

Quality of Plant Production under Normal and Stress Conditions: Biochemical Characterization and Dependence on Mineral Nutrition

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The quality of plant production represents a set of indicators (type, shape, dimensions, color, chemical composition, nutrients, etc.) that affect its biological and commercial value. The most essential indicator determining the biological value of the produce as human food is its chemical composition. The main groups of chemical components in plant production are proteins, carbohydrates, fats, essential oils, as well as vitamins, mineral elements, biologically active substances, and others. Their presence or absence in a given plant product, as well as their specific composition and balance among them, are significantly influenced by environmental factors and cultivation conditions.

The biological value of protein is among the most important biochemical indicators determining the quality of plant production. The value of protein depends on some of its properties, the degree of its assimilation by the organism, and its amino acid composition, particularly the content of essential amino acids and their ratio.

Environmental factors exert a significant influence on the quality of plant production. The chemical composition, which largely determines the quality of the produce, changes in a negative direction under stress impacts. The possibilities for counteracting stress factors include the selection of more tolerant and higher-quality varieties and hybrids, as well as various agrotechnical measures, among which mineral nutrition holds a primary place. The correct use of different fertilization systems for agricultural crops with fertilizers of various forms and compositions can, to a significant extent, buffer or compensate for the negative effects of abiotic stress factors on the yields and quality of agricultural crops.