1.Growth and physiological responses of *Solanum lycopersicum* to atonik and benzyl adenine under vernalized conditions

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Abstract:

A foliar application of Atonik (250, 500 and 1000 ppm) and benzyl adenine (25, 50 and 100 ppm) under vernalization was investigated on *Solanum lycopersicum* (var. Beto 86) plant. All determined growth parameters (root length, root fresh and weights, shoot length, number of leaves, number of nodes, total leaf area, shoot fresh and dry weights and relative water content) were inhibited in response to treatment with vernalization. Meanwhile vernalization in combination with varying concentration of Atonik or benzyl adenine (BA) led to a general significant increase in these parameters. Vernalization alone or in combination with Atonik or benzyl adenine accelerated flowering especially in response to 1000 ppm Atonik or 50 ppm BA under vernalization treatment. Vernalization treatment significantly increased the concentration of chlorophyll *a* and *b*, carotenoids and consequently total pigments. While chlorophyll *a/b* is insignificantly affected. In general, vernalization and different concentrations of Atonik or BA led to a massive increase in these pigments. Glucose, sucrose, polysaccharides, ammonia, amino and soluble as well as total nitrogen and protein were increased in tomato plants under the influence of vernalization alone or in combination with Atonik or BA. Moreover, a general significant increase in the content of K+, Na+ and Ca++, were detected in both tomato root and shoot as a result of treatments. Vernalization caused a significant decrease in total auxins, gibberellic acid and different cytokinin fractions in the shoot of tomato plants, whereas abscisic acid increased significantly by this treatment. At vernalization, all concentrations of Atonik or BA reverse this situation ascompared with control values.

Keywords: Atonik, benzyl adenine, *Solanum lycopersicum*, vernalization.

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2. PLANT-GROWTH METABOLISM AND ADAPTATION IN RELATION TO STRESS CONDITIONS .16. SALINITY AND HORMONE INTERACTIONS IN AFFECTING GROWTH, TRANSPIRATION AND IONIC RELATIONS OF PHASEOLUS-VULGARIS

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Abstract

Addition of either abscisic acid (ABA) or kinetin at 10(-6) M to salinized media (20 - 120 mM NaCl) induced remarkable effects on growth of *Phaseolus vulgaris* plants. Whereas ABA inhibited the plant growth and the rate of transpiration, kinetin induced stimulation of both parameters. Moreover, ABA increased proline and phosphorus concentrations in the salinized plants whilst kinetin decreased them. ABA induced stimulation of the transport of K, Ca and Cl from root to shoot, accumulation of K, Na and Cl in root cells and inhibits the transport of Na and accumulation of Ca. Kinetin appeared to inhibit the transport and accumulation of Na and Cl, transport of K, and stimulates the accumulation of K and Ca as well as the transport of Ca. The highest influence of both ABA and kinetin was mostly observed when these hormones were used in combination with the highest concentration of NaCl (120 mM) in the medium.

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3-EFFECTS OF SALINITY ON GROWTH AND METABOLISM OF PHASEOLUS-VULGARIS

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Abstract

Increasing salinity induced a marked reduction in the plant growth, though Phaseolus seedlings tolerated salinity up to 120 mM NaCl. A great reduction in sugar and protein contents occurred with increasing salinity, whereas soluble nitrogen compounds and the relative contents of the photosynthetic pigments were increased in the treated plants. Increasing Ca concentration in the salinized medium appeared to improve the plant growth and to increase the contents of saccharides and proteins in the NaCl-treated plants. This suggests that Ca could be added to salinized media to overcome the deleterious effects of salinity on the growth and productivity of leguminous crop plants.

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4. SALINITY ON THE INTERNAL SOLUTE CONCENTRATIONS IN PHASEOLUS-VULGARIS

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Abstract

In response to salinity, remarkable changes in ion distribution and concentration, proline content, relative growth rate (RGR) and in transpiration rate were maintained in 4-week-old Phaseolus vulgaris plants. Thus increasing salinity levels in the growth medium induced a reduction in the RGR and in the rate of transpiration. In all of the plant organs, Na, Cl and proline concentrations increased continuously whereas K and Ca concentrations decreased with increasing salinity except in the second and third trifoliate leaves. The magnitude of increase in Na concentration in roots was more profound than in leaves. Moreover, Mg was almost unaffected by increasing salinity. On the other hand, desalinization of the growth medium increased the internal contents of K and Ca and largely decreased that content of Na in all of the plant organs. The present changes in the internal ion concentrations are discussed in relation to K - Na selectivity and ion transport in the plant.

Keyword: PHASEOLUS-VULGARIS; SALINIZATION; DESALINIZATION; RGR; TRANSPIRATION; INTERNAL SOLUTES; PROLINE

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