

What's your favourite fungus?

The One That Makes the Cheese

Cheese is produced as the result of milk changing from liquid to a semi-solid consistency; this change is known as coagulation. The resultant product is called a 'curd'. In order to cause milk to become more solid, special enzymes are used to coagulate the proteins in the milk.

Traditional cheese making used enzymes from animals. These enzymes called chymosin or rennet are obtained from the stomach membranes of ruminants such as cows. As the cheese industry expanded, people started looking for enzymes from other sources. Today around 80% of cheese-making uses coagulation enzymes from fungi, not animals. Two widely used fungi are the moulds *Aspergillus* and *Mucor*. The enzymes from the fungi make the proteins stick together into milk curds, which are then treated further to produce the final cheese.

Mould ripening is something different. This is a method that is used to add flavour to cheese, and has been in use for at least 2,000 years. As the name suggests fungi are also involved in this process. Blue cheeses such as Roquefort, Gorgonzola, Stilton, Danish Blue and Blue Cheshire, all get their strong flavour and odour from *Penicillium roquefortii*. The fungus is added to the cheese, which is then placed in storage at a controlled temperature and humidity. Adding the fungus to the cheese is usually done by coating metal rods or wires with fungal spores and sticking them into the immature cheese (you can often see the holes and the tracks of the wires through the cheese when you buy it). The fungus then grows through the cheese producing flavour and odour compounds.

Fungi are also used to change the texture of cheese. This is what happens in the case of Camembert and Brie cheeses. The two cheeses are ripened by the mould *Penicillium camembertii*, which is cultivated on the outside of the newly made solid cheese. As the fungus grows it releases enzymes into the cheese that digest the cheese proteins to make a softer (eventually creamy) consistency.

In the days before refrigeration the only way to store milk for any length of time was to make it into cheese; which is why cheese making is a traditional industry all over the world.

