The science of sweeter sugars

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Scientists in Italy and the UK have figured out what makes sugars sweeter.

Sugars such as fructose, glucose and mannose have similar chemical structures, but taste very different in sweetness. This is because they each form hydrogen bonds of different lengths when they interact with water. Longer bonds appear to be less sweet.

Sugar crystals on a ruler – the black marks are 1 mm apart.

Fructose hydrogen bonds are around 1.8 Å, but mannose's bonds are much longer and weaker, 1.95 Å on average.

The team got their data from experiments carried out in water. This is not the same as experimenting on real human taste buds, but the team believe a similar pattern of hydrogen bond lengths occur when the sugars interact with human taste buds.

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1. The research might help produce sweeter artificial sweeteners. The sweeter the sugar, the less you need to use. What are three consequences of eating too much sugar?
2. What other foods do you think we should produce artificially? Why?
3. An Å is an angstrom. 1 Å is 0.1 nm. Work out how many Å are in 37 nm.