How do jelly sweets set?

From the sweeties.net wiki

Every jelly sweet is mostly sugar and glucose syrup. What turns that syrup into a sweet you can pick up is a gelling agent: a small amount of something that, as the syrup cools, forms a three dimensional network that traps the sugar and water. The four big ones are gelatine, pectin, starch and agar: see what is in a jelly sweet?

Side by side

| Gelling agent | Comes from | How it sets | Suitable for vegans? | |---|---|---|---| | Gelatine | Animal collagen, mostly pig skin and cattle bones and hides | Gels as it cools; melts below body temperature | No | | Pectin | Fruit, mostly citrus | Needs lots of sugar and some acid | Yes | | Starch | Plants such as maize, wheat and potato | Thickens when cooked, sets and firms as it cools | Yes | | Agar | Seaweed | Gels below about 32 to 42°C, melts only above 85°C | Yes |

Gelatine: the melting chew

Gelatine is a protein made from collagen. It dissolves in hot water and, as it cools, its chains bond together into a network that can hold 5 to 10 times gelatine's own weight in water. The gel can be melted again by warming, and its upper melting point is below human body temperature, which is why gelatine sweets such as gummy bears and jelly babies soften and melt as you chew: see gelatine in sweets explained

Pectin: sugar and acid

High methoxy pectin, the kind that suits high sugar jellies, sets only when there is a lot of sugar, with soluble solids above 60 per cent, and some acid, at a pH of 2.8 to 3.6. The sugar ties up the water and forces the pectin chains to stick together into a gel. The ingredients are heated to dissolve the pectin, and the gel starts to form as the mixture cools. Ordinary pectin gels do not set again once they have been melted: see pectin sweets explained

Starch: slow and firm

When starch is heated in water, its granules swell and dissolve into a thick, sticky mass. As it cools, the long starch molecules slowly realign, a process called retrogradation, and the jelly sets and firms. That is how Turkish delight is set, and why starch jellies can keep firming up over time: see starch jelly sweets explained and why do jelly sweets go hard?

Agar: the jelly that will not melt

Agar comes from seaweed. It sets into a gel below about 32 to 42°C but does not melt again until it is heated above 85°C. In Mexico, agar is used for colourful sugar coated sweets shaped like slices of melon and watermelon.

Gum arabic: the old pastille maker

Traditional pastilles were often made with starch and gum arabic. The gum binds the flavourings, slows down how fast the pastille dissolves, and hardens it so that it keeps in storage and transport: see how are fruit pastilles made?

Shaped in starch, set in drying rooms

Gummies and other soft sweets are often made on a starch mogul, a machine that stamps shapes into trays of cornstarch and fills them with the hot gel, which is left to set. Haribo says its gummies have plenty of time to solidify in drying rooms before they are turned out and given a thin coat of wax: see what is starch moulding? and what sweets are gelatine free?