

# Ascorbic Acid and Riboflavin Content of Market Milk

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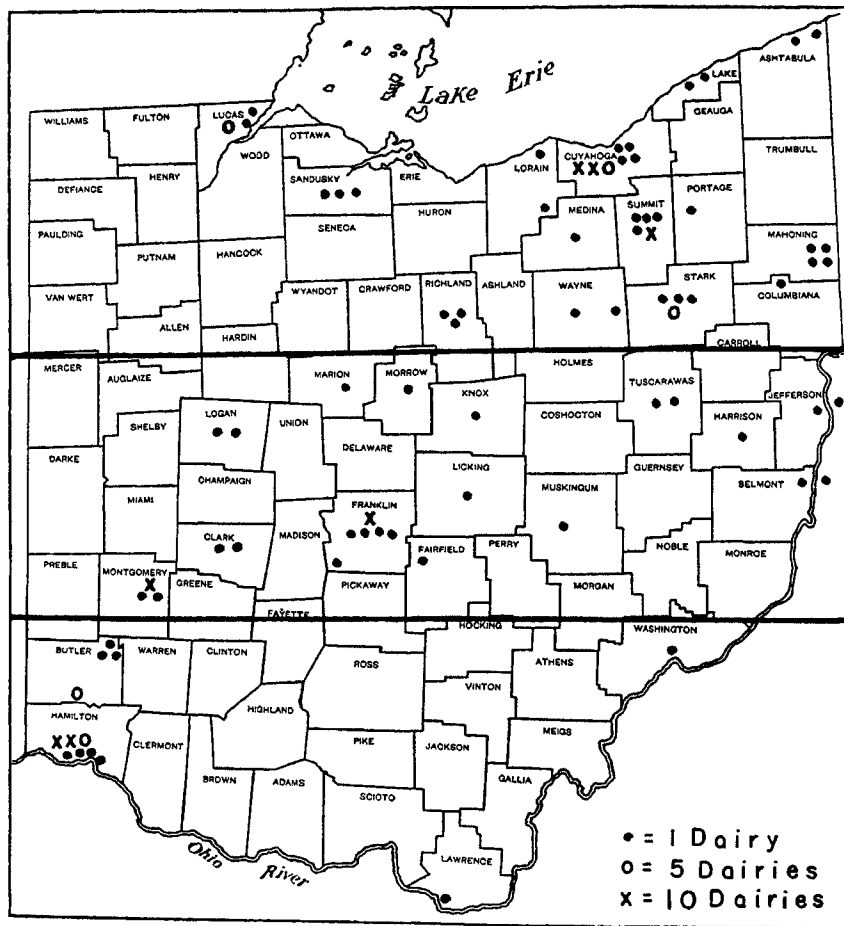


Fig. 1.—Location of the 162 dairies from which Ohio market milk samples were obtained. North section of the state—79 dairies; central section—44 dairies; and southern section—39 dairies.

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## INTRODUCTION

A previous report presented (8) the vitamin A potency of market milk produced in Ohio. Determinations on the amounts of reduced ascorbic acid and of riboflavin were made on the same samples reported in the vitamin A study to show seasonal and area variations.

## EXPERIMENTAL

During the period February, 1948 through April, 1949, 392 samples of vitamin D-fortified milk from 162 dairies in Ohio were sent to the Ohio Agricultural Experiment Station for vitamin D assay. Figure 1.

Milk was shipped in the original glass quart bottles in iced containers. Immediately upon arrival, each shipment was sampled for reduced ascorbic acid and riboflavin determinations. It is estimated that when the milk was received at the laboratory 24 to 72 hours had elapsed since the time of production.

Reduced ascorbic acid was determined by the macro method of Mindlin and Butler (7), modified for the determination of ascorbic acid in milk, using the Evelyn Photoelectric Colorimeter.

Riboflavin was determined by a fluorometric method described by Holmes (3), (5), using a Coleman Photofluorometer.

## RESULTS

In Figure 2, the average reduced ascorbic acid and riboflavin content of Ohio market milk during the period February, 1948 through April, 1949 is plotted in milligrams per quart. Table 1 shows, in addition, the number of samples received each month.

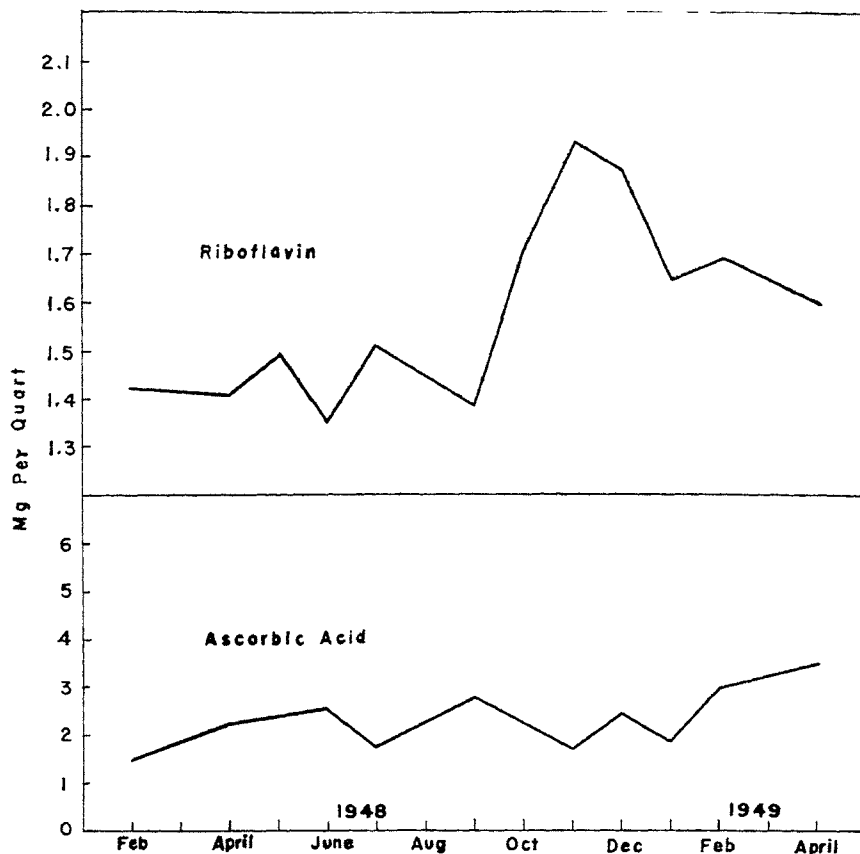


Fig. 2.—Seasonal variation of riboflavin and reduced ascorbic acid content of Ohio market milk.

No significant differences in reduced ascorbic acid are shown that could be attributed to seasonal effect. However, a greater amount of riboflavin was present during the winter months than in the summer season.

No greater differences in reduced ascorbic acid or riboflavin content of the milks from the north, central or southern sections were observed. Table 2.

## DISCUSSION

The results obtained in this study give a reasonably accurate picture of the reduced ascorbic acid and riboflavin contents of market milk as received by the consumer at different seasons of the year and from different areas of the state. The average amount of reduced ascorbic acid

TABLE 1.—Seasonal Variations in the Reduced Ascorbic Acid and Riboflavin Content of Ohio Market Milk

	No. samples	Reduced Ascorbic Acid* milligrams per quart	Riboflavin milligrams per quart
1948			
February	26	1.47	1.42
March	..	....	....
April	74	2.21	1.41
May	82	2.40	1.48
June	12	2.56	1.35
July	13	1.79	1.51
August	..	....	....
September	29	2.82	1.38
October	28	2.23	1.71
November	46	1.69	1.93
December	40	2.46	1.87
1949			
January	11	1.83	1.64
February	22	2.96	1.68
March	..	....	....
April	9	3.49	1.59
Total	392		
Average		2.33	1.58

\*30.1 percent or 118 samples had no ascorbic acid present.

from 392 samples over a period from February, 1948 through April, 1949 was 2.33 mg. per quart. Fresh milk has a reduced ascorbic acid content of approximately 18-20 mg. per quart (1), (2), (4), (6), (9). It was found that 118 samples or 30.1 percent had no measurable amounts of reduced ascorbic acid present when analyzed.

The average amount of riboflavin from these same samples had a content of 1.58 mg. per quart, which is the average amount found in fresh milk (2), (3), (9).

Reduced ascorbic acid content of the milk samples did not show much variation due to either seasonal or regional differences while the riboflavin content increased greatly during the period October 1948 through January 1949. There is no apparent explanation for this increase. The riboflavin content of milk from different areas does not show any marked differences. However, milk from the northern part of the state was slightly lower in riboflavin than the central and southern areas.

**TABLE 2.—Seasonal and Area Variations in the Reduced Ascorbic Acid and Riboflavin Content of Ohio Market Milk**

	Number of Samples			REDUCED ASCORBIC ACID Milligrams per Quart			RIBOFLAVIN Milligrams per Quart			
	Total	North	Central	South	North	Central	South	North	Central	South
1948										
February	26	17	3	6	0.94	3.04	2.22	1.31	1.49	1.71
March	..	..	..	..	..	..	..	..	..	..
April	74	39	16	19	3.16	1.63	0.91	1.36	1.49	1.41
May	82	44	20	18	2.96	1.42	2.19	1.49	1.44	1.53
June	12	5	1	6	4.08	..	2.56	1.57	1.36	1.16
July	13	5	1	7	1.75	..	2.07	1.38	2.10	1.52
August	..	..	..	..	..	..	..	..	..	..
September	29	7	8	14	3.24	3.61	2.17	1.41	1.52	1.29
October	28	10	7	11	1.92	1.64	3.13	1.58	1.83	1.72
November	46	33	12	1	1.47	2.12	3.40	1.74	2.22	2.77
December	40	14	6	20	4.51	1.67	1.10	1.87	1.71	1.92
1949										
January	11	8	..	3	1.84	..	1.82	1.69	..	1.53
February	22	14	4	4	2.17	2.49	5.48	1.66	1.74	1.67
March	..	..	..	..	..	..	..	..	..	..
April	9	2	..	7	2.33	..	3.75	1.39	..	1.65
Average	..	..	..	..	2.53	2.20	2.57	1.54	1.69	1.66

## SUMMARY

A total of 392 samples of market milk from 162 dairies in Ohio obtained during the period February, 1948 through April, 1949 were analyzed for their reduced ascorbic acid and riboflavin content.

The average amounts of reduced ascorbic acid and riboflavin during this period was found to be 2.33 and 1.58 mg. per quart, respectively.

One-hundred-eighteen samples or 30.1 percent had no measurable amounts of reduced ascorbic acid present when analyzed.

More riboflavin was found during the period October 1948 through February 1949 than in the other months of the year.

No marked differences in the amounts of reduced ascorbic acid and riboflavin in different areas of the state were found.

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