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Dependence of Wheat Seed Germination Kinetics on Temperature and Magnetic Field

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ABSTRACT

Temperature dependence of wheat seed swelling and sprouting kinetics in water in the range of 10-25°C for constant magnetic field (~10^4 Gs) has been studied. Grain weight growth was chosen to serve the parameter under control. Activation energies for swelling and germination processes have been estimated (43.5 and 47.5 kJ mol^{-1}) of which the latter depended linearly on the share of hydrophilic substances in seeds. The assumption has been made that the quantum-cooperative phenomena in hydrate shells of biomolecules and clusters with correlated states of water spin-isomers define the adaptive physiology. Optimal temperatures of seed stratification and sprouting has been attributed to transitions between ice-like and spiral clusters. **Magnetic field** did not effect the kinetics of swelling but it slightly inhibited the rate of sprouting. Negative influence of magnetic field was explained by effect of Lorenz force on protons in the plain perpendicular to their motion in scutellum plasmalemma.

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