



Biodegradable hydrogel materials for water storage in agriculture - review of recent research

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ABSTRACT

The aim of the study was to indicate the potential application of superabsorbent hydrogels as water reservoirs, as well as macro and microelement carriers, for the use of watering and fertilization of arable lands in the context of hydrological drought. A review of the latest research on biodegradable structures used in agriculture is presented. Hydrogels composed of natural polymer materials can absorb water from precipitation and gradually release it into the soil during drought. They are therefore a buffering factor increasing the water capacity of soils. The application of biodegradable biopolymer hydrogels reduces the frequency of land irrigation, increases the soil's ability to infiltrate and retain water and meets basic environmental protection requirements. The use of superabsorbent hydrogels in agriculture leads to water resources saving. According to the concept of sustainable development, biopolymer hydrogels, which are environmentally friendly, have considerable potential for being used as a reservoir of water and fertilizer nutrients in the agricultural sector. Synthetic hydrogels based on acrylates and acrylamides show high mechanical strength and the potential to absorb significant quantities of water. Due to the problem of their biodegradability, they are being attempted to replace with biopolymers such as alginate, agar, cellulose, chitosan, and starch. Biocapsule from natural materials can serve as a water storage, but also as macro- and micro-elements carriers for precise fertilization.

Keywords: Hydrogel; Soil moisture; Water holding capacity; Superabsorbent; Drought

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