MODERN MEDICINE AND PRACTICE
http://inovatus.es/index.php/ejmmp

EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE
Vol. 3 No. 11 (Nov - 2023) EJMMP ISSN: 2795-921X

STUDYING THE PROCESS OF INTERACTION OF HYDROLYZED POLYACRYLONITRILE WITH EPICHLOROHYDRIN, DETERMINING THE STRUCTURE OF THE OBTAINED COMPOUNDS

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Abstract: The research results of this article are scientifically based on the issue of the technology of obtaining high swelling hydrogels using production waste and local raw materials, which allows to improve the quality of the product, increase the volume of production and reduce the cost.

Key words: GIPAN, hydrogels, bifunctional compound, polymer hydrogel, lyogell, xerogel, coagell.

Introduction

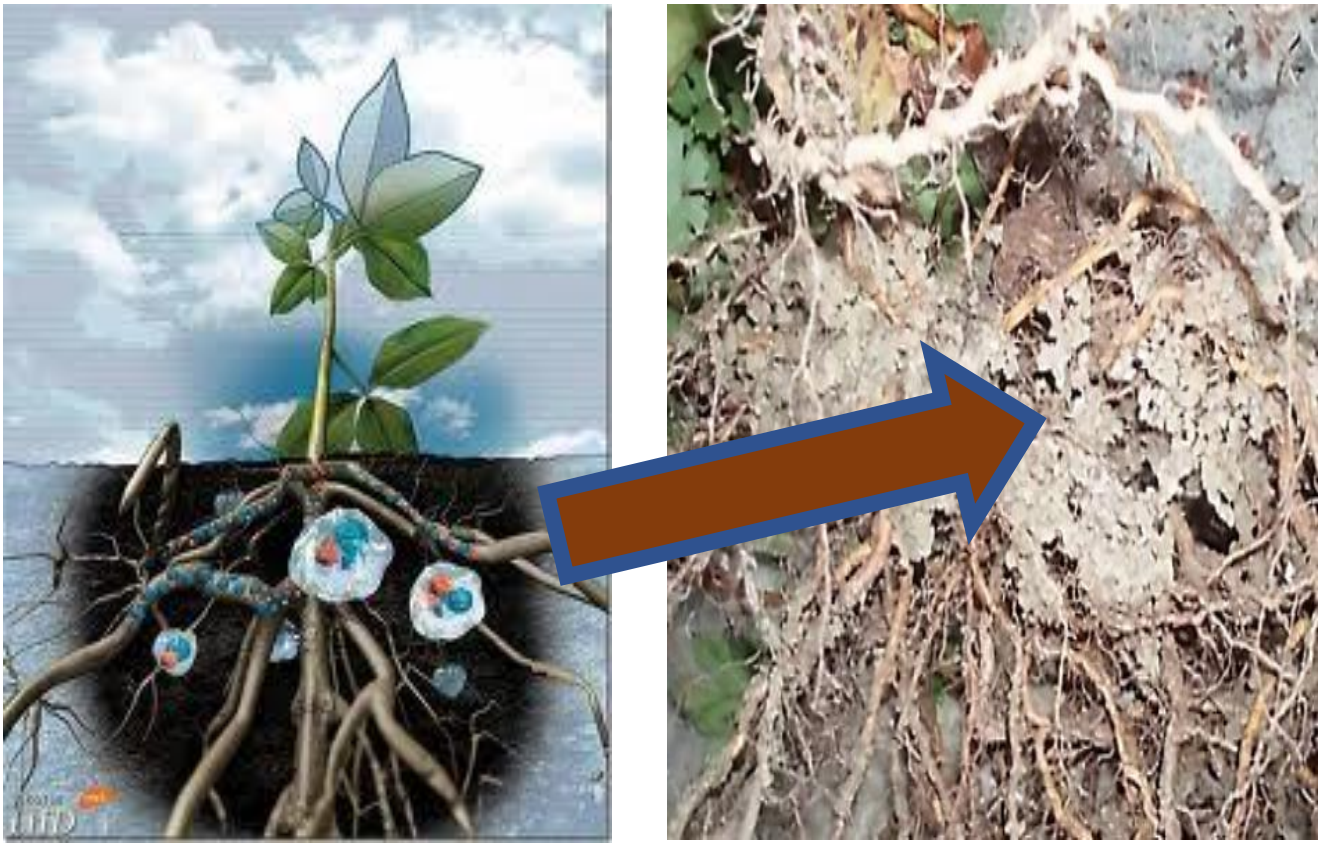
Gels contain very little dispersed phase (up to 1-2%). Gels containing a lot of liquid are called lyogels. They are formed by coagulation of solutions of high molecular weight substances. These include jelly, yogurt, etc. Dry high polymer substances are also gels and contain very little liquid, such as carpenter's glue, starch, rubber, etc.

Dry gels that contain little liquid are called xerogels. Flour, dried glue, flint and other substances are included in xerogels.

Gels are often formed as a result of coagulation or "salting" events. Gels formed in this way are called coagules. If the xerogel is placed in a liquid, this substance absorbs the liquid and increases its volume, that is, it begins to swell. When dry gelatin is placed in water, the gelatin swells and gradually turns into a gel and then into a gel.

Research materials and methodology

The main part of hydrogels is used to absorb physiological fluids in various hygienic materials. For this purpose, several hundred thousand tons of polymer gels are produced every year in the world. The areas of use of hydrogels include agriculture. Hydrogels are used here as a means of retaining moisture for plants.



The effect of hydrogel is based on its ability to trap moisture around the plant, resist evaporation, and attract groundwater. The plant can use not only irrigation and atmospheric moisture, but also hydrogel water. It also reduces the consumption of water in cultivated plants. In addition, water absorption is high in rocky areas, and the hydrogel used there can retain water around the roots.

Hydrogels should be mixed with seeds during planting. These hydrogels, which are consumed in almost the same amount as the planted seeds, can absorb the water absorbed into the soil during rain and irrigation, keep it around the roots for a long time, and provide the plant with water. As a result, the time between watering the land increases and saves a lot of water. Most importantly, it is environmentally friendly. Also, hydrogels provide water to the plant until the next watering. During the next watering, the hydrogel will be soaked in water again and will continue to supply the plant with woter.

Research Results

The analysis of the conducted scientific literature showed that obtaining hydrogels based on natural and synthetic polymers and studying its physico-chemical properties and the process of oil extraction from various wells is an urgent issue. From this point of view, obtaining hydrogels based on polymers produced in the chemical industry and studying its physical and chemical properties is of both scientific and practical importance.

Potassium salt of PAK:

density: 1.08 g.ml, mass fraction: 14%, color: pale discharge, aggregate state: liquid, infinitely soluble in water

Ant extract:

Colorless gas. Liquefaction temperature – 1180C. Density at boiling temperature -19,20.-200C d = 0,815 g/ml. The density of a 33% solution in water d = 1.09 g/ml. Soluble in water and alcohol. Benzene is rare in ether. It does not dissolve in petroleum ether at all. 99.9% of aldehyde in water is in the form of monohydrate. [31]

EDA: Ethylenediamine H2NCH2CH2NH2

Colorless oily yellow liquid with ammonia smell. The melting temperature is 8.50C. Boiling temperature is 1170C. The density of the pure state is 1.45677g/ml. The density of a 70% solution in water is 0.9625 g/ml. It dissolves well in water, alcohol, acetone, benzene, ether, and poorly in heptane.

Study of GIPAN cross-linking was carried out in the presence of initiator in aqueous solutions. The amount of cross-linking agent varied between 0.1-7 % by weight of **GIPAN**.

The change in reaction temperature has a significant effect on the entire gelation process, so at temperatures above 60C, the reaction lasts for a short time. Thus, the optimal temperature of 70 C was selected, at which gelation occurs in a few minutes.

As the concentration of the cross-linking agent increases, the swelling of the hydrogel decreases. At a low concentration of the cross-linking agent, the dependence is directly proportional, an increase in the concentration above 3%, which leads to a violation of dependence. The relationship between the increase in the concentration of the binding agent and the decrease in the stiffness is arranged in the dynamic curves.

This is explained by the formation of a dense network of interconnected units with an increase in the concentration of the cross-linking agent, which, in turn, reduces the water retention capacity of the synthesized hydrogels.

The concentration of the cross-linking agent in the reaction mixture is optimal in the range of 1-3%, because with its increase, the length of the macromolecule of the formed polymer decreases, and as a result, the degree of swelling of the hydrogel decreases. The effect of water storage in the reaction system was studied. With an increase in the degree of dilution of the reaction system, either the absence of the gel formation process is observed, or the process slows down significantly over time. In this case, the product has a very low degree of cross-linking and is mainly soluble in water.

Conclusion

In the process of synthesis, as a result of the formation of a network structure, the main method for polymers is polymerization, because it determines the size of the formed hydrogel network and regulates the chain length, which has a decisive effect on the properties of the polymer.

The study of the properties of the obtained hydrogels showed that the degree of saponification of acrylic acid is low, a large number of free carboxyl groups remain, which form a dense network after further gelation, which in turn reduces water absorption. Low absorption is explained by the fact that hydroxyl and saponified carboxyl groups play an important role in chemically retaining water. Binding water molecules hold them and increase water absorption.

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