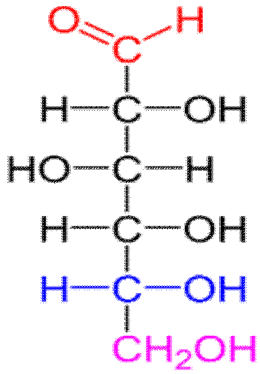
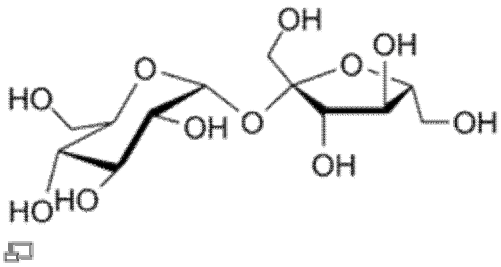
Structure, Forms and Isomers:

Monosaccharide e.g glucose



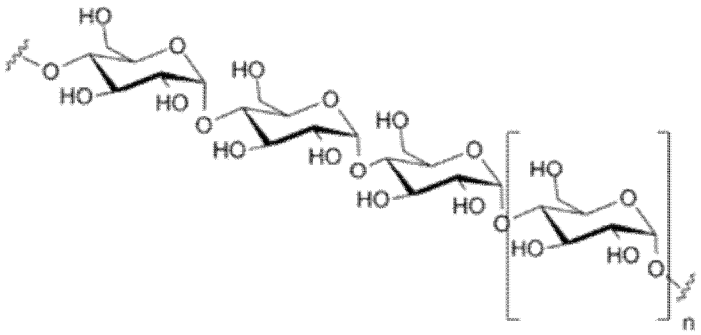
D-glucose is an aldohexose with the formula $(C{\cdot}H_2O)_6$. The red atoms highlight the aldehyde group, and the blue atoms highlight the asymmetric center furthest from the aldehyde; because this -OH is on the right of the Fischer projection, this is a D sugar. Glucose can exist in both a straight-chain and ring form. The aldehyde or ketone group of a straight-chain monosaccharide will react reversibly with a hydroxyl group on a different carbon atom to form a hemiacetal or hemiketal, forming a heterocyclic ring with an oxygen bridge between two carbon atoms. Rings with five and six atoms are called furanose and pyranose forms, respectively, and exist in equilibrium with the straight-chain form.

Disaccharides e.g sucrose

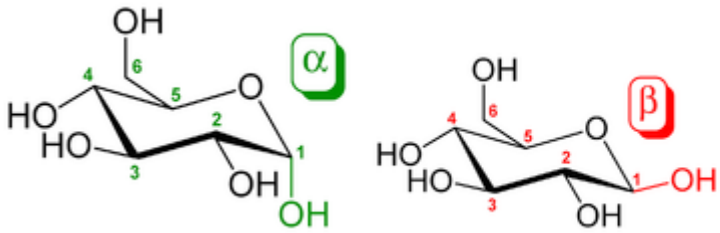


Sucrose, also known as table sugar, is a common disaccharide. It is composed of two monosaccharides: D-glucose (left) and D-fructose (right).

Oligosaccharides and polysaccharides



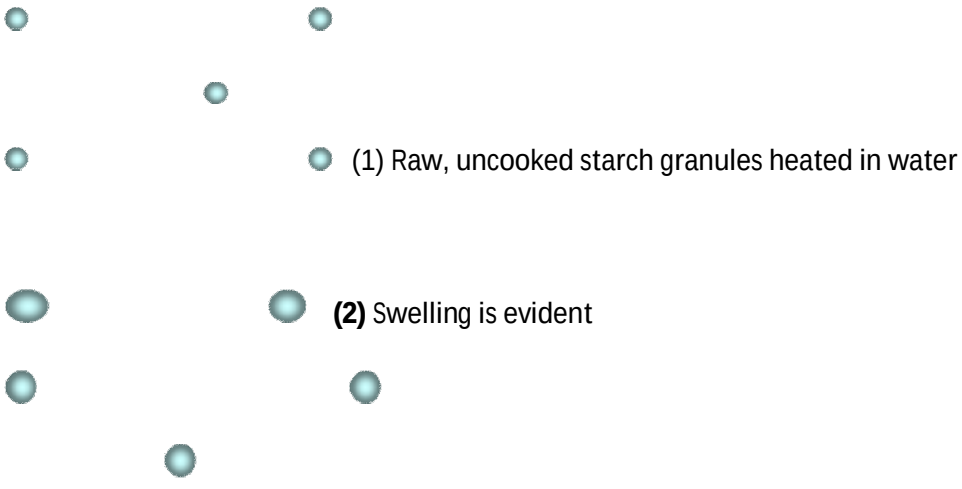
Amylose is a linear polymer of glucose mainly linked with α(1→4) bonds. It can be made of several thousands of glucose units. It is one of the two components of starch, the other being amylopectin.

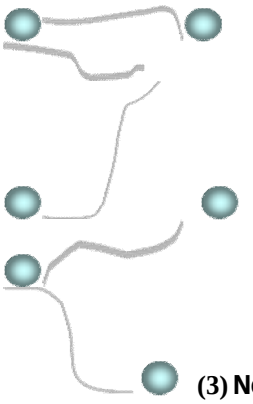


The α and β anomers of glucose. Note the position of the hydroxyl group (red or green) on the anomeric carbon relative to the CH_2OH group bound to carbon 5: they are either on the opposite sides (α), or the same side (β).

Starch Gelatinization and Pasting, Gelation, and Uglification

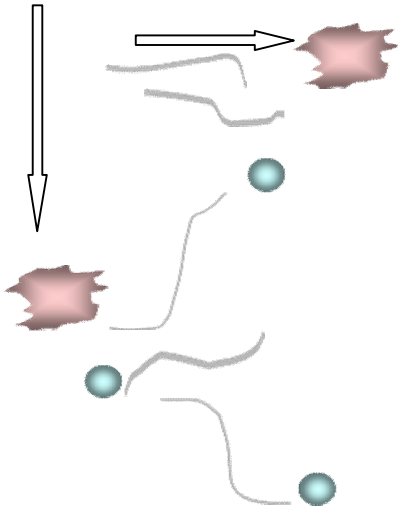
Starch granules contain both linear amylose and branched amylopectin. The following illustrations take place when heat is applied to starch.





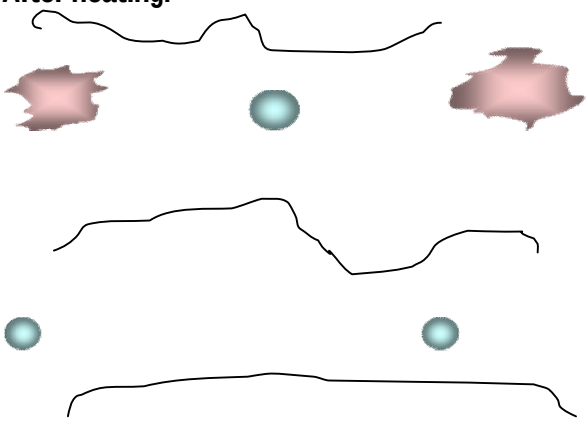
(3) Notice loss of amylose from the granules

(4) Some granules have collapsed

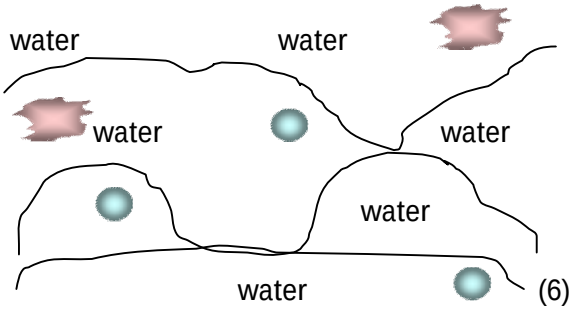


Gelatinization and pasting are complete

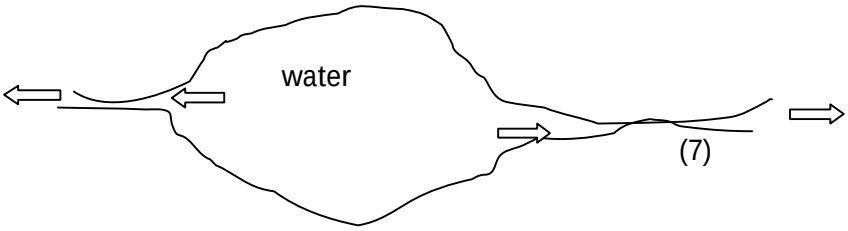
After heating:

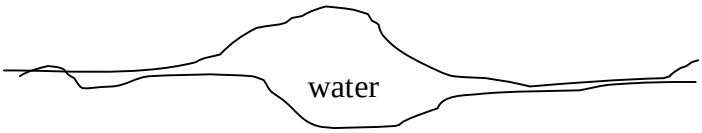


(5) Now we start to cool.



(6) **This is a starch gel**





(8) WATER of SYNERESIS that has been squeezed out of the gel structure
The texture gets very ugly when this happens.

Timeline

(9) Ugly texture Syneresis