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Effect of irradiated oligosaccharides (sodium alginate and chitosan) on selective vegetables and crops as growth promoter in respect of yield, disease control action and nutrient content

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Radiation processing of biomaterials is an area of current research for development of new applications. Consequently, the present study was designed to evaluate the potential uses of biomaterials like - Chitosan and Sodium alginate as plant growth promoter, nutrient contents and anti-fungal agent. Chitosan and sodium alginate solutions were treated with Co-60 gamma rays at 12 KGy radiation dose. At first different concentrations (20, 50, 120, 300 & 500 ppm) applied through foliar spraying at 7 days interval on selective vegetables, crops and fruits i.e. tomato, egg plant, cabbage, potato, maize, red leafy, green coriander, water melon, cucumber, rice, jute and betel vine for 30 to 90 days. It was found that the efficiency of irradiated biomaterials on these selective vegetables, crops and fruits were remarkable. However, further experiments are needed throughout the year to evaluate the actual growth promoting and anti-fungal activity of irradiated biomaterials on betel vine plants. Except this, their mixtures (70% alginate+30% chitosan) were also applied through foliar spraying on betel vine plants for 30 days. The results obtained by treatment with irradiated chitosan and sodium alginate showed increase in productivity and nutrient uptake and it reduced the disease and total fungal count dramatically. The mixture of these biopolymers also proved to reduce fungal count more than 100 times in contrast with the control, besides this other concentration of chitosan and alginate were also found to reduce fungal count at a high rate. Both of these oligosaccharides were showed the potent actions against the diseases of betel vine plants in contrast with control. In case of sensory evaluation test, chitosan treated betel leaves were positioned the best acceptance.

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Non-affinity of the erythrocyte membrane – The role of band 3 rearrangement under thermal fluctuations

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The erythrocyte membrane structural changes under thermal fluctuations are considered in the context of energy transfer and dissipation caused by the cortex-bilayer coupling. The fluctuations induce alternating expansion and compression of the membrane parts in order to ensure surface and volume conservation. These changes could induce phosphorylation of some actin junctions due to ensuring the membrane integrity and function which cause additional energy dissipation. The liberated parts of the spectrin filaments freely fluctuate. Their fluctuations induce excitation of the surrounding band 3-spectrin low affinity complexes and influence their association-dissociation dynamics. Dissociated band 3 molecules could freely diffuse through the membrane. The freely diffusing band 3 molecules could form clusters which induces additional structural in-homogeneities. High affinity band 3-ankyrin complexes located near the center of spectrin tetramers survive these energetic perturbations. Consequently, the spectrin filament conformations are dependent on the state of: (1) band 3 complexes with adducin located at the spectrin-actin junction complexes and (2) band 3 complexes with spectrin located along the spectrin filaments. Complex dynamics of the single filament conformations is connected with cumulative effects of changes the state of the protein complexes. These structural changes caused anomalous nature of energy dissipation with damping effects. The spectrin mobility reduction is the key factor which influences the spectrin inter-filament interactions and the cortex nonlinear stiffening in affine regime (for smaller relaxation times). Nonlinear nature of the cortex stiffening in non-affine regime (for higher relaxation times) is connected with the spectrin intra-filament interactions.

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