



**CRESPEL & DEITERS**  
GROUP

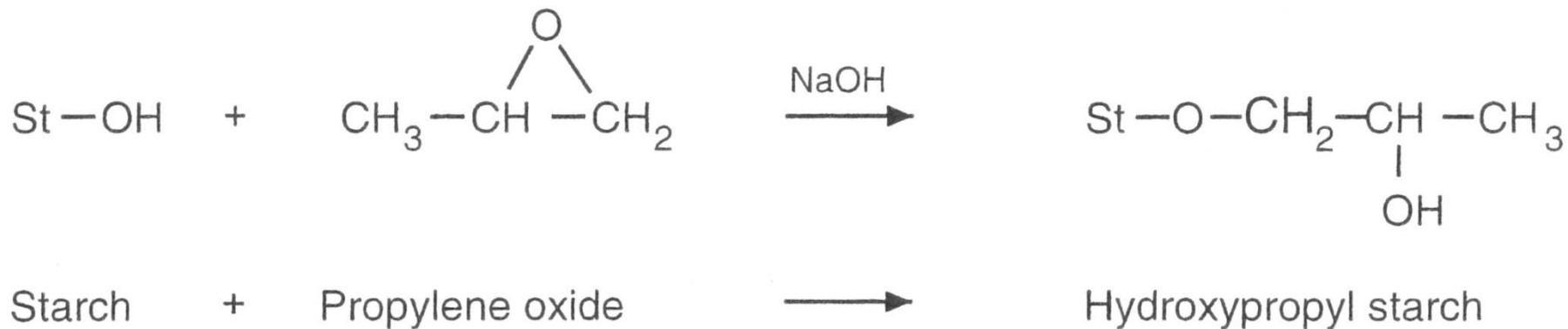
# Why nonionic starch ethers act as anionic flocculants in cementitious systems

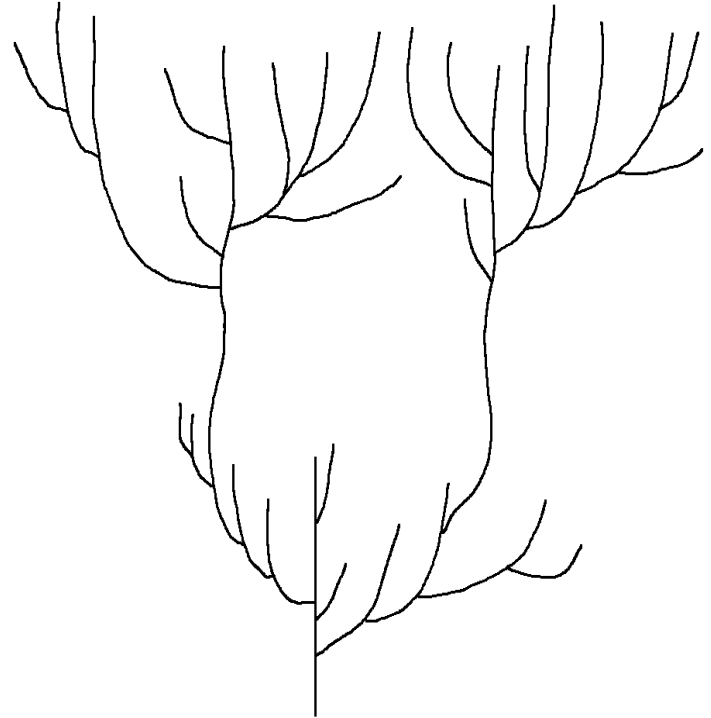
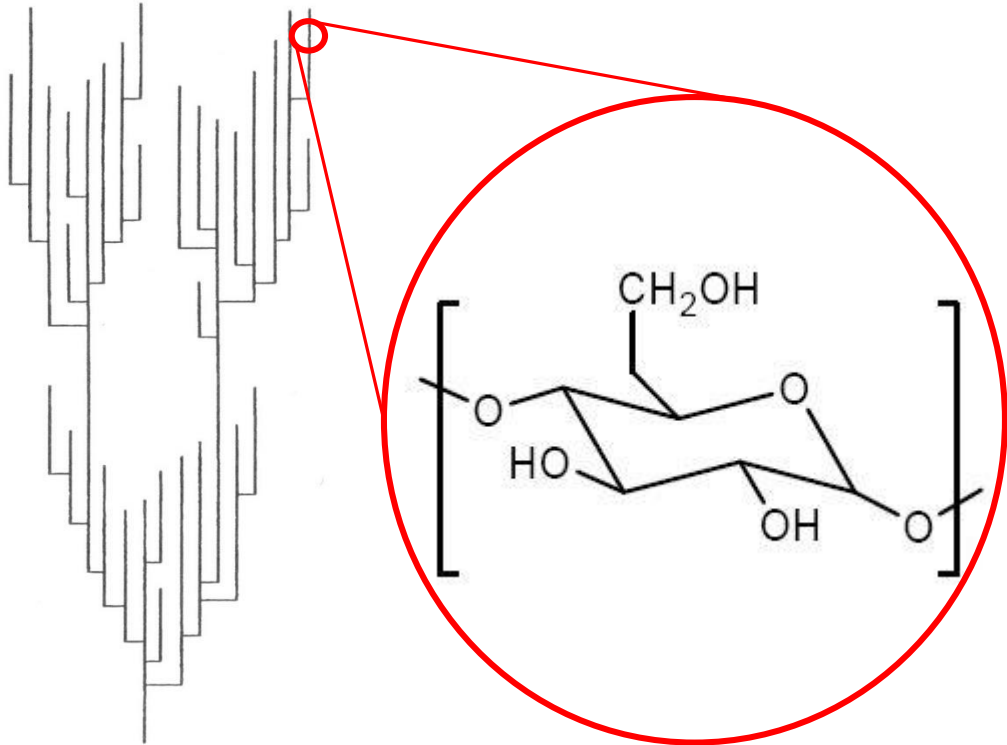
26. Konferenz „Rheologische Messungen an mineralischen Baustoffen“  
Regensburg, 21.02.2017

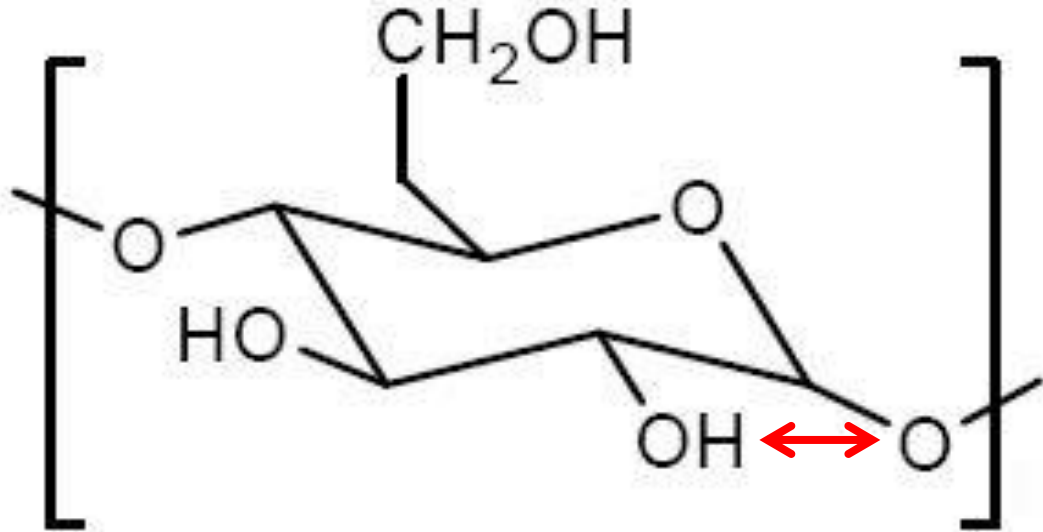
Passionate  
about wheat.  
Since 1858.



## Hydroxypropylation of Starch







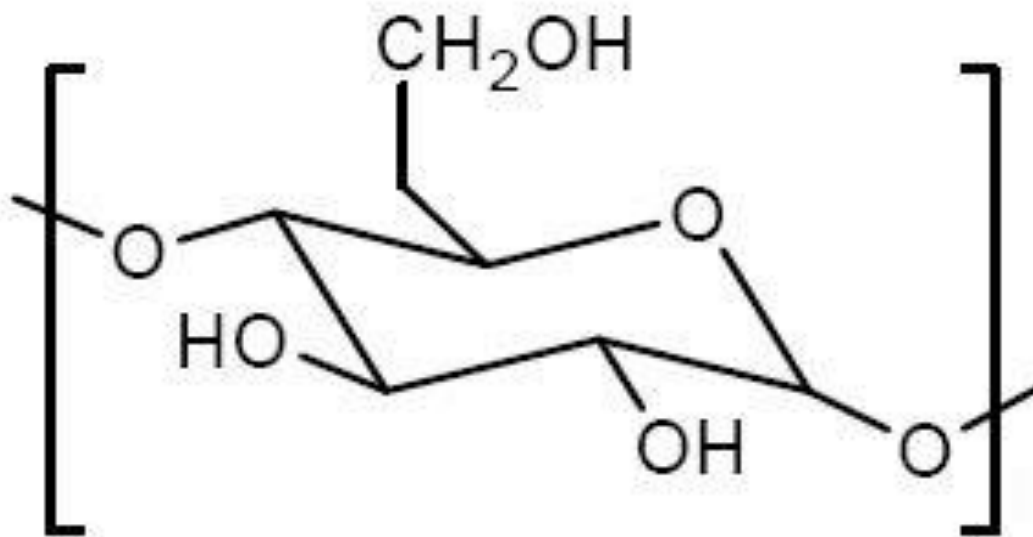


# Hydroxypropyl starch

Relative reaction speeds of the different OH groups

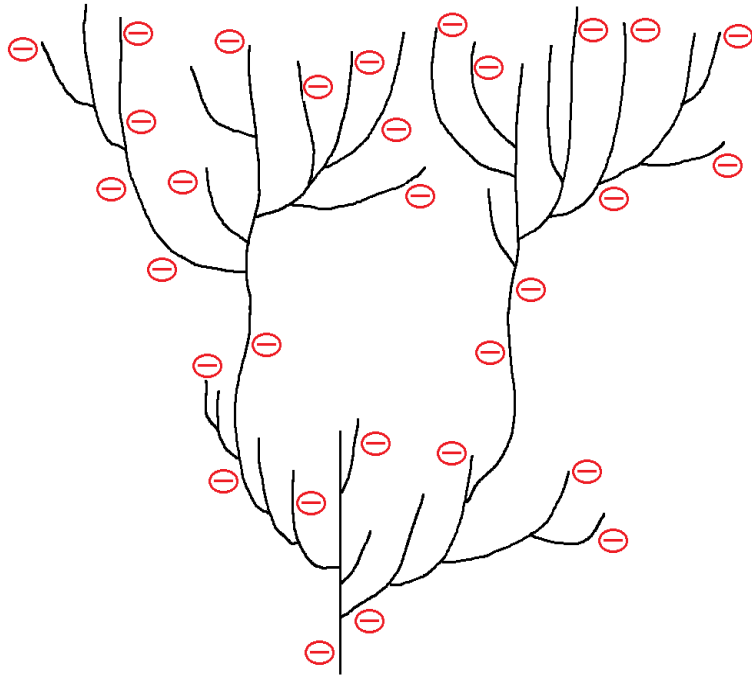
<b>C-2</b>	<b>C-3</b>	<b>C-6</b>
12	1	1

Sara Richardson et al.: Characterisation of the substituent distribution in hydroxypropylated potato amylopectin starch. Carbohydrate Research 328(3), 2000, pp. 365-373.



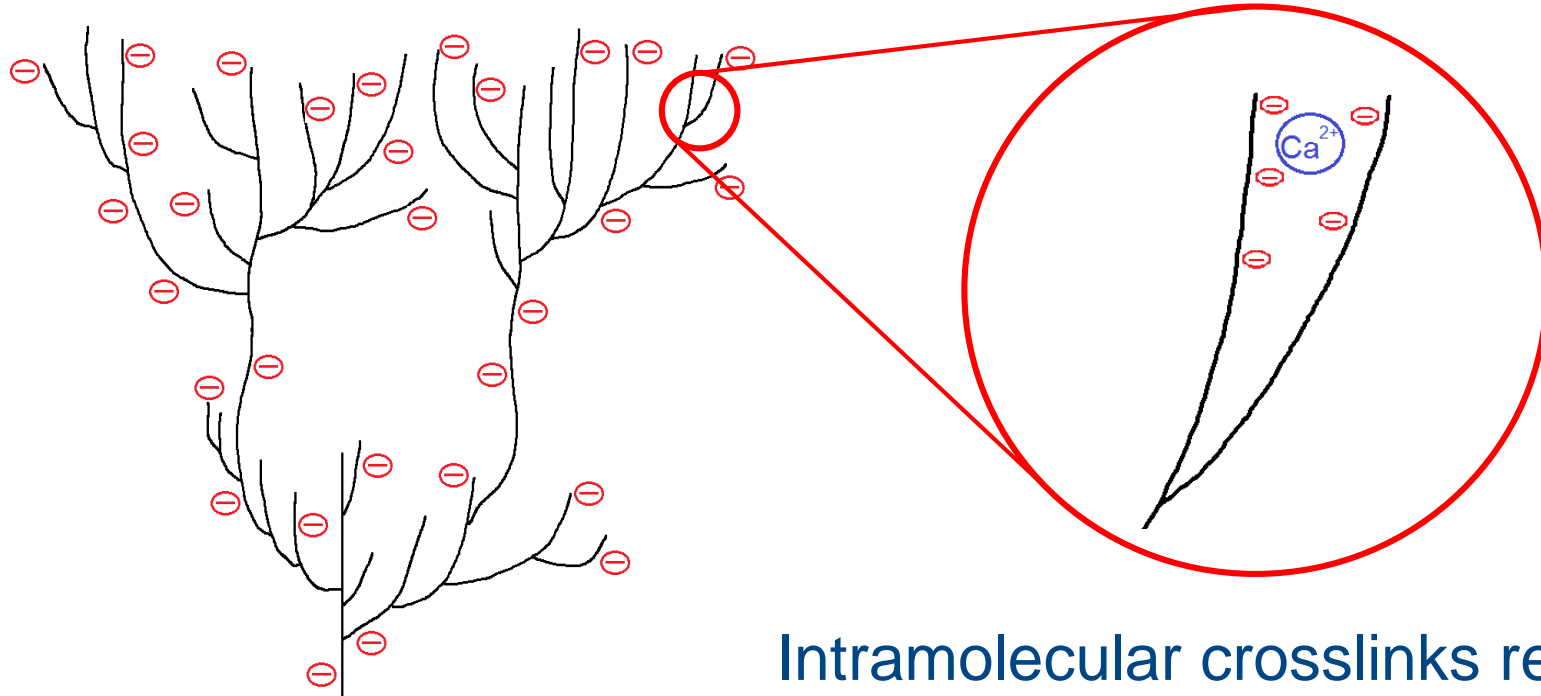
Typical DS = 0.6

→ 40% of the OH-groups at C-2 are left unsubstituted



HP-starch at pH 13  
= highly anionic

Dissociation starts at  
pH 10.5

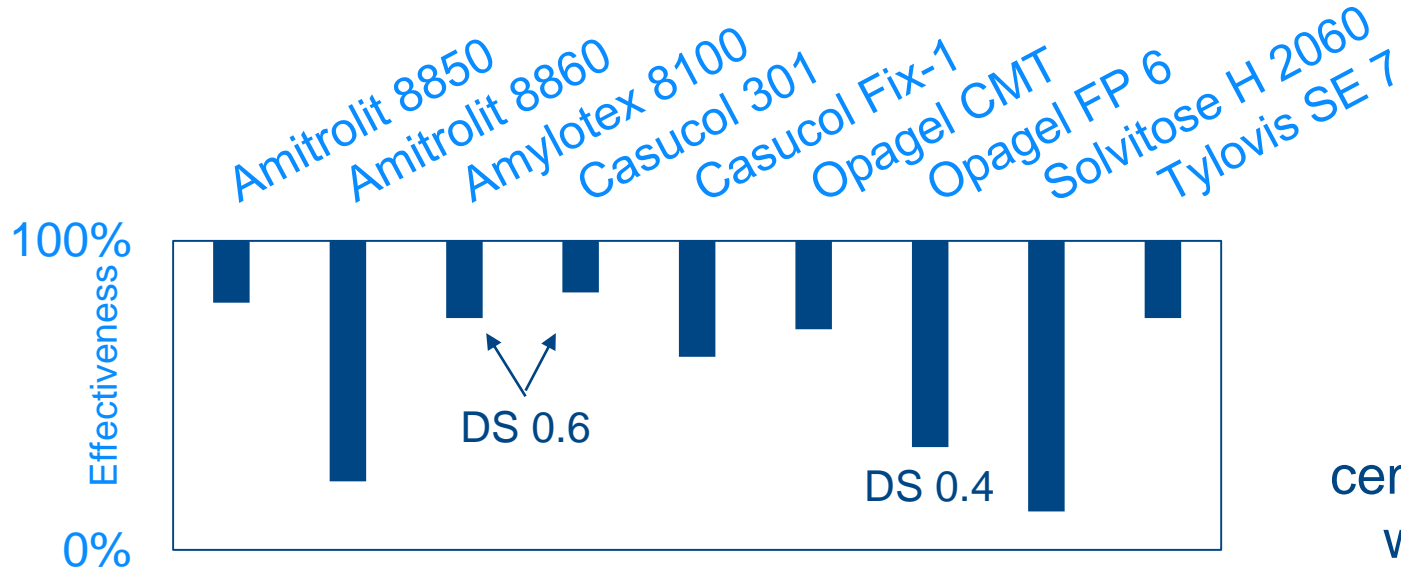


Intramolecular crosslinks reduce hydrodynamic volume



# Decrease of flocculation effect when adding 1% calcium formate

## The higher the DS, the less calcium sensitive?





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... and now I am looking forward to  
an interesting discussion with you!