

## ABSTRACTS

### FERMENTATION TECHNOLOGY LABORATORY

1. ROLE OF EARTHWORMS IN AGRICULTURE, J. V. Bhat and S. R. Khambata, *Research Series Publication*, 1959, **22**, (1-35), Indian Council of Agricultural Research, New Delhi.

In this bulletin, brought out as a tribute to the great biologist Darwin and to mark the centenary of the publication of his work 'The Origin of Species', is provided in brief much of the information available on the earthworm with special reference to its habits and habitat, density of population and distribution, its propagation for soil fertility, microflora of its intestine and their influence on the microorganisms of soil, together with a list of publications dealing on the role of earthworms in agriculture.

2. ANTIMETABOLITES IN THE NUTRITION OF THE SILKWORM *Bombyx mori* L., PART II, ETHIONINE AS ANTAGONIST TO METHIONINE, M. B. Shyamala and J. V. Bhat, *J. Sci. Ind. Research, (India)*, 1959, **18C**, 242-244.

Through the use of ethionine (an antimetabolite), the essentiality of methionine for the nutrition of the silkworm *Bombyx mori* L. has been demonstrated. The silkworm's inability to use a mixture of cysteine and betaine to counteract the ill-effects of ethionine has also been brought out to prove its demand for methionine. Confirming evidence has been adduced by the observations that silkworm homogenates do not form methionine when incubated with a mixture of homocysteine and betaine.

3. CONTROL OF MICROORGANISMS IN FOOD INDUSTRIES, *Ann. Rev. Food Technology (India)*, 1960, **1**, 1-35.

In this article all the important papers published during the past ten years on the association of microorganisms with food materials together with the attempts made by the food microbiologists towards the control of the microorganisms in the processing and the preservation of foods have been critically reviewed and the future lines of research which should prove profitable have been indicated.

4. THE CHARACTERISTICS AND QUESTIONABLE TAXONOMIC POSITION OF OXALATE-DECOMPOSING BACTERIUM, *Vibrio extorquens*, V. N. Iyer, S. R. Khambata and J. V. Bhat, *Proc. Indian Acad. Sci.*, 1960, **51 B**, 157-163.

By a complete re-examination of oxalate decomposing bacterium named by Janota (Poland) as *Pseudomonas extorquens* along with four other similar strains

available in the culture collection at this Institute, it has been suggested that the cultures should be placed in the genus *Arthrobacter* rather than in *Pseudomonas*, although all the five strains represent, strictly speaking, a phylogenetic link between the pseudomonads and diptheroids.

5. A NOTE ON A CORYNEFORM BACTERIUM PRODUCING  $\gamma$  CAROTENE, V. G. Pradhan and J. V. Bhat, *Curr. Sci.*, 1960, 29, 102-103.

In this article a detailed report of the studies carried out on a culture described by Dr. Mahdihassan (1939) as *Mycobacterium carotinogen* has been made and reasons given for considering the bacterium as a new species in the genus *Corynebacterium*. Suggestion has been made for calling it *Corynebacterium carotenogenum* in view of its ability to produce  $\gamma$  carotene.

6. PECTIN DECOMPOSITION BY ACTINOMYCETES, M. H. Bilimoria and J. V. Bhat, *Curr. Sci.*, 1960, 29, 118-182.

In this note evidence has been provided to show that most of the species of actinomycetes (hitherto not well associated with the process) possess ability to decompose pectic substances.

#### DEPARTMENT OF INORGANIC AND PHYSICAL CHEMISTRY

1. THE EFFECT OF DEXTRIN INHIBITOR ON THE CORROSION POTENTIALS OF ALUMINIUM IN ALKALINE SOLUTIONS, J. Sundararajan and T. L. Rama Char, *Corrosion Prevention and Control*, 1959, 6, No. 1, 41.

The data on potentials of aluminium corroding in alkaline medium has been presented under the following conditions: NaOH 0.1 - 0.3 N, dextrin 0.6 - 30 g/l, immersion period with inhibitor 2 hours, temperature 32°C. The plot of potential against corrosion rate gives a straight line indicating the electro-chemical nature of corrosion. The plot of the difference in the steady state potential against dextrin concentration gives an adsorption isotherm curve. The Langmuir type of adsorption is indicated.

2. ELECTROPLATING OF NICKEL FROM THE PYROPHOSPHATE BATH, S. K. Panikkar and T. L. Rama Char, *J. Electrochem. Soc.*, 1959, 106, 494.

The pyrophosphate bath has been found to be satisfactory for the plating of nickel. Detailed studies have been made of the effect of the variables on electrode efficiencies and potentials. The effect of addition agents and structure of deposits has been dealt with, and throwing power measured. The bath gives good quality deposits over a wide range of operating conditions. The advantages of the bath over the Watts and chloride type are low metal content, high throwing power, and ability to plate directly on zinc.

## 3. ELECTROPLATING OF ZINC AND ITS ALLOYS FROM THE PYROPHOSPHATE BATH,

T. L. Rama Char, *Electroplating, India*, 1959, 1, 48.

Investigations carried out in the author's laboratory have shown that zinc and its alloys with tin, nickel, copper and iron can be satisfactorily electro-deposited from the complex pyrophosphate bath. A detailed study has been made of the effect of the variables on alloy deposit composition, cathode efficiency and cathode potential. In the nickel-zinc and iron-zinc systems there were sudden changes in plate composition and cathode potential at low current densities due to the deposition of alloys of different phases. Anode corrosion was easy with cast tin-zinc and copper-zinc alloys. Two tables and 30 references.

4. ELECTROPLATING IN EAST GERMANY, T. L. Rama Char, *J. Sci. and Ind. Research*, 1959, 18A, 158.

Brief outline on the recent trends in East Germany in the field of electroplating: research and teaching, industry, general.

5. ELECTROPLATING REPORT—INDIA, 1957-58, T. L. Rama Char, *Electroplating, India*, 1959, 1, 9.

The developments in India during 1957 and 1958 in electroplating and allied fields have been reviewed with reference to research, teaching, Scientific Societies and Conferences.

6. INHIBITION OF THE CORROSION OF ALUMINIUM IN ACID AND ALKALINE SOLUTIONS: EFFECT OF ALLOYING ELEMENTS, J. Sundararajan and T. L. Rama Char, *Bull. India Section, Electrochem. Soc.*, 1959, 8, 35.

This paper presents the results of investigations on the corrosion rates and inhibitor efficiencies in hydrochloric acid and sodium hydroxide solutions for aluminium alloy of 4 compositions: Commercial 92, 99.5, aircraft zinc alloy 86, and aircraft copper alloy 91 per cent aluminium. The inhibitors were agar-agar, gum acacia, gelatin and glue in alkaline and, acridine, thiourea and nicotinic acid in acid medium. The 99.5 per cent aluminium is most resistant to corrosion in both media. Agar-agar and gum acacia are the best inhibitors for alkali. The acid inhibitors provide very good protection, acridine and thiourea being better for all the compositions.

7. CATHODE POLARIZATION IN THE ELECTRODEPOSITION OF METALS AND ALLOYS  
T. L. Rama Char, *Electroplating, India*, 1959, 1, 165; *Enlarged Abstracts Theoretical Division, The Electrochemical Society*, No. 199, 106.

The significance of cathode polarization during the electrodeposition of metals and alloys from the pyrophosphate bath has been discussed with respect to the nature of the single metal potential curves, structure of deposits and throwing power. The utility of cathode potential data in alloy deposition has

been examined in relation to the feasibility of codeposition, plate composition and structure, and mutual influence of the metals. Table presents values for current density range, polarization total and activation, exchange current density, energy transfer coefficient, energy of activation and throwing power during the plating of tin-zinc, nickel, copper and lead. Three figures show the reconstruction of single metal potential curves from alloy composition and potential for the tin-copper, nickel-zinc, and copper-zinc systems.

8. ELECTRODEPOSITION OF COPPER-ZINC ALLOYS FROM THE PYROPHOSPHATE BATH, (Miss) Vasanta Sree and T. L. Rama Char, *Electroplating and Metal Finishing*, 1959, 12, 326, 385.

The pyrophosphate bath has been used for the codeposition of copper with zinc. The optimum conditions for obtaining satisfactory alloy plates in the composition range 60-100 per cent copper have been established. Anode behaviour with cast alloys is normal. X-ray patterns of the deposits show the existence of only the alpha-solid solution with f.c.c. structure. This bath possesses some advantages over the cyanide bath for brass plating.

9. DIE GALVANISIERUNG IM PYROPHOSPHATBAD, T. L. Rama Char, *Proc. Third Internationales Kolloquium—Galvanotechnik, Ilmenau*, 1958, 82 (published 1960).

Detailed studies carried out in the author's laboratory have shown that the pyrophosphate bath is suitable for the electrodeposition of various metals—tin, copper, zinc, nickel and lead, and alloys—tin with zinc, nickel, lead, copper, and copper with zinc and nickel. The optimum conditions for each metal and alloy have been established, and some of the important aspects of deposition discussed. Four tables and 43 references.

10. ANODIC CORROSION OF NICKEL-COBALT AND NICKEL-IRON ALLOYS IN PYROPHOSPHATE PLATING SOLUTIONS, (Miss) Vasanta Sree and T. L. Rama Char, *Corrosion Prevention and Control*, 1960, 7, No. 4, 41.

A study has been made of the behaviour of cast nickel-cobalt and nickel-iron anodes during the electrodeposition of nickel-cobalt and nickel-iron alloys from the pyrophosphate bath. Anode corrosion is satisfactory as found from measurements of the anode efficiency and potential, and from analysis of plating solutions.

11. ELECTRODEPOSITION OF COPPER FROM THE PYROPHOSPHATE BATH, S. K. Panikkar and T. L. Rama Char, *J. Sci. and Ind. Research*, 1960, 19 A, 265.

The optimum conditions have been established for the plating of copper on steel from complex pyrophosphate solutions. Potential measurements have been made and the throwing power determined. This bath comparable to the

high efficiency cyanide bath for copper plating with the added advantage of higher permissible current density. Three tables, 15 figures and 25 references.

12. IRON-COBALT ALLOY PLATING FROM THE PYROPHOSPHATE BATH, (Miss) Vasanta Sree and T. L. Rama Char, *J. Sci. and Ind. Research*, 1960, 19 B, 223.

The pyrophosphate bath has been used for the deposition of iron-cobalt alloys. Table shows the effect of electrolyte concentration on deposit composition, cathode efficiency and potential.

13. RECENT DEVELOPMENTS IN ELECTROPLATING, 1955-59, T. L. Rama Char and S. Venkatachalam, *Bull. India Section, Electrochem. Soc.*, 1960, 9, 30.

A review has been made of the developments during the last five years in electroplating with special reference to metals and alloys, plating baths and general techniques. 113 references.

14. SOME HINTS IN CHROMIUM PLATING FOR THE JOB PLATER, S. Venkatachalam and T. L. Rama Char, *Electroplaters' and Metal Finishers' Assoc., Madras, Ann. Review*, 1958-59, 17.

This paper outlines the importance of chromium plating in industrial finishing, operating conditions and precautions to be taken, impurities in the plating solution, and anodes.

15. ELECTRODEPOSITION OF COBALT AND IRON FROM THE PYROPHOSPHATE BATH, (Miss) Vasanta Sree and T. L. Rama Char, *Bull. India Section, Electrochem. Soc.*, 1960, 9, 59.

Cobalt and iron have been plated from the pyrophosphate bath. Measurements have been made of the cathode efficiencies and potentials. Table gives operating conditions for the two metals. Nine figures cover cathode efficiency, cathode potential and photomicrographs of deposits.

16. INHIBITORS FOR ALUMINIUM IN ACID SOLUTIONS, J. Sundararajan and T. L. Rama Char, *Corrosion Technology*, 1960, 7, 207.

Corrosion rates and inhibitor efficiencies have been determined for commercial aluminium in hydrochloric acid with acridine, nicotinic acid, dextrin, thiourea and tannic acid as inhibitors. Polarization studies have been made with thiourea. The mechanism of corrosion inhibition has been discussed. Two figures, 3 tables and 17 references.