

course of this work, and Prof. Armando Manes, for suggesting the Latin name.

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1. Bezenberger, E., 1904. 2. Bhatia, B. L., 1936.
3. Carini, A., 1921, 1929, 1939, 1940.

**CATALYSIS OF THE REACTION
BETWEEN VANADATE AND AROMATIC
AMINES CATALYSED BY THE
OXALATE ION**

It has been previously reported that oxalate catalyses the reaction between dichromate and hydriodic acid¹ and dichromate and hydrobromic acid² and dichromate and aromatic amines.³ Viswanatham and Gopalarao⁴ have found that the oxalate ion has a profound accelerating action on the reaction between the vanadic

simultaneously and the time required for the appearance of blue violet colour was noted. In the absence of oxalate it took three minutes for the colour to appear, whereas when one ml. of N/10 oxalic acid was added (under otherwise identical conditions) the colour was immediately produced. The results with other amines experimented with are recorded in the following table.

All substances, (except benzidine), under test are dissolved in concentrated sulphuric acid and a known volume of the solution is treated with a known volume of decinormal vanadate solution and a requisite amount of water is added to bring up the volume of the reaction mixture to a total of 20 ml.

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TABLE I

No.	Substance	Quantity and concn. of test soln.	Quantity of 0.1 N vanadate	Overall concn. of oxalate	Observation	
					without oxalate	with oxalate
1	Aniline	2 ml. of 1% soln.	2 ml.	1×10^{-2} N	Light green colour in ten minutes.	Slight green precipitate in 3 minutes.
2	Dimethyl-aniline	0.1 ml. of 2.5% soln.	1 ml.	1×10^{-2} N	Light orange colour in 30 minutes.	Orange colour in 2½ minutes.
3	Paratoluidine	2 ml. of 0.1% soln.	1 ml.	1×10^{-2} N	No change even in ten minutes.	Reddish brown colour in 5 minutes.
4	α naphthyl-amine	1 ml. of 0.1% soln.	1 ml.	1×10^{-2} N	Light pink colour after 8 minutes.	Pink colour in ½ minute turning reddish brown in 2 minutes.
5	Diphenyl-amine	0.1 ml. of 0.05% soln.	0.5 ml.	0.5×10^{-2} N	Blue-violet colour in 3 minutes.	Blue violet colour immediately.
6	Diphenyl-benzidine	0.1 ml. of 0.05% soln.	0.25 ml.	0.5×10^{-2} N	Light blue violet colour in 1 minute turning more intense in 2 minutes.	Intense blue-violet colour immediately.
7	Benzidine	5 ml. of 0.05% soln. in 10% acetic acid	0.1 ml.	0.5×10^{-2} N	Blue-violet colour immediately. A fine blue violet precipitate forms in 8 minutes which does not settle down even after thirty minutes.	A bulky violet precipitate in 1½ minutes which settles down almost immediately leaving the supernatant liquid colourless.

acid and the hydriodic acid. This catalytic influence of the oxalate ion has been utilised by them for the iodimetric estimation of vanadate.⁵

It is now found that oxalate markedly accelerates the reactions of a number of aromatic amines with vanadate also. The phenomenon has been studied by noting the time required for the appearance of the characteristic colour on reaction with vanadate in the presence and absence of oxalate. For example, 0.5 ml. of a decinormal solution of sodium vanadate is taken in a clean beaker and water is added to make the volume 20 ml. and 0.1 ml. of a 0.05% solution of diphenylamine in concentrated sulphuric acid was added and the mixture stirred quickly. A stop-watch was started

1. C. R. Viswanatham and G. Gopalarao, *Curr. Sci.*, 1942, 11, 102. 2. —, *Ibid.*, 1943, 12, 186. 3. —, *Ibid.*, 1944, 13, 47. 4. —, *Ibid.*, 1943, 12, 229. 5. C. R. Viswanatham, J. V. S. Ramanjaneyulu and G. Gopalarao, *Proc. Nat. Inst. Sci. India*, 1943, 11, 333.

**EARTHWORMS AND INSECTS IN
RELATION TO SOIL FERTILITY**

BESIDES producing general effects, viz., weathering of soil carried above the surface, the earthworms, and insects like termites and ants are known to bring about changes in the organic matter, mineral matter and structure of the