

# Stability of Ascorbic Acid in the Presence of Ferrous and Ferric Ions

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IT WAS REPORTED earlier (1) that ferric (but not ferrous ions) have a deleterious effect on the stability of ascorbic acid in pharmaceutical preparations. Since sorbitol is a good vehicle for ascorbic acid, the effect of different concentrations of ferrous and ferric ions in 70 and 50% (w/v) sorbitol between the pH range 2.5 to 4.0 was examined. The results are presented in this communication.

The influence of ferrous sulfate (BDH) and ferric chloride (Riedel, De Haen; A. G. Seelze, Hanover) on the stability of 0.5% solution of ascorbic acid

Results presented in Table I indicate that in 70% sorbitol ascorbic acid retention was best at pH 2.5. At the pH levels tried, the concentration of ferrous ions had no influence on the stability of this vitamin. Ferric ions, as reported earlier (1), had a deleterious effect, but varying concentrations of ions had no influence on the stability of ascorbic acid at pH 2.5 and 4.0.

Ferrous ion at the 0.175 and 0.150% level had no effect on the stability of ascorbic acid in 50% sorbitol at all the pH levels tried. Deleterious effect was noticed below 0.150% concentration of ferrous

TABLE I.—PER CENT RETENTION OF ASCORBIC ACID\*

Concn. of Iron in 100 ml.	% Retention		
	pH 2.5		pH 3.5
	Vehicle	70% Sorbitol	pH 4.5
Nil (control)	73.6	58.2	54.3
F <sup>2+</sup>			
0.175	66.0	66.5	62.5
0.150	72.3	68.8	62.1
0.125	72.3	59.8	62.2
0.100	72.2	...	...
0.075	78.8	47.5	49.2
0.050	78.6	...	51.3
0.025	76.2	48.7	52.3
F <sup>3+</sup>			
0.150	48.6	...	46.9
0.100	53.8	...	...
0.050	57.3	...	41.5
	Vehicle	50% Sorbitol	
Nil (control)	75.2	74.8	65.3
Fe <sup>2+</sup>			
0.175	71.3	72.1	70.4
0.150	78.4	75.2	69.7
0.125	66.0	61.7	62.5
0.100	51.9	33.3	25.6
0.075	50.0	28.0	24.0
0.050	48.3	22.4	18.2
0.025	39.7	23.3	16.6
F <sup>3+</sup>			
0.150	55.5	...	41.6
0.100	46.9	...	47.4
0.050	51.1	...	55.5

\* Three-month storage period; temperature, 37°C.

(E. Merck) was studied by storing the samples at the desired pH at 37° for 3 months in sigcol brown glass-stoppered bottles. Each sample contained 0.2% of *p*-hydroxy benzoate (Rhodia, France) as preservative. The vitamin was assayed by the 2, 4-dinitrophenyl hydrazine method, modified by Meyer *et al.* (2).

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ions, unlike in 70% sorbitol; this effect was more at a higher pH level. This observation in 50% sorbitol might have something to do with the equimolar concentrations of iron and ascorbic acid. Generally, in the presence of ferric ions deleterious effect was observed at the three concentrations tried, but the change in pH had not affected materially the retention values of the ascorbic acid.

## REFERENCES

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