

antioxidative activity is noted. This synergistic effect is particularly noticeable with oleic acid (Table II).

TABLE II  
Synergetic effect of organic acids and inhibitors

Substrate Kathiawar Agmark Ghee

Inhibitor mixture %	Induction period* with inhibitor hours	Anti-oxidative index
0.2 Oleic acid		
+0.02 Hydroquinone ..	23	11.5
0.5 Oleic acid		
+0.02 Hydroquinone ..	36	18
0.2 Oleic acid		
+0.02 Kamala dye ..	78	39
0.5 Oleic acid		
+0.02 Kamala dye ..	>86	>43
0.5 Oleic acid		
+0.05 Kamala dye ..	>86	>43
0.02 Citric acid		
+0.02 Kamala dye ..	9	4.5
0.2 Citric acid		
+0.02 Kamala dye ..	19.5	9.75
0.02 Tartaric acid		
+0.02 Kamala dye ..	12	6
0.2 Tartaric acid		
+0.02 Kamala dye ..	26	13

\* Induction period for control 2 hours.

This behaviour resembles that observed by Olcott and Mattil<sup>2</sup> who found that mixtures of orcinol and phosphoric acid prolong the period of induction in lard to a greater extent than either substance individually. It seems likely that the observation of Holmes, Corbet and Hartzler<sup>7</sup> on the superior stabilizing effect of combinations of lecithin and hydroquinone on vitamin A over that of either alone, is a case not dissimilar to the one recorded here. The advantages of using mixtures like oleic acid and Kamala instead of the abovementioned antioxidant mixtures of lecithin, phosphoric acid and other objectionable compounds are obvious.

The sample of Kamala dye was provided by Dr. S. Krishna, Biochemist, Forest Research Institute, Dehra Dun, to whom the authors' thanks are due.

<sup>1</sup> Banerjee, *Agric. & Livestock in India*, 1938, 8, 153.

<sup>2</sup> Olcott and Mattil, *J. Amer. Chem. Soc.*, 1936, 58, 2204.

<sup>3</sup> Rogers, *C.A.*, 1932, 26, 613; *U.S. Patent*, 1,826,258.

<sup>4</sup> Greenbank and Holmes, *Ind. Eng. Chem.*, 1934, 26, 243.

<sup>5</sup> Eckey, *U.S. Patent*, 1,982,907.

Richardson, Vibrans and Andrews, *C.A.*, 1935, 29, 518, 2770.

<sup>6</sup> Bollman, *Ibid.*, 1923, 17, 3234.

<sup>7</sup> Holmes, Corbet and Hartzler, *Ind., Eng. Chem.*, 1936, 28, 133.

## OBITUARY

### Dr. Gopal Chandra Chakravarti

IT is with deep regret that we record the tragic and premature demise of Dr. Gopal Chandra Chakravarti—a former Lecturer in the Department of Organic Chemistry, *Indian Institute of Science*, Bangalore. He was practically bed-ridden since 1934 on account of paralytic attack and was staying in Calcutta. On 20th October 1939, he died of burns caused by an accidental fire in his bed chamber.

Born in June 1897, he was the son of Mr. Chandra Kumar Chakravarti. He took the B.Sc., B.A., M.Sc. and D.Sc. degrees of the Calcutta University with distinction. He was the recipient of a Silver Medal in 1921, Nagarjuna Gold Medal in 1924, and also a Premchand Roychand Scholarship. He was Demonstrator in Chemistry in St. Paul's College, Calcutta, 1920–21, Sir T. N. Palit Research Scholar in the University College of Science, Calcutta, 1921–24, and

Professor of Chemistry, Serampore College, 1925–27. He joined the *Indian Institute of Science*, Bangalore, as a lecturer in 1927 and held that position till July 1934 when, for reasons of health, he had to resign from service.

Dr. Chakravarti's field of researches comprised both of synthetic chemistry and chemistry of natural products. His papers on the colour of complex diazoles and on sulphur-containing dyestuffs are of great interest. He studied the colouring constituents and the waxy product of the alkannet root and also suggested a constitutional formula for alkannin. His papers on mercaptans and thiophthalic acids deserve special mention.

Dr. Chakravarti was a devoted researcher. But for his ill-health he would have made still more valuable contributions to the science of chemistry.

B. H. IYER.