

of the casein molecule prior to coagulation has frequently been postulated (cf. Oppenheimer).⁴ In the enzyme now obtained from *Withania coagulans* we have for the first time a preparation which is entirely devoid of proteolytic activity and which therefore provides clear proof of the independence of the process of coagulation to hydrolytic cleavage of casein.

The author's thanks are due to Mr. Zal R. Kothavalla, Imperial Dairy Expert, Bangalore, who suggested the research and supplied the material and to Prof. M. Damodaran for his interest in the work.

(MISS) K. M. YESHODA.

University Biochemical Laboratory,
Madras,
December 23, 1940.

¹ Rona, *Praktikum der physiologischen chemie*, 1931, **1**, 276.

² Michaelis and Rothstein, *Biochem. Zeit.*, 1920, **105**, 60.

³ Rona and Gabbe, *Ibid.*, 1922, **134**, 39.

⁴ Oppenheimer, *Die Fermente*, 1926, **1**, 978.

CATALYSIS BY ASCORBIC ACID

DURING the course of our work on the role of ascorbic acid in physiological processes and the cause of its stability in plant and animal tissues we have found that it catalyses the reduction of silver chloride by sodium sulphite.

The experiments were conducted in brown bottles and silver chloride was formed *in situ* by adding to each bottle 10 ml. of 0.1N silver nitrate and 10 ml. of 0.1N potassium chloride solution. The requisite volumes of sodium sulphite solution and ascorbic acid solution were then added, followed by enough distilled water to make up the total volume to 50 ml. After three to three and half hours, the contents of each bottle were poured through a filter (Whatman No. 42, for fine precipitates). The residue on the filter was carefully washed until free from the soluble salts. The funnel with the filter is then put over a 250 ml. volumetric flask and the residue on the filter treated with 1:1 dilute analytical nitric acid. The corresponding brown bottle was also treated similar-

ly and the liquid poured on the filter. The treatment is repeated three times to ensure complete solution of any metallic silver formed by reduction. It is well known that silver chloride does not dissolve in 1:1 nitric acid. The filtrate in the 250 ml. flask was made up to the mark, and the amount of silver in an aliquot portion estimated volumetrically by titration with standard potassium thiocyanate solution, using ferric alum as the indicator.

Under these experimental conditions we have found that sodium sulphite does not reduce silver chloride, while ascorbic acid does so readily. Further we made the interesting observation that in the presence of sodium sulphite a given amount of ascorbic acid produces a much larger reduction of the silver halide than when it is alone.

TABLE I
5 Milligrammes of ascorbic acid

Volume of sodium sulphite solution 0.025 Molar	Amount of AgCl in milligrammes Ag	Milligrammes Ag obtained by reduction in 3½ hours
0	107.9	2.88
5 ml.	107.9	6.26
10 ml.	107.9	9.04
15 ml.	107.9	9.71

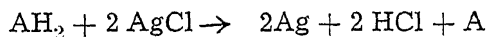
The results indicate that ascorbic acid induces the reduction of silver chloride by sodium sulphite. The following table shows the influence of the concentration of the inductor, namely ascorbic acid on the rate of reduction, keeping the concentration of sodium sulphite at a constant but fairly high value.

TABLE II
Concentration of sodium sulphite 0.05 Molar

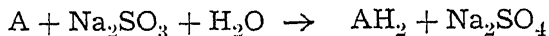
Amount of ascorbic acid	Amount of AgCl in milligrammes Ag	Milligrammes Ag obtained by reduction in 3 hours
5 milligrammes	107.9	7.08
10 „	107.9	12.18
15 „	107.9	17.00

It will be seen from the above results that the rate of the induced oxidation increases with increasing concentration of the inductor.

The mechanism of this induced oxidation may be as follows:—



Ascorbic acid

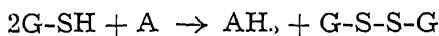


Dehydroascorbic acid

This is similar to the mechanism suggested by Pandalai and Gopala Rao¹ for the reaction between silver chloride and sodium sulphite induced by hydroquinone or metol.

In order to obtain confirmation of this mechanism we prepared dehydro-ascorbic acid by oxidation of the vitamin in aqueous solution with Norit Charcoal and found that the oxidized form thus prepared is incapable of reducing silver chloride by itself, while it can do so in the presence of sodium sulphite.

It will be of interest in this connection that Hopkins and Morgan,² Borsook and Jeffries³ found that glutathione reduces dehydro-ascorbic acid to ascorbic acid.



Glutathione

It is by this mechanism that Hopkins and Morgan explained the protection of vitamin C from oxidation in tissues.

G. GOPALA RAO.

T. V. SUBBA RAO.

Andhra University,

Waltair,

November 15, 1940.

¹ *Zeit. Anorg. Chemie*, 1933, 215, 23.

² *Biochem. J.*, 1936, 30, 1446.

³ Borsook and Jeffries, *Science*, 1936, 83, 397.

STRAINS OF COLLETOTRICHUM FALCATUM WENT

Colletotrichum falcatum Went is widely known as the causal organism of red rot of sugarcane, a disease present wherever sugarcane is grown. While surveying the red rot flora in the cane-growing tracts of America, Abbott¹ came across differences in the cultural characters of the

parasite. He could distinguish two principal races among his collection which for convenience he designated as light and dark races. He found also that these two types varied in their virulence.

Red rot broke out in an epidemic form in North Bihar during 1939-40 season and did considerable damage to the crop. Specimens of diseased canes were obtained from several localities and cultures taken from affected tissues adopting a standard method of culturing in all cases. Differences in the morphology of the cultures obtained could be noticed in one month when two distinct types and an intermediate form could be distinguished. The following are the descriptions:

Type A.—The colony of this type is cottony and floccose in texture, white in colour during the first two weeks assuming a very light tint of gray with age. Slimy pink masses of conidia are absent in this culture.

Type B.—The texture of the colony is loose and silky. For the first two weeks the aerial mycelium is almost translucent and on account of this character it is difficult to define the actual shade of gray to which it belongs even with the help of Ridgway.² Abundant dark pseudopycnidial masses are to be seen in the aerial mycelium while an enormous number of slimy masses of conidia are produced on the surface of the medium; the slimy masses are of salmon colour (Ridgway, *loc. cit.*). Old cultures exhibit a more compact texture with the loose silky mycelium more or less disappearing with age. On oatmeal agar this grows much faster than Type A.

Type C.—The colony of this type has a compact velvety texture and is darker than Type A. Conidia are produced in pink masses sparingly with a tendency to confine themselves to the margins of the media. This is perhaps an intermediate form of A and B.

In certain cases during the tissue-culture examination two types of the parasite were met with and no antagonism was observed between the races. This is in agreement with the findings of Abbott.¹