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Enzymes

Posted by Anonymous on Tue, 2015-03-03 18:08

Enzymes: Hi, do you have a recipe to mix trypsin 1:250 powder into a solution suitable for an enzyme digestion prac.

No concentration was stipulated in the activity.

Voting:



No votes yet

Year Level:

Senior Secondary

Laboratory Technicians:

Laboratory Technicians

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Enzymes

Submitted by sat on 05 March 2015

A 0.5% to 1% w/v trypsin solution is generally suitable for enzyme digestion practicals. Here is a recipe to prepare 100mL of a 0.5% w/v solution.

Wear PPE: safety glasses, gloves, laboratory coat, face mask or work in a fume cupboard that is not turned on to minimise exposure to dust or aerosols. If working outside a fume cupboard make sure you are in a draft free area.

Weigh out 0.5g of trypsin

Add to 80mL of distilled water at room temperature in a beaker.

Stir gently to dissolve.

Adjust to a final volume of 100ml.

Store at 4⁰C (fridge) for a short period of time or on ice during use.

Do not heat or allow the solution to froth as this will denature the enzyme.

Trypsin solutions are best freshly made.

Trypsin is a pancreatic enzyme which digests proteins into peptides and amino acids.

Chemical Formula Arrow

Protein + trypsin  amino acids
Image not found
file:///var/www/vhosts/assist.asta.edu.au/httpdocs/sites/assist.asta.edu.au/files/Long%20Arrow.jpg

Trypsin in powder form is a hazardous substance[1], however in low aqueous concentrations is considered to be a low hazard.

Working with Enzymes

Enzymes are proteins that are catalysts of chemical reactions. Catalysts increase the speed of the chemical reaction but do not form part of the final product. 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).

Enzyme activity is affected by concentration, temperature, pH, substrate concentration and can be affected by the age of the reagents. 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.

It is important to keep enzymes stable and prevent them from denaturing. It is best to use the lowest concentration and smallest amount possible.

General Safety Precautions when using Enzymes

Safe handling of enzyme preparations can be accomplished through proper work practices, engineering controls, and use of personal protective equipment.

Note: Enzymes are biologically active proteins. It is advised to avoid inhalation of enzyme dust or aerosols which can lead to sensitisation and allergic reactions. Enzymes may cause

asthma and are irritating to the eyes, respiratory system, mucous membranes and skin. Always wear safety glasses and gloves. When working with powdered enzymes wear 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.

Minor spills should be cleaned up immediately without generating dust. Place waste into a labelled container for disposal via a waste contractor. Do not discharge waste into the sewer or waterways.

Science ASSIST recommends you conduct a site specific risk assessment to assess and control the risks. You will need to determine how to safely prepare, handle and dispose of the solution. We have developed a Risk Assessment template for schools to use, see [Risk Assessment Template](#).

References

Science ASSIST. 2018. Chemical Management Handbook for Australian Schools – Edition 3, Science ASSIST website, <https://assist.asta.edu.au/resource/4193/chemical-management-handbook-au...> (See Laboratory notes on Enzymes)

Enzyme Technical Association (ETA). Nd. 'Working Safely With Enzymes', Enzyme Technical Association (ETA) website, <https://www.enzymetechnicalassociation.org/wp-content/uploads/2017/11/Wo...> (Accessed via <https://www.enzymetechnicalassociation.org/documents/>)

'SAFETY - Working with enzymes', National Centre for Biotechnology Education University of Reading website, <http://www.ncbe.reading.ac.uk/SAFETY/enzymesafety.html> (2017)

<https://www.rsc.org/Education/Teachers/Resources/cfb/enzymes.htm>

[1] Chemwatch, November 2011. Material Safety Data Sheet: Trypsin

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