

THE EFFECT OF SOIL ZONE ON THE NUTRIENT CONTENTS OF VEGETABLES

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by

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Human beings have extensive nutritional requirements. They must receive an adequate supply of many different nutrients if they are to develop and maintain healthy bodies. These nutrients include several vitamins and minerals. A pronounced lack in the supply of any one of these may produce a deficiency disease in the individual. While the incidence of these is very rare in Canada, this does not mean that everyone is receiving the necessary supply of all required nutrients. Nutritionists believe that many people consume less than the optimum amounts, and point to the improved health of subjects whose nutritional status has been raised above minimum levels.

Foods vary appreciably in their contents of nutrients. Animal products are particularly good sources and constitute the majority of the so-called protective foods. However, animals rarely synthesize these nutrients themselves, but get them from their food in turn. So the essential food sources of vitamins and minerals are plant products. The latter foods when consumed directly provide a portion of the vitamin and mineral intake of the average person. This portion may be large since plant products are consumed in greater amounts than are animal ones.

Garden vegetables form a large share of the average diet. They vary a good deal in nutrient content. One kind of vegetable- indeed, even one variety of a vegetable- will show remarkable variations in the amounts of the different nutrients it contains. These variations have been attributed to differences in the soil, the moisture and temperature of the soil, light intensity, duration and quality, relative humidity and rainfall, and temperature,

and even to the maturity of the plant when harvested.

In Manitoba there is a variety of soil types, from the black earth of the Red River Valley to the podzol soils of the far north. They vary in acidity or alkalinity, in available mineral and organic matter, in texture and moisture. If this is really a factor affecting the nutrient content of vegetables we would expect to find differences in the nutrient content of the vegetables produced in these different soil zones. To test the validity of this the project reported herein was begun. It is a study of the nutritive value of vegetables grown in several areas of the province, these being chosen to represent the different soil zones. This was expected to give some indication of the variations which occur and to show whether these variations are due to the soil zone or to some other environmental effect, or both.

FACTORS WHICH AFFECT THE VITAMIN AND MINERAL CONTENT
OF VEGETABLES

Several investigators have studied the factors which are believed to affect the vitamin and mineral content of vegetables. Their work is discussed below for each factor investigated.

1. Locality.

Many attempts have been made to correlate the vitamin content of vegetables with locality or type of soil in which they are grown. Generally the investigators have not tried to control other factors of environment. In 1936, Tressler, Mack and King (90) found that twelve varieties of spinach grown on upland soil averaged 50% higher in ascorbic acid content than those same varieties grown on muck soil. They believed variety to be of secondary importance to locality. On the other hand, Lampitt, Baker, and Parkinson (49) found no differences in ascorbic acid concentration between potatoes of two varieties grown on two different, but well-defined, types of soil (black land and silt land). Also Hanson and Waldo (36) obtained close agreement with strawberries grown in several different types of soil, and Lyons and Fellers (58) decided that geographical source was not significant in the production of ascorbic acid in tomatoes.

Different varieties of tomatoes and cabbages were grown in several localities in Maine by Murphy (65). She found that plants from one locality might be consistently high in ascorbic acid during one season while another locality would produce plants with higher ascorbic acid content the next season. Her