Year 12 Biology (Rennet)

Posted by Anonymous on Thu, 2015-10-22 10:00

Year 12 Biology (Rennet). Dear Sir or Madam, I am just wanting to source Rennet for Yr 12 Bio experiments. We have previously used 'Simply Junket' powder, which is now very expensive. I have sourced 'Mad Millie' tablets from a cheese-making shop—10 tabs for $3.20. Just wondering what other folk use for this experiment and would appreciate any 'tips' you would have.

Voting:
No votes yet

Year Level:
Senior Secondary
Laboratory Technicians:
Laboratory Technicians

Showing 1-2 of 2 Responses

Year 12 Biology

Submitted by sat on 30 October 2015

Answer reviewed 26 February 2023

Source of rennet

Rennet is an extract from the stomach of ruminants containing a number of enzymes. Its main constituent is the enzyme rennin (also known as chymosin). Rennin coagulates the protein casein in milk and is used in the production of most cheeses. Rennin is now usually produced from microbial or plant sources rather than by extraction from the digestive tract of a calf.

Rennin acts on casein in milk to cause clotting or coagulation causing the milk to separate into “curds” (solids) and “whey” (liquid).

milk + rennin ? curds + whey

Rennet is available in both liquid and tablet form from some health food stores, science supply companies, and from Australian web-based companies selling cheese- and yoghurt-making products.

The enzyme rennin is also commercially available for cooking as junket. Junket is available in tablet or powder form from some supermarkets, grocery stores, health food stores and science supply companies.

Science ASSIST has developed a list of recommended science suppliers for schools to use, see School science suppliers [1]. For cheese- and yoghurt-making products there are several Australian suppliers you can access on-line.

Tips for using Rennin (as Junket or Rennet)

- For enzyme experiments on milk protein, rennin works best at mammalian body temperature of 37° C. If the milk is too cold, the reaction is very slow, and if the milk is too hot, the heat will denature the rennin, rendering it inactive.
- The optimum pH range of the substrate milk should be between 5.8—6.2.
- It works best with whole milk; you can use dry powdered milk, but allow more time for it to coagulate.
- Do not use evaporated milk as the gums and stabilisers in the milk will not allow the protein to coagulate. The same applies to ultra-heat treated milk (UHT), which is treated above 90° C and so reduces the milk’s ability to coagulate.
- Dissolved in water, junket powder forms a solution that coagulates milk. It is considered more convenient because the powder has a longer shelf life than liquid rennet.
- Store dry powder or tablets at room temperature out of direct sunlight.
- Vegetarian Rennet1 in liquid form, is guaranteed to be active for at least 12 months if kept in the dark and refrigerated at 4° C.
- Always follow the manufacturer's instructions for preparation and use.
- Rennet or junket solutions are best freshly made just before use.
- A recommended working strength of 1% solutions of rennin is generally suitable for enzyme digestion activities. Use 1 mL of 1% working solution with every 10 mL of milk. After mixing the enzyme and milk substrate together, leave to stand without stirring or bumping the container. Disturbing the mixture will disrupt the coagulation process. Setting usually takes 10–15 minutes.
- Being a food additive, junket powder is considered quite safe to work with. However, as a school science activity, it is recommended to follow safe work practices when working with enzymes. See 'Working with Enzymes and General Safety Precautions' below.
- Never allow students to consume any food products made in the science laboratory.

Working with Enzymes and General Safety Precautions

An enzyme is a protein molecule that acts as a biological catalyst. A catalyst increases the speed of a chemical reaction but does not form part of the final product. Enzyme activity is affected by concentration, temperature, pH, substrate concentration and can be affected by the age of the reagents. Enzymes act on substrates to make products in a chemical reaction, and they are highly specific to the reactions they catalyse (the lock and key model).

It is important to keep enzymes stable and prevent them from denaturing. Never froth an enzyme solution, as it can denature. It is best to use the lowest concentration and smallest amount possible.

- **Enzymes are biologically active proteins** that should be handled with care. It is advised to avoid inhalation of enzyme dust or aerosols as this can lead to sensitisation and allergic reactions. Enzymes may cause asthma and are irritating to the eyes, respiratory system, mucous membranes and skin. When working with powdered enzymes, always wear safety glasses, gloves, a dust mask, or work in a fume cupboard that is not turned on to minimise exposure to any dust. Always use practices that do not generate dust or aerosols.
- Enzymes in powder form are considered hazardous substances. However, in dilute aqueous concentrations are considered to be a low hazard.
- Enzymes when dissolved into solution are much less stable than in powder form and lose their activity quickly. Therefore, it is best to prepare only what is required just before use.
- Enzymes in powder form should be stored in the fridge (4° C), unless otherwise specified. Diluted solutions can be stored in the fridge but should be used within of an hour or two of preparation and be kept on ice during an experiment.
- It is always advisable to check the enzyme reaction is working as required and make adjustments to the conditions and concentrations if needed before any practical class.
- Minor spills should be cleaned up immediately without generating any dust. Place waste into a designated, labelled container for disposal via a waste contractor. Do not discharge into sewer or waterways.

Science Assist recommends you conduct a site-specific risk assessment to assess and control the risks. We have developed a risk assessment template for schools to use, see Risk Assessment Template.[2]

Please refer to our laboratory notes on enzymes in the Chemical Management Handbook for Australian Schools - Edition 33 and our previous Q&A Enzyme preparation for experiments.[4]

References

[1] Science ASSIST. (2023). *School science suppliers*. Retrieved from the Science ASSIST website. https://assist.asta.edu.au/resource/664/school-science-suppliers

[2] Science ASSIST. (2018). *Risk Assessment Template*, Retrieved from the Science ASSIST website: http://assist.asta.edu.au/resource/2298/risk-assessment-template

[3] Science ASSIST. (2018). *Chemical Management Handbook for Australian Schools – Edition*. Retrieved from Science ASSIST website: https://assist.asta.edu.au/resource/4193/chemical-management-handbook-au... (See Laboratory notes on Enzymes pp135-143)

[4] Science ASSIST. (2023). *Enzyme preparation for experiments, Science ASSIST Q&A*, Retrieved from the Science ASSIST website: http://assist.asta.edu.au/question/2816/enzyme-preparation-experiments

Cheeselinks. (2017). *Vegetarian Rennet.* Retrieved (26 February 2023) from Cheeselinks website: https://www.cheeselinks.com.au/product/vegetarian-rennet/

Enzyme Technical Association. (2017). *Working Safely With Enzymes*. Retrieved from Enzyme Technical Association (ETA) website: https://www.enzymetechnicalassociation.org/wp-content/uploads/2017/11/Working-Safely-with-Enzymes-Nov2017-English.pdf (Accessed via https://www.enzymetechnicalassociation.org/documents/)

Institute of Food Technologists. (n.d.) *Experiments in Food Science Series – Food Chemistry Experiments* . Retrieved (26 February 2023) from Wayback web archive website: https://web.archive.org/web/20180219050706/http:/www.ift.org/~/media/Kno...

Royal Society of Biology. (nd). *Chemistry for Biologists*. Retrieved (26 February 2023) from Royal Society of Biology website: https://www.rsb.org.uk/education/teaching-resources/secondary-schools/ch...

Southern Biological. (nd). *Biochemistry: Working with Enzymes*. Retrieved (26 February 2023) from the Southern Biological website: https://www.southernbiological.com/enzymes-overview/

Year 12 Biology

Submitted by on 30 October 2015

Junket tablets from the supermarket in the jelly/pudding section works well.
