

## **Poly(vinyl alcohol) cryogels as carriers of phytohormones**

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### **Introduction**

In recent years, hydrogel materials have been increasingly used in agriculture, especially for combating soil erosion and enhancing plant productivity.

Poly(vinyl alcohol) cryogels are physical macroporous heterophase gels formed by freezing polymer solutions, maintaining them frozen, and then thawing. PVA cryogels can serve as carriers of various biologically active substances, such as phytohormones that influence plant growth and development.

### **Methods**

Auxins are the group of phytohormones that play a key role in regulating plant growth and development. This class of compounds are universal plant growth regulators that affect cell division, elongation, morphogenesis, and the formation and growth of plant roots. In this work, poly(vinyl alcohol) cryogels were obtained using the freeze-thaw method in the presence of auxins at different concentrations - indole-3-acetic acid and indole-3-butyric acid in nonprotonated and salts forms. For the obtained samples, elastic moduli and heat resistance were estimated, the dynamics of auxin release from the gel matrix into the aqueous environment were studied, and experiments on biological activity of obtained materials were carried out.

### **Results**

The study showed that poly(vinyl alcohol) cryogels formed with the auxins additives saved their elastic and thermal properties. The release of substances into the aqueous environment from the gel matrix occurs without diffusion barriers. It was demonstrated that incorporating auxins into the polymer matrix of PVA cryogels does not lead to a change in their biological

activity; specifically, rhizogenesis in plants is stimulated, leading to the formation of more roots and enhanced plant growth.

### **Conclusion**

Thus, PVA cryogels with auxin additives represent a promising type of hydrogel that can be effectively used in agriculture to improve plant's phytoproductivity.