Proceedings of the Iowa Academy of Science

Volume 31 | Annual Issue Article 62

1924

Three Maxims for the Study of the Nutrition of Microorganisms

Ellis I. Fulmer

ADSORPTION FROM SALT SOLUTIONS BY COLLOIDAL COPPER FERROCYANIDE

MIKKEL FRANKERT AND J. A. WILKINSON

In order to compare the two views as to the cause of the acidity developed when a soil is treated with a neutral salt solution (selective adsorption and base exchange theories) colloidal copper ferrocyanide was treated with different salt solutions of varying strengths and the alkalinity or acidity developed was compared with the amount of copper dissolved. Potassium salts developed a whole series from a small amount of acidity to a large amount of alkalinity. The order of the anions is as follows:— acid $Cl > NO_3 > SO_4$ Acetate and pure H_2O neutral $Fe(CN)_6''' < HPO_4 < Fe(CN)_6''''$. With the exception of the acetate which dissolves a large amount of copper, the amounts of copper dissolved were in the inverse order. Aluminum salts all gave basic solutions the order being $Cl < NO_3 < SO_4$ for the alkalinity. There is no relationship between the amount of copper dissolved and the alkalinity developed. Barium nitrate gave a neutral solution and the chloride alkalinity but neither dissolved any copper. The results are best explained on the basis of the selective adsorption theory.

THREE MAXIMS FOR THE STUDY OF THE NUTRITION OF MICROORGANISMS

ELLIS I. FULMER

I. The relative potencies of two materials cannot be arrived at by the comparison of the effects of the two materials at equal concentrations.

Corollary:— The effect of treatment upon the potency of a material cannot be determined by the comparison of the treated and untreated material at equal concentrations.

II. The relative potencies of two materials at one temperature may not be true for any other temperature.

Corollary:— Temperature coefficients for the effect of a material must be determined under optimum conditions for each temperature.

III. If two materials are to be compared as a source of a protoplasmic constituent the physical chemical effects of the materials must be compensated for.