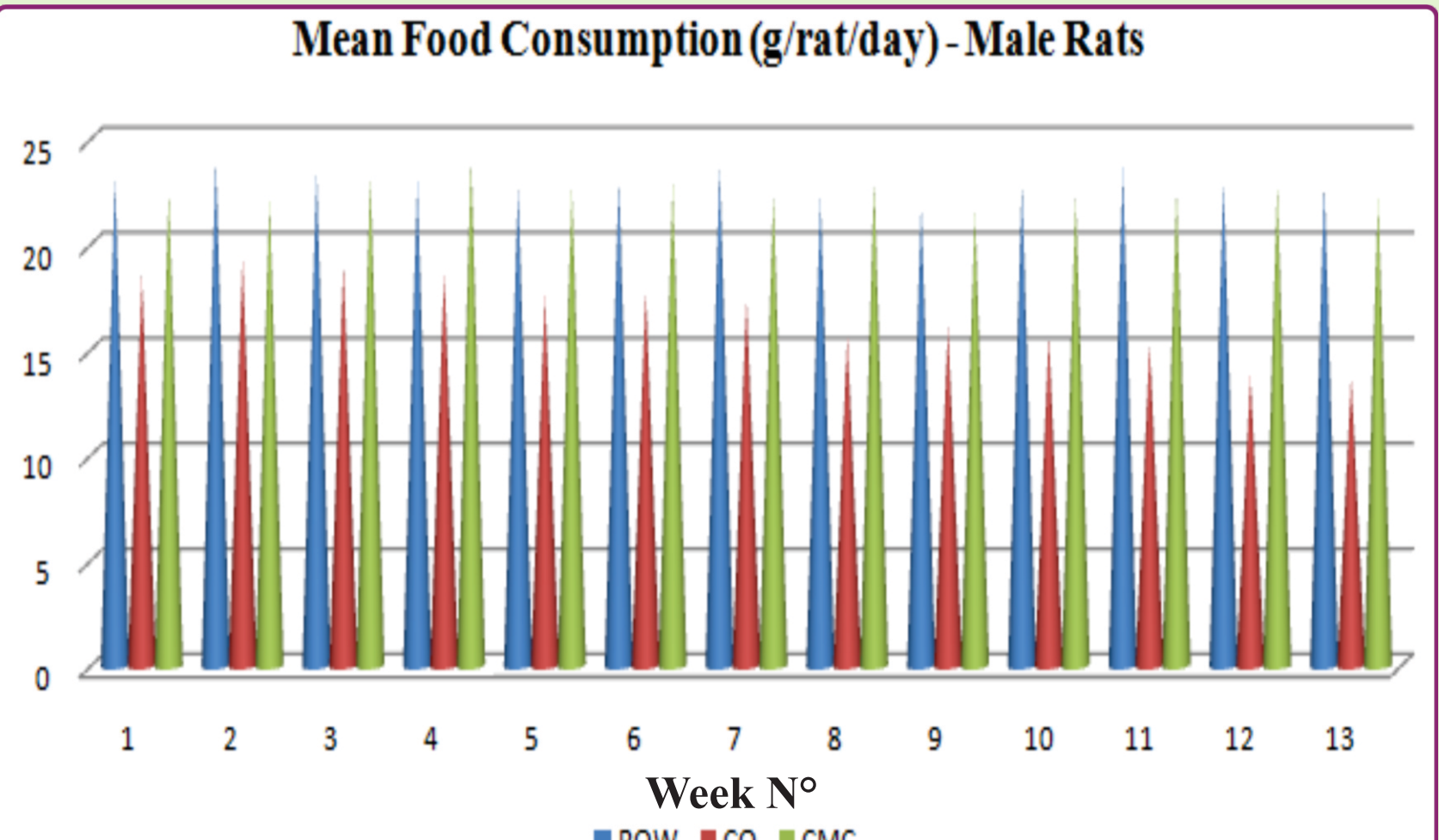
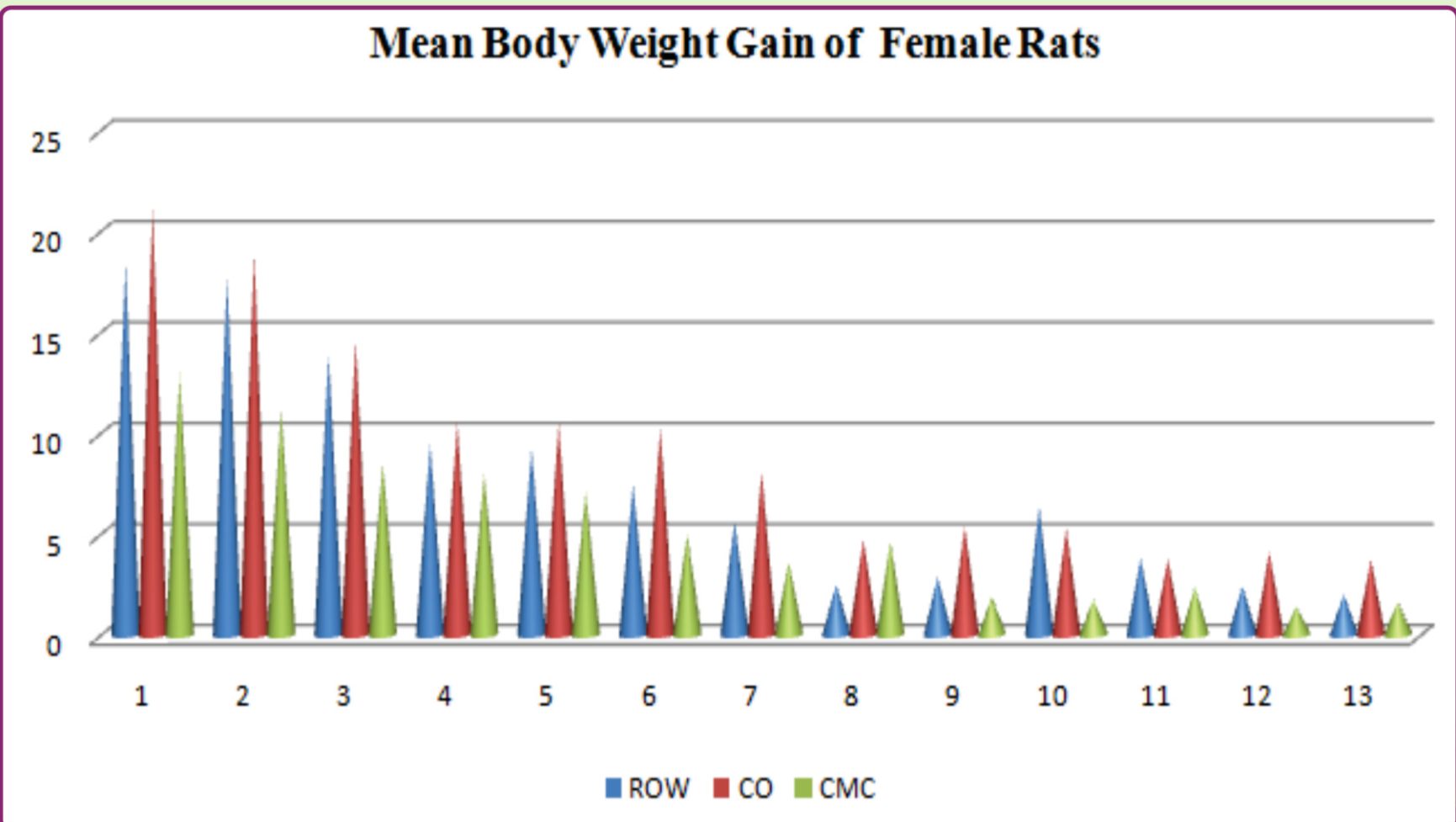
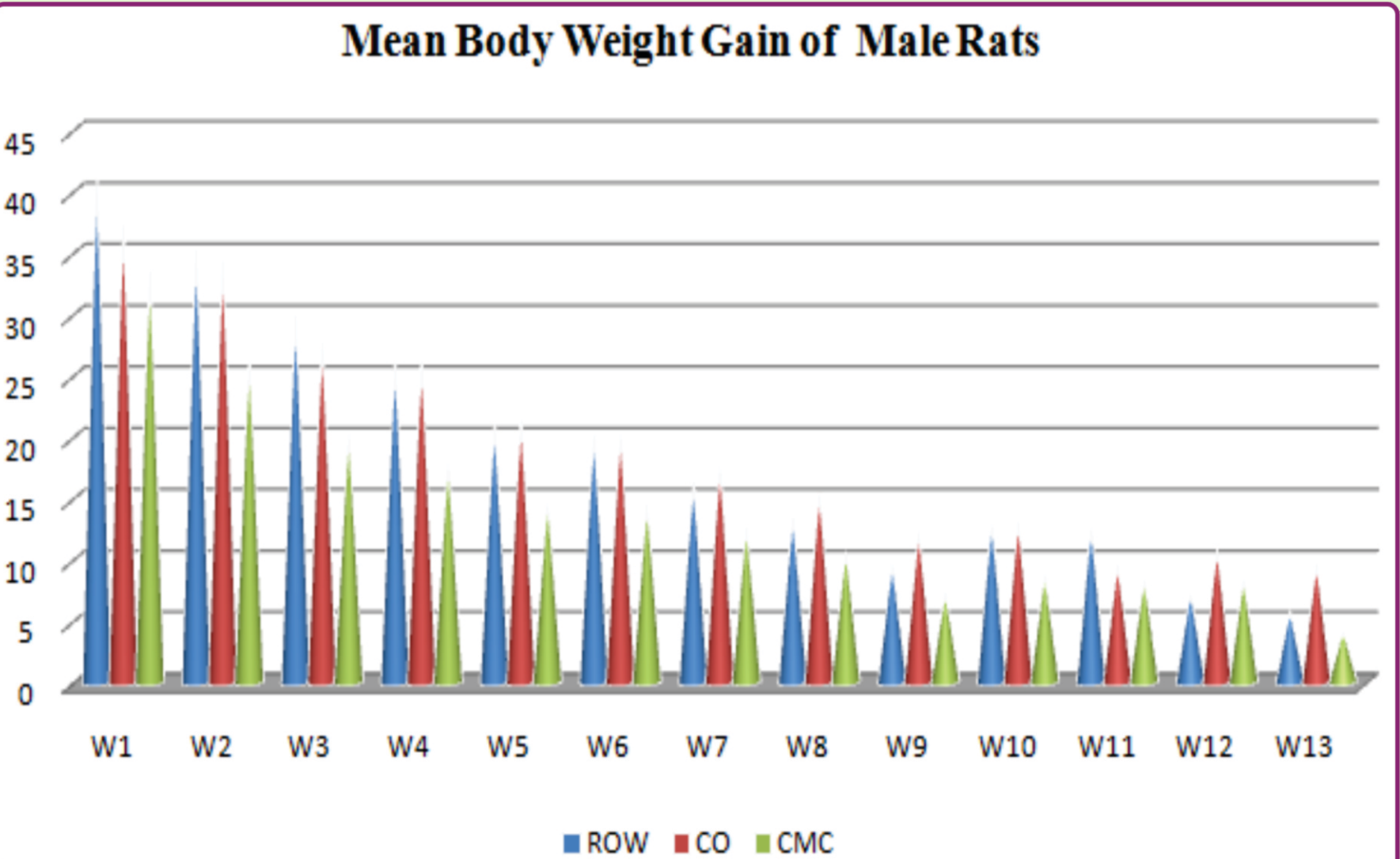
Table: 5		
Week N	Mean Body Weight (g) and Body Weight Gain of Male Rats - Carboxy Methyl Cellulose (CMC)	
	Mean Body Weight (g)	Body Weight Gain (g)/week
PT	244.25	-
1	277.74	33.50
2	303.98	26.24
3	324.27	20.30
4	342.20	17.93
5	356.83	14.63
6	371.31	14.48
7	383.96	12.65
8	394.59	10.63
9	401.88	7.29
10	410.62	8.74
11	419.00	8.38
12	427.35	8.36
13	431.51	4.16

Table: 6		
Week N	Mean Body Weight (g) and Body Weight Gain of Female Rats - Carboxy Methyl Cellulose (CMC)	
	Mean Body Weight (g)	Body Weight Gain (g)/week
PT	180.89	-
1	193.85	12.96
2	205.06	11.21
3	213.59	8.53
4	221.59	8.00
5	228.68	7.10
6	233.67	4.99
7	237.29	3.62
8	241.94	4.65
9	243.81	1.87
10	245.58	1.77
11	247.96	2.38
12	249.33	1.37
13	250.93	1.61

Table: 7			
Week N	Mean Food Consumption (g/rat/day) - Male Rats		
	RO Water	Corn Oil	CMC
1	23.12	18.51	22.53
2	24.08	19.36	22.12
3	23.51	19.07	23.21
4	23.03	18.68	24.05
5	22.74	17.58	22.78
6	23.08	17.81	22.85
7	23.67	17.45	22.37
8	22.25	15.67	22.98
9	21.89	16.05	21.57
10	22.82	15.70	22.25
11	23.63	15.26	22.59
12	23.04	13.78	22.87
13	22.84	13.67	22.21

Table: 8			
Week N	Mean Food Consumption (g/rat/day) - Female Rats		
	RO Water	Corn Oil	CMC
1	17.62	14.05	16.12
2	17.46	15.53	16.87
3	17.05	14.44	16.83
4	16.66	13.83	16.74
5	16.40	14.21	17.40
6	16.83	13.68	17.18
7	16.61	13.47	16.41
8	15.63	12.30	16.69
9	15.42	12.56	16.03
10	17.04	12.31	16.41
11	16.91	12.09	15.82
12	16.28	11.06	16.35
13	16.07	10.19	15.62

Mean Body Weight Gain of Male Rats



CONCLUSION

Based on the results, it could be concluded that the selection of vehicle plays a vital role in toxicity studies. The results of this study show that vehicle selection may play a significant role on growth rate and food consumption in repeated dose oral toxicity studies and the variation in data could be considered for assessment of chemical effect more precisely.