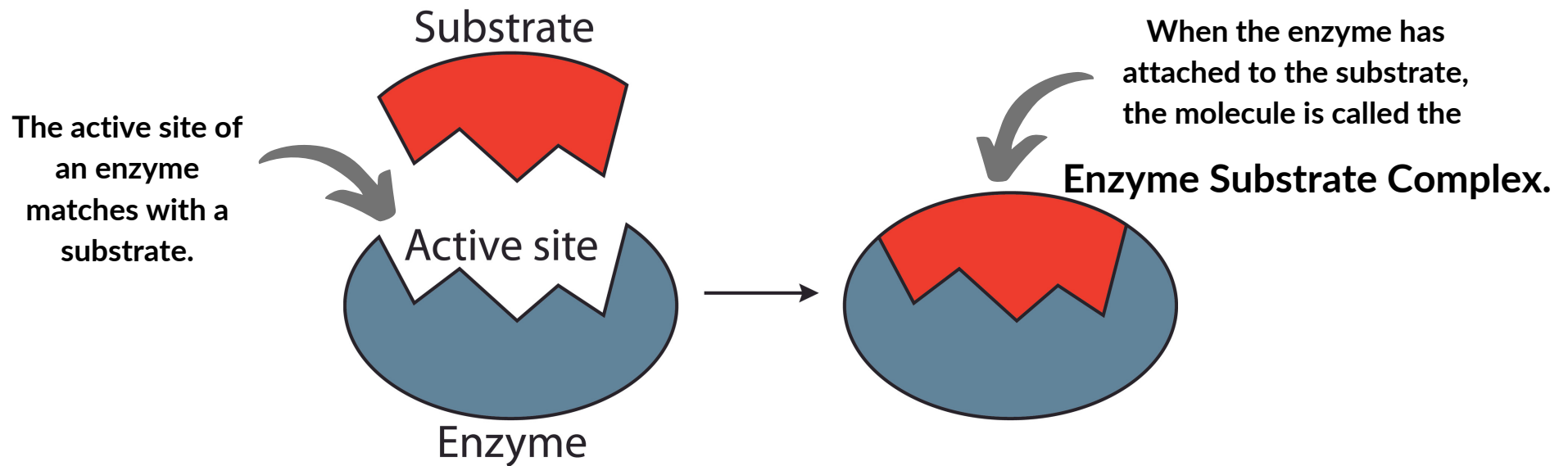


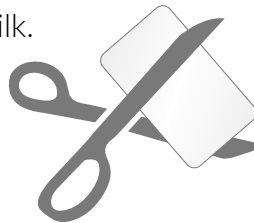
Enzymes

Enzymes are proteins that speed up chemical reactions. Enzymes have ideal conditions. If the pH or temperature changes, the enzyme becomes denatured and doesn't function the same.



Names of enzymes often end in -ase

- Lactose is the sugar in milk.
- Sucrose is table sugar.
- Lipids are fats
- Proteins



- **Lactase** breaks down lactose.
- **Sucrase** breaks down sucrose.
- **Lipase** breaks down lipids.
- **Proteases** break down proteins.

Rennet

Rennet is a complex set of enzymes. Chymosin is the key component of rennet. Chymosin is a protease enzyme that curdles casein, the primary protein in milk. Rennet also contains enzymes such as pepsin and lipase. Rennet begins working at temperatures between 85-105° F. Temperatures above 140° F deactivate the enzyme.

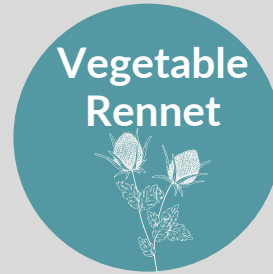


Rennet is found naturally in the stomach lining of a young ruminant animal such as a calf, goat, or sheep. Rennet helps young ruminants digest milk by curdling it.

Rennet is not a primary product of raising ruminant livestock, but can be collected as a by-product. Calves raised for veal are the most common source of animal rennet.

Animal rennet is used most in small-scale and hobby cheesemaking.

Animal rennet contains multiple enzymes that coagulate milk, breakdown fats and proteins, and produce interesting and robust flavors in aged cheeses. Many traditional and European-style cheeses like Parmesan Reggiano and French Brie use animal rennet to produce their distinct flavors.



Rennet can be harvested from plants such as thistle.

Plant-derived rennet is not as powerful as animal-based rennet and does not coagulate milk as effectively as rennet from animals. However, it can provide a vegetarian option for consumers desiring it.

Vegetable rennet can lead to bitter flavors in cheeses that age for extended periods of time. However, traditional Spanish and Portuguese cheeses develop their distinct flavor from plant-derived rennet.



As demand for cheese grew in the late 20th century, scientists began searching for alternatives to calf rennet. The veal industry in the United States was (and is) too small to support the entire cheese industry.

Fermentation Produced Chymosin (FPC) is the most technologically advanced form of rennet used in cheesemaking. FPC is useful because the enzymes in the formulations can be altered and closely controlled to produce desirable flavors in the final aged cheese.

FPC comes from cultured yeast cells that have been introduced with genetic information that allows them to produce enzymes such as chymosin, pepsin, and lipases that are identical to those found in animal rennet. FPC is suitable for consumption by vegetarians and it can be produced in quantities that match the market demand.