

Seed mucilaginous envelope - natural composite hydrogel

The definition of hydrogel describes it as hydrophilic, three-dimensional, polymeric network able to absorb huge amount of water. Mucilage envelope produced by diverse plant seeds/fruits (diaspores) is considered as natural hydrogel and shares with it some specific features i.e. it is built of different polysaccharides (pectins, hemicelluloses and cellulose), which interact with each other via diverse types of bonds and form a three-dimensional network. Mucilage envelope due to the presence of hydrophilic pectins/hemicelluloses has an ability to absorb water. This aptitude to water absorption and gathering defines also the ecological role and the physical properties of the mucilage. First, the mucilage envelope creates the proper conditions for seed germination. In a fully hydrated stage mucilage demonstrates also very low frictional properties which play important role in seed dispersal via endozoochory. Second, water loss from the mucilage causes good adhesive properties, which are responsible for the diaspores attachment to the ground –anti-dispersal function or to the animals' body-epizoochoric dispersal. From industrial point of view, low friction and high adhesion are the properties that are essential in the medicine, bioengineering, cosmetics, food or pharmacy. Natural polymers, like seed mucilage, are most attractive source among diverse hydrogels particularly due to their high biodegradability, non-toxicity and non-irritability.

References

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