

Starch

Starch is a polysaccharide formed by a large number of D-glucose units (homoglycan). Starch is not a chemical individual, but a mixture of polymer chains with different molecular weights.

Biomedical Significance

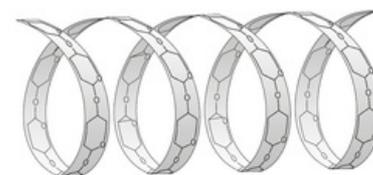
It is the **storage polysaccharide** of plants (the exception is plants of the star family, where inulin plays the role of starch). It is stored in plants in the form of **starch grains**. Nutritionally, it is the **most important** polysaccharide. In humans, it is hydrolyzed by α -Amylases (salivary and pancreatic) to the disaccharide maltose.

Chemical properties

General Formula: $(C_6H_{10}O_5)_n$. It consists of two types of polymers:

Amylose

- It usually makes up about 20% of the starch grain.
- It consists of an unbranched glucose chain connected by an **α -(1→4) O-glycosidic bond**.
- The polychain forms a helix stabilized by intramolecular hydrogen bonds.
- The helix cavity corresponds in size to the molecule iodine (I_2), which gives a blue color with amylose, this property is used in the proof of starch Lugol's solution (solution I_2 in KI).



Amylose

Amylopectin

- About 80% starch grain.
- The basic chain is the same as amylose, but unlike it, it branches every 20-30 glucose units with an **α -(1→6) bond**.

Physical Properties

In cold water, it forms **colloidal solutions** (only the amylose part is soluble; amylopectin does not dissolve, but swells). Compared to an identical number of free molecules, glucose is osmotically **inactive**.

Resources

Cereals, potatoes and other plant parts commonly found in food.

Links

Related Articles

- Glucose
- Polysaccharides

References

- MATOUŠ, Bohuslav. *Basics of medical chemistry and biochemistry*. 2010. edition. Prague : Galen, 2010. 0 pp. ISBN 978-80-7262-702-8.
- BENEŠOVÁ, Marika – SATRAPOVÁ, Hana. *Graduate! from chemistry*. 1. edition. Brno : Didaktis, c2002. ISBN 80-862-8556-1.