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UNIVERSITY OF LOUISVILLE

THE EFFECTS OF ICE CREAM IN THE
DIET OF YOUNG LIFE

A DISSERTATION

SUBMITTED TO THE FACULTY OF
THE GRADUATE SCHOOL OF LIBERAL ARTS
IN PARTIAL FULFILLMENTS OF THE
REQUIREMENTS FOR THE DEGREE
OF MASTER OF SCIENCE
DEPARTMENT OF CHEMISTRY.

by

MILDRED A. SCHNEIDERHAN.

1926

72-June 33 E. J. S.

THE EFFECTS OF ICE CREAM IN THE
DIET OF YOUNG LIFE.

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INTRODUCTION.

Much work has been done in the past on the nutritional value in young life of different dairy products, all of which experiments have been carried to successful completion by various men at different times.

There is, however, no published information demonstrating the comparative values resulting from experimental work in the nutritional value of ice cream as a supplementary diet in infant life.

For the purpose of the following experiments, the albino rat, (*Mus Norvegicus Albinus*) and the Norway rat, (*Mus Norvegicus*), together with Guinea Pigs and cats were used.

It is a well known fact that rats exhibit the same sensitivity to surrounding conditions to which they are subjected as does man, and likewise that they respond to these conditions in a like manner.

They are, therefore, ideal subjects for nutritional experimentation.

The life of the Albino Rat and the Norway is three and four years respectively, while the average old-age possibilities of man is approximately ninety years. The body composition and the composition of the kidney secretion of the rat are exact in percentage to that of man. Therefore, multiplying the results of these experiments will give the results to be gained for man. It is the purpose of this paper to show the relative nutritional value of ice cream in young life, as demonstrated by simultaneous experiments.

EXPERIMENTAL.

EXPERIMENT NUMBER ONE.

The rats used in experiment one were two litters of Albino Rats, one litter containing nine individuals, the other, ten. The litters were from two pairs of pure bred Albino Rats and were separated from their respective mother immediately before the weaning period.

The rats were separated and placed in individual, sanitary cages when they were three weeks and four days old. Their weights were taken weekly and all changes in appearances were carefully observed and tabulated.

The rats were all subjected to the same conditions of environment and temperatures. Each rat was given all the particular diet it could eat, and the amount of food which it ingested was carefully noted.

The first litter consisting of ten subjects was separated into two groups of five each and were fed on the following diet:

GROUP ONE

Rat #1-	Fresh Milk and White Bread Soaked in Water
Rat #2-	" " " " " " " "
Rat #3-	" " " " " " " "
Rat #4-	" " " " " " " "
Rat #5-	" " " " " " " "

GROUP TWO

Rat #6-	Ice Cream and White Bread Soaked in Water
Rat #7-	" " " " " " " "
Rat #8-	" " " " " " " "
Rat #9-	" " " " " " " "
Rat #10	" " " " " " " "

The second litter consisting of nine subjects was separated into two groups of five and four individuals each, which were fed on the following diets, respectively:

GROUP THREE

Rat #11-	Ice Cream and Fresh Milk
Rat #12-	" " " " "
Rat #13-	" " " " "
Rat #14-	" " " " "
Rat #15-	" " " " "

GROUP FOUR

Rat #16-	Ice Cream, Fresh Milk, White Bread Soaked in Water
Rat #17-	" " " " " " " " "
Rat #18-	" " " " " " " " "
Rat #19-	" " " " " " " " "

The weights of all rats fed on the same diets are given on the same page following, and comparisons in rate of growth are made by means of a chart showing the best rat from each group.

✓ GROUP ONE (CONTROL)

	✓ Rat #1 Male	Rat #2 Female	Rat #3 Female	Rat #4 Male	Rat #5 Male
Nov. 2	52 gms	46 gms	52 gms	55 gms	59 gms
" 8th	74.4	67.4	73.3	74.9	78.9
" 15th	89	88.7	96.2	106.9	86.1
" 22nd	110.4	108.5	110.1	122	114.9
" 29th	135.5	119	128.8	142.1	137.7
Dec 6	141	126	136.2	160	154
" 13th	141.8	136.2	144	170	170
" 20th	151.4	133.5	147.4	159.5	160.9

✓ GROUP TWO (EXPERIMENTAL) ✓

	Rat #6 Female	Rat #7 Female	Rat #8 Female	Rat #9 Male	Rat #10 Male
Nov. 2	55 gms	57 gms	51 gms	62 gms	52 gms
" 8th	74.7	87.1	70	87.7	77.6
" 15th	91.1	104.5	88.5	117	111.6
" 22nd	106.7	120.4	105.8	116.6	133.4
" 29th	127	134	120	117.5	133.8
Dec. 6	138.7	146.1	128.8	133	156.6
" 13th	141.4	146.8	137.8	133	179
" 20th	148.8	162.6	147.3	159.3	188.3

GROUP THREE (EXPERIMENTAL)

		Rat #11 Female	Rat #12 Female	Rat #13 Male	Rat #14 Female	Rat #15 Male
Nov.	2	53 gms	57 gms	61 gms	48 gms	67 gms
"	8	64.6	72.8	77.5	61.2	84
"	15th	95	98.9	100.1	91.9	129.4
"	22nd	113.9	115.5	121.1	112.2	159.1
"	29th	128	132.9	136.3	128.5	178.6
Dec.	6	138.7	146	146.6	137.7	198.2
"	13th	149.8	147.4	149.6	142.6	189
"	20th	154.1	159.6	164.3	150.7	206.2

GROUP FOUR (EXPERIMENTAL)

		Rat #16 Male	Rat #17 Male	Rat #18 Male	Rat #19 Female
Nov.	2	63 gms	59. gms	62 gms	50 gms
"	8	97.5	81	93.5	77.5
"	15th	132.4	105.8	122.2	92.8
"	22nd	161.7	128.4	150.3	106.1
"	29th	185.4	150.1	173.8	137
Dec.	6	194.7	168.5	189.7	119.7
"	13th	205.1	184.9	203.8	135.2
"	20th	226	217.2	200	135

Grams

250

200

150

100

50

3

4

5

6

7

8

9

10 Weeks.

Rat #1 Brood + Milk
Rat #10 Brood + Ice Cream
Rat #5 Milk + Ice Cream
Rat #17 Brood + Milk + Ice Cream

Chart # 1

EXPERIMENT NUMBER TWO.

Rats numbers three and five were bred together for two weeks. The female was fed for the entire gestation period on a table scrap diet and ice cream. Four rats were born on March 3rd. One rat died the second day.

At the end of three weeks. the remaining three rats were separated and placed in individual. sanitary cages, and weighed thereafter, weekly. In each case, each subject was given all the food in the particular diet it could eat and each was subjected to the same conditions of environment and temperatures.

They were put into two groups of two and one, respectively, and fed on the following diets:

GROUP ONE

Rat #21- Fresh Milk and White Bread Soaked in Water

GROUP TWO

Rat #22- Fresh Milk, Bread Soaked in Water and Ice Cream

Rat #23- " " " " " " " " "

The weights of these rats are given on the following page for comparison, and a chart is also given to show the rate of growth of rats numbers twenty-one and twenty-three.

GROUP ONE (CONTROL)

Rat #21- Female

Mch.	24th	45.5 gms
"	28th	55.4
Apr.	4th	63.8
"	11th	71.2
"	18th	81.5
"	25th	90.7
May	2nd	110.0
"	9th	129.3

GROUP TWO (EXPERIMENTAL)

Rat #22- Female Rat #23- Male

Mch.	24th	36 gms	46.4 gms
"	28th	67	79
Apr.	4th	80	95.1
"	11th	85	100.1
"	18th	98.2	114.6
"	25th	117.3	132.5
May	2nd	136.5	170
"	9th	146	194.5

GRAMS.

200

150

100

50

3

4

5

6

7

8

9

Chart #2.

10 Weeks

— Rat #21 Bread + Milk

--- Rat #23 " " + Ice Cream.

EXPERIMENT NUMBER THREE.

The Guinea Pigs used in this experiment were descendants of the same litter.

When they were two weeks old, the four young were separated into two groups of two and two, each, weighed once each week, and all changes in appearance were carefully observed and noted.

They were fed on the following diets:

GROUP ONE (CONTROL)

Guinea Pig #1- Oats, Alfalfa and Water

Guinea Pig #2- " " " "

GROUP TWO (EXPERIMENTAL)

Guinea Pig #3- Oats, Alfalfa, Water and Ice Cream

Guinea Pig #4- " " " " " "

The weights of each guinea pig are given on the following page with a corresponding chart showing the rate of growth of Guinea Pigs numbers one and four:

GROUP ONE (CONTROL)

	Guinea Pig #1 Female	Guinea Pig #2 Male
Apr. 7th	145 gms	153.8 gms
" 10th	148.3	173
" 18th	157.7	183.1
" 25th	148.3	156.3
" 26th	dead	greens added to diet
" 29th		dead

GROUP TWO (EXPERIMENTAL)

	Guinea Pig #3 Male	Guinea Pig #4 Female
Apr. 7th	150.8 gms	141.2 gms
" 10th	180	172.5
" 18th	216.1	184
" 25th	180.6 Greens added	159.6 Greens added
May 2nd	136.5	165
" 3rd	dead	
" 9th		222

GRAMS

160

240

20

200

80

60

40

20

100

KEPPEL & ESSER CO., NEW YORK

100

2

3

4

5

6

7

8 Weeks

----- Guinea Pig # 4 Oats, Apples + Ice Cream.
 _____ Guinea Pig # 1 " " "

Chart # 3.

- On April twentieth, the two Guinea Pigs in group one showed evidences of Scurvy. On April twenty-sixth, Guinea Pig number two, died, exhibiting all the external symptoms of advanced Scurvy.

There was added immediately to the diets of the three remaining Guinea Pigs, fresh greens.

The other Guinea Pig in group one showed evidences of Scurvy on April twenty-second, and despite the fact that it ate plentifully of the greens it died on April twenty-ninth, evincing all the symptoms of advanced Scurvy with accompanying convulsions.

Likewise, in group two, Guinea Pig number three exhibited symptoms of Scurvy on April twenty-seventh. Upon addition of greens to the diet, the condition seemed to improve during the following three days. However, on May third, it died. Apparently, the metabolic processes were so weakened after the onslaught of Scurvy that they could not rebuild themselves.

Guinea Pig number four began losing weight on April twentieth. Four days later, greens were added to the diet. On May second, there was an increase of 4.4 grams in weight from April twenty-fifth. On May fifth, there was an increase of 16 grams. The final weight taken was 222 grams.

These animals are of exceptional advantage in feeding experiments because of the fact that their digestive system is practically identical with that of human beings.

EXPERIMENT NUMBER FOUR.

As an added check on the work already performed, two young Persian cats were obtained for further ice cream experiments.

Both kittens were from the same litter. They were removed from the mother when they were five weeks old, immediate before the weaning period. They were placed in separate sanitary cages, weighed weekly, and fed on the following diets.

Cat #1- Bread Soaked in Water, Fresh Milk and Ice Cream.

Cat #2- " " " " " "

Both cats were subjected to the same conditions of environment and temperatures, and care was given to give each animal all it could eat. The eyes were washed daily with a weak solution of boric acid, and the fur was combed daily.

The table following shows the comparative weights obtained during the experiment:

	Cat #1 Male	Cat #2 Female
Apr. 24th	405.5 gms	405 gms
May 2nd	420.8	420
" 9th	481	470
" 16th	560	510
" 23rd	642	537.4
" 30th	740	553.1

On the following page is given a chart showing the growth curve of these two subjects:

Grams

800

700

600

500

400

300

6

7

8

9

10

Weeks

Chart # 4

Cats Fresh Milk and Bread
" " " + Ice Cream

EXPERIMENT NUMBER FIVE.

In order to check the experiments performed in groups two and three in the first experiment, four Norway Rats were obtained from the same litter, two males and two females.

Rats numbers seven and nine from group two, Experiment One were bred together for one week. On March twenty-ninth three young were born two of which died on the second day. When the one remaining rat was twenty-one days old, it was removed from the mother and together with the Four Norway Rats utilized for the following experiment.

The Norway Rats were removed from the mother when they were twenty-one days old, placed in separate cages and with the Albino Rat mentioned above, placed in two groups and fed on the following diets:

GROUP ONE

Rat #24- Bread Soaked in Water and Ice Cream

Rat #25- " " " " " " "

Rat #26- " " " " " " "

GROUP TWO

Rat #27- Ice Cream and Milk

Rat #28- " " " "

The weights of all the rats were taken weekly and all changes in appearances carefully noted. They were all subjected to the same conditions of environment and temperatures, throughout. The weights of both groups are given on the following page for comparison:

GROUP ONE (EXPERIMENTAL)

		Rat #24 Male Albino	Rat #25 Male Norway	Rat #26 Female Norway
Apr.	19th	39.3gms	44.8 gms	38.6 gms
"	25th	56.5	61.7	54.7
May	2nd	75.7	79.3	66.6
"	9th	80.4	85.8	76.1
"	16th	100	90	85
"	23rd	106	104.1	90

GROUP TWO (CONTROL)

		Rat #27 Male Norway	Rat #28 Female Norway
Apr.	19th	32.7 gms	42.3 gms
"	25th	45	60.5
May	2nd	44.7	77.7
"	9th	46.7	86.2
"	16th	dead	90.1
"	23rd		101.4

A chart showing the curve of growth of rats numbers twenty-four, twenty-five, and twenty-eight is given on the following page:

GRAMS

--- Rat #21 Thick + Sea Cream
--- Rat #24 Bread-like Cream
— Rat #25 " "
Chart # 5

8 Weeks.

CONCLUSIONS

The charts drawn to demonstrate graphically the results of these experiments show conclusively the relative nutritional value of ice cream as a supplementary diet in young life.

During these experiments, the rats, both the Albino and the Norwegian shed practically no fur at all while on the experimental diets and at the same time, they exhibited unusual, healthy, normal activity.

The rats in groups two, three and four of Experiment One, and those in group two in Experiment Two, likewise those of groups one and two in Experiment Four developed an unusually long coat of fur of extraordinary texture and fineness and of continued whiteness.

In every case where ice cream was supplemented in the diet, the subject's rate of growth was more rapid. Each showed a consistent and steady rise in the curve of growth toward normal development as a result of increased body-building materials contained in the ice cream ingested.

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