THE POLAROGRAPHIC CURVE OF SERUM FROM RATS FED p-DIMETHYL-AMINOAZOBENZENE[1]

WHITE and White[2, 3] have demonstrated that growth inhibition resulted in young rats when carcinogenic chemicals and certain other organic compounds were included in the diet, and they reported that this could be corrected by dietary supplements of l-cystine and dl-methionine. It was concluded that certain carcinogens, as well as non-carcinogens, could induce a specific deficiency of the sulfur containing amino acids probably by imposing on the organisms an increased requirement for organic sulfur in the form of cystine or methionine for detoxication mechanisms. Since Brdička[4] has shown that the production of the polarographic curve obtained with blood serum is quantitatively proportional to the concentration of the sulfur-containing amino acids, we used the polarograph to obtain information regarding the level of these substances in the blood of rats on diets containing p-dimethylaminoazobenzene (butter yellow). Rusch, Klatt, Dirksen and Meloche[5] have pointed out that cystine is highest in the albumin fraction of the blood and found that the height of the polarographic curve was directly proportional to the amount of serum albumin.

Twenty-four young albino rats weighing 60–70 gm were divided into two series of 12 each. Three different basic diets were used. Diet I was composed of dextrin 77, casein 6, butter 5, crisco 5, salts 4, brewers yeast 2 and cod liver oil 1. Diet II was the same except that dextrin was reduced to 67, the casein was raised to 16, and 0.02 per cent. butter yellow was added. Diet III was the same as diet I except that 0.067 per cent. cystine and 0.02 per cent. butter yellow were added. In series I, three rats were killed at the beginning of the experiment, the remainder put on diet I and kept for 21 days when 3 more were sacrificed. Butter yellow (0.02 per cent.) was added to diet 1 and after 9 days on this ration, 3 were killed and the remaining 3 placed on diet II for 7 days more after which time they were also sacrificed. Series II was performed in the same manner, except that the rats were kept on diet I for 30 days before making any changes and diet III was used instead of diet II. Blood for the polarographic determinations was obtained when the rats were decapitated and it was prepared by the method previously described.[5]

The average height of the polarographic curves of the rats on normal diets in series I was 19.7 mm, but decreased to 17.5 mm on diet I, was further lowered to 15.8 mm when butter yellow was added and increased to 17.8 after the level of casein was raised. In series II, the figures were 20 mm for the controls, 15.3 mm after 30 days on diet I, 13.3 mm after butter yellow was added and 14.8 mm when additional cystine was included in the diet. In Fig. 1 representative

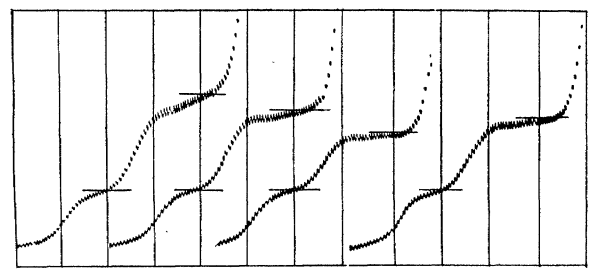

FIG. 1

curves of each group are arranged in the order just given. The lower curves found in series II were probably due to the greater depletion of cystine, since the rats were kept on the deficient diet over a longer period. The failure of the curves to return to the normal starting height may have been due to inadequate amounts of essential factors or to the short period allowed for recovery. From these results it is probable that the addition of butter yellow to the diet of rats resulted in a reduction in the level of the sulfur containing amino acids of the blood sera. This is in harmony with results obtained by different methods as reported by White and White.

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VITAMIN B_6 AND GROWTH OF EXCISED TOMATO ROOTS IN AGAR CULTURE[1]

ROBBINS and Schmidt[2] reported that pyridoxine (vitamin B_6) had a marked favorable effect on the growth of excised tomato roots in a mineral-sugar solution containing thiamin. Bonner and Devirian[3] obtained similar results. Bonner[4] reported beneficial results with five strains of tomato. Robbins[5] observed that the excised roots of one inbred tomato showed little response to pyridoxine while those of another

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