**Starch based hydrogels: Formulation of self-assembled starchy hydrogels.**

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Hydrogels are defined as a three-dimensional polymer networks, with hydrophilic properties since they are capable of retaining water in their structures without disintegrating 1,2. Concerning their molecular structure, hydrogels are crosslinked networks that can be classified as regular hydrogels with a water absorption capacity of 1 g/g and as superabsorbent hydrogels with a water absorption capacity of 10-1000 g/g that can be formed either by physical or chemical procedures 1,3. Due to their unique properties, hydrogels have become extremely important for various applications in a variety of fields including food, biomedical, pharmaceutical and have been commonly used in encapsulation, drug delivery, food packaging and also in biosensor technologies4. For the preparation of hydrogels, natural polymers are preferred, substituting unsustainable materials such as petrochemicals and synthetic polymers. Among other biopolymers, starch has been used to create hydrogels since it is a non-toxic, renewable, biocompatible and biodegradable plant polysaccharide. Starch is mainly composed of amylose (AM) and amylopectin (AP) and due to its nature, upon a Temperature (Gelatinization Temperature) it can be dissolved in excess water and after this phenomenon (Gelatinization) it can form a physical reorganization network (retrogradation). This strategy (physically formation) is the simplest method to create a hydrogel network that also called self-assembled hydrogels (Xiao, 2013). The ratio of amylose: amylopectin influences the functional properties of starch. High amylose maize starch is a type of Resistant starch that have been associated with the prevention and control of chronic health conditions, including type II diabetes, obesity, colon cancer and cardiovascular diseases.

In this study, we investigate the behavior of different corn starch hydrogels in order to better understand their structure as a hydrogel matrix. We study the effect of normal and high amylose corn starch on the physical crosslinking process used to create hydrogels. Characteristically, starch type and concentration levels (from 8% to 15% w/v) with RS substitutions (2 or 10%) are examined and further characterized for textural, rheological and morphological characteristics. The study is solely focused on physically produced starch-based hydrogels elucidating the mechanisms of retrogradation with storage time, to flourishing the knowledge on structural characterization due to its distinctive characteristics. All in all, our results are encouraging for the “eco-friendly” their use in the Food Industry.

**References**

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