Swelling Hydrogels on the Base Nitron Fiber Wastes for Water Keeping in Sandy Soils

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Abstract : Superabsorbent polymer hydrogels can swell to absorb huge volumes of water or aqueous solutions. This property has led to many practical applications of these new materials, particularly in agriculture for improving the water retention of soils and the water supply of plants. This article reviews the methods of polymeric hydrogels, measurements and treatments of their properties, as well as their effects on soil and on plant growth. The thermodynamic approach used to describe the swelling behaviour of polymer networks proves to be quite helpful in modelling the hydrogel efficiency of water-absorbing additives. The paper presents the results of a study of the physical and chemical properties of hydrogels based on of the production of "Nitron" (Polyacrylonitrile) wastes fibre and salts of the 3-rd transition metals and formalin. The developed hydrogels HG-Al, HG-Cr and HG-formalin have been tested for water holding the capacity of sand. Such a conclusion was also confirmed by data from the method of determining the wilting point by vegetative thumbnails. In the entering process using a dose of 0.1% of the swelling polymeric hydrogel in sand with a culture of barley the difference between the wilting point in comparison with the control was negligible. This indicates that the moisture which was contained in the hydrogel is involved in moisture availability for plant growth, to the same extent as that in the capillaries.

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