Polysaccharides
(Polymers of D-glucose)

	Plant Starch 20%	Plant Starch 80%	Animal Starch	Plant Fiber
Polysaccharide	Amylose	Amylopectin	Glycogen	Cellulose
Source	Plants	Plants	Animal	Plants
Structure	Helically coiled (Unbranched)	Also helically coiled, but branched (every 25 units.)	Like amylopectin, but more highly branched (every 10-15 units.) Stored in liver and muscle. Maintains blood glucose level.	Linear (Unbranched) Chains arranged in parallel rows held together by H-bonds. (Rigid structure.)
Glycosidic bond	α-1,4	α-1,4 main chain, α-1,6 branches (C-1 of branch with C-6 of main chain.)	α-1,4 main chain, α-1,6 branches (C-1 of branch with C-6 of main chain.)	β-1,4

Starches can be hydrolyzed:

$$\text{amylose (amylopectin)} \xrightarrow{H^+,\,enzyme} \text{dextrins} \xrightarrow{H^+,\,enzyme} \text{maltose} \xrightarrow{H^+,\,enzyme} \text{D-glucose}$$

Humans can't digest cellulose – we don't have the right enzymes (cows, termites, etc. have bacteria in gut that allow them to hydrolyze β-1,4 glycosidic bonds.)

I_2 can test for the presence of starch:

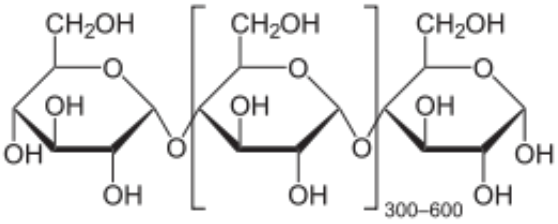
$$\text{Amylose} + I_2 \longrightarrow \text{blue color}$$

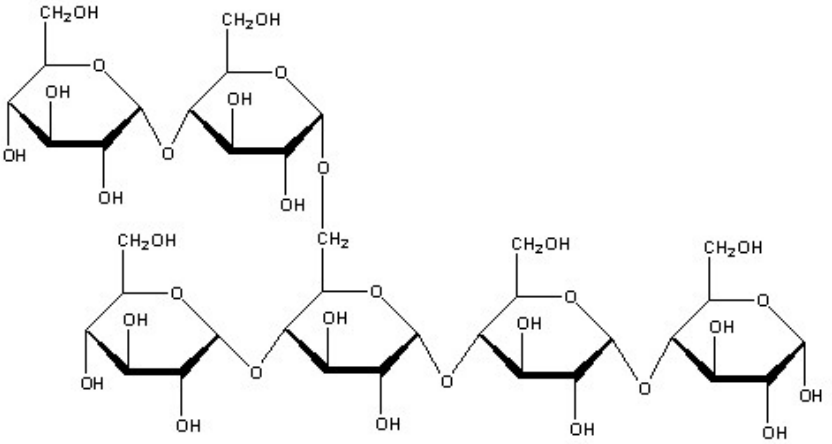
$$\text{Other starches} \longrightarrow \text{brownish, purple, etc.}$$

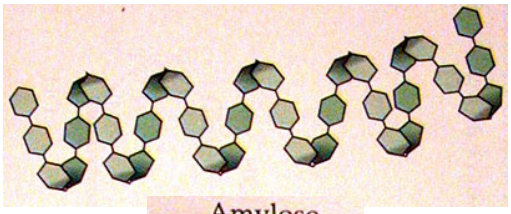
Fermentation (making bread, beer, wine.)

$$\begin{matrix}\text{Glucose,}\\ \text{Fructose}\\ \text{(some other sugars)}\end{matrix} \xrightarrow{\text{yeast enzymes}} 2CH_3CH_2OH + 2CO_{2(g)}$$

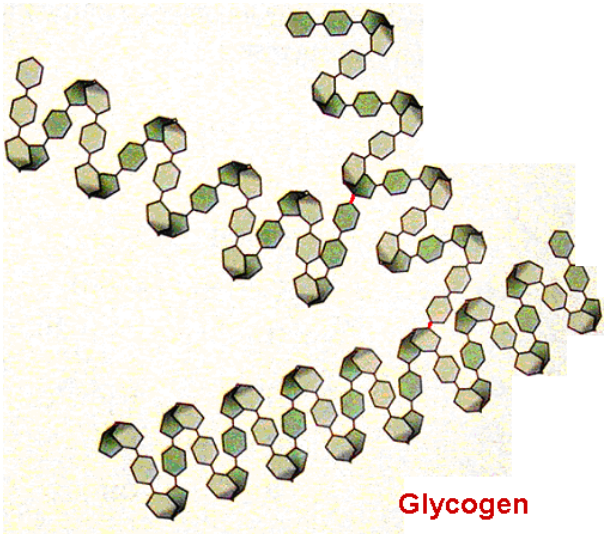
Polysaccharides



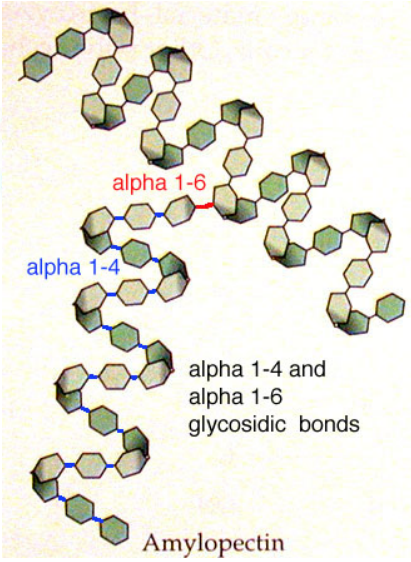




Amylose
only alpha 1-4
glycosidic bonds



Glycogen



Amylopectin