THE EFFECT OF POTASSIUM ON THE PRODUCTION OF PROTEINS, SUGARS, AND STARCH IN COWPEA AND IN SUGAR BEET PLANTS AND THE RELATION OF POTASSIUM TO PLANT GROWTH

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It has been shown (1, 2, 9) that the plant may take up more potassium from the soil solution than is actually needed for normal growth. It has also been shown (6) that the potassium in the tomato plant is practically all water-soluble and that, being extremely labile, it can readily be retranslocated within the plant. The function of the potassium ion in plant metabolism is still a matter of conjecture. It appears from previous work (6), however, that there is not always a correlation between the percentages of sugars and starch in the plant and the heavier uptake of potassium. In some cases, it appears that the highest percentages of sugar and starch were produced at a potassium concentration which was also conducive for maximum growth; while in other cases high percentages of sugars and starch were found with a small uptake of potassium and with decreased plant growth. In nearly all cases, it was shown (6) that a high percentage of potassium in plants is associated with a lower percentage of total nitrogen and total water-soluble nitrogen than that found in plants which contain a low amount of potassium. These results suggested that potassium might be directly or indirectly concerned in the synthesis of proteins, that the lack of condensation of the amino acids to protein prevented growth, and that this in turn caused the high water-soluble nitrogen fraction.

It was the plan of the investigation reported here, therefore, to determine, if possible, the relationship between the amount of

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3Reference by number is to “Literature Cited,” p. 679.