A PRELIMINARY STUDY OF THE RELATIONSHIP BETWEEN VITAMIN C CONTENT AND INCREASED GROWTH RESULTING FROM FERTILIZER APPLICATIONS

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WITH increased yields due to the extensive use of commercial fertilizers, especially on truck crop farms, it becomes desirable that research workers investigate the influence of these fertilizer materials on the nutritive value of the plant.

Pfitzer and Pfaff (1) found that the vitamin C content of many plants was relatively unaffected by fertilizer treatment, though the plants showing the highest yields were also highest in vitamin C content. Luettmerding (2) showed that in germinating oats, peas, and wheat, vitamin C formation was accelerated in proportion to the acidity of the medium. Hahn and Görbing (3) found that the amount and type of fertilizer used have a marked effect on vitamin C content of spinach. A fertilizer well balanced in nitrogen, phosphorus, and potash gave the highest vitamin C. An unbalanced fertilizer gave crops of low vitamin C content. The greatest decrease in vitamin C occurred when excess nitrogen was present.

Fellers, Young, Isham, and Clague (4) reported that variations in the amount of potash and nitrogen used in the fertilization of asparagus did not appreciably affect the vitamin C or A content of this crop. The antiscorbutic ratings as determined in this experiment were as follows: Asparagus receiving high nitrogen fertilization was slightly better than that from a normal completely fertilized plat and the latter was somewhat superior to asparagus grown under high potash fertilization. There was a slightly greater growth rate in animals fed on the no-potash asparagus than in those fed the high potash plants.

In England, two varieties of apples from high and low nitrogen plats were tested by Bracewell, Wallace, and Zilva (5). They found that the nitrogen content of the apples did not correlate with the vitamin C content. That the nature of the soil had no measurable effect on the antiscorbutic potency of oranges was reported by Bracewell and Zilva (6). Potter and Overholser (7) and Batchelder (8) found that Winesap apples from trees receiving applications of a complete fertilizer were a better source of vitamin C for guinea pigs fed 5 grams daily than apples from trees not so fertilized.

EXPERIMENTAL METHODS

It was decided to investigate the effect of fertilizer treatment on the vitamin C content of New Zealand spinach (Beta vulgaris) and Swiss chard (Tetragonia expansa). Both species of plants are grown for their leaves and thus the entire aerial portion could be used for ascorbic acid (vitamin C) determinations, thereby lessening the error which usually accompanies the separation of a plant into several

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3Figures in parenthesis refer to “Literature Cited”, p. 893.