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Microorganisms suitable for use in school science

Posted by Anonymous on Wed, 2015-11-11 18:21

What types of microorganisms are suitable for use in Australian school science laboratories?
Are special laboratory facilities required to handle these microorganisms?

Voting:



No votes yet

Year Level:

9

10

Senior Secondary

Laboratory Technicians:

Laboratory Technicians

Showing 1-1 of 1 Responses

Bacteria

Submitted by on 23 November 2015

Answer reviewed 20 February 2023

Science ASSIST has developed a comprehensive document called [Guidelines for Best Practice for Microbiology in Australian Schools](#), see [GUIDELINES for best practice for microbiology in Australian schools](#). **We strongly recommend you download this document as it discusses in detail the underpinning knowledge and laboratory techniques required for schools to successfully prepare, deliver and disassemble microbiology practical activities.**

In particular, see chapters 3 and 4 regarding risk assessment, school work levels, staff training, working safely in microbiology and microbiology rules.

Before schools embark on working with microorganisms they should ask the following questions and perform a site-specific biological risk assessment.

- What microorganism is being used? Is it a Risk Group 1 microorganism?
- Do the school facilities comply with the requirements of Physical Containment Level 1 laboratories?
- Does the school have the necessary equipment for sterilisation and decontamination procedures?
- Do the staff have training in microbiological skills?
- What manipulations are being performed with the microorganism? Are methods being used to eliminate or minimise exposure to potentially infectious material via aerosols, splashes, ingestion, absorption and accidental inoculation?
- Are any staff or students wishing to participate in microbiological activities immunocompromised or immunosuppressed. These individuals are more prone to infections and they should consult a doctor to determine whether their participation is appropriate.

Schools are advised to check what microorganisms and activities are permitted in their jurisdiction/school sector and perform a site-specific biological risk assessment before proceeding to work with any microorganisms.

Classification of microorganisms by risk group

The Australian Standard AS/NZS 2243.3.2022 *Safety in laboratories Part 3: Microbiological safety and containment* has drawn up the following classification for microorganisms.

- Risk Group 1 (low individual and community risk)
- Risk Group 2 (moderate individual risk, limited community risk)
- Risk Group 3 (high individual risk, limited to moderate community risk)
- Risk Group 4 (high individual and community risk)

Types of microorganisms allowed in Australian school science laboratories

Microorganisms used in school laboratories must be no higher than a Risk Group 1 (RG1). Risk Group 1 includes those microorganisms that are unlikely to cause human disease in healthy individuals. Some examples used in Australian schools are:

- *Escherichia coli* (K-12)
- *Staphylococcus epidermidis*
- *Micrococcus luteus*
- *Lactobacillus species*
- *Bacillus subtilis*
- *Saccharomyces cerevisiae*
- *Penicillium chrysogenum*
- *Mucor* – positive and negative species
- *Physarum polycephalum*

These are however still considered opportunistic and may be a risk to people who are immunocompromised or immunosuppressed¹.

Choice of microorganism

Science ASSIST recommends that schools choose the microorganism with the lowest level of risk that will meet learning outcomes. Schools need to ensure that they have the necessary staff training, the required facilities and equipment to be able to manage the risks.

It is good practice to regard all microorganisms, regardless of their risk group, as potential pathogens and to handle them with standard microbiological techniques to minimise risk to laboratory staff, students and the environment.

The use of Risk Group 1 microorganisms in schools does not negate the importance of good microbiological practice.

Bacteria, fungi and protozoa are the most common microorganisms studied in school microbiology.

School Laboratory facilities

In Australia, laboratories are classified into four levels of Physical Containment (PC 1–4). The level of containment must be at least the level appropriate for the risk group of the microorganism being used in the laboratory. Only risk group 1 microorganisms which are obtained as pure cultures from biological suppliers should be used in a PC1 laboratory. Potentially pathogenic microorganisms which fall under Risk group 2, 3 or 4 are not to be handled in PC1 laboratories.

Australian secondary school science laboratories are generally constructed to Physical Containment 1 (PC1) if they comply with the requirements of AS/NZS 2243.3-2022. Safety in laboratories. Part 3. Microbiological safety and containment. There are many school laboratories that are not to PC1 level. Schools wishing to conduct activities using RG1 microorganisms should assess their own laboratory for compliance with the requirements of AS/NZS 2243.3. 2022.

Staff Training

Teachers and technicians should be trained and experienced in good microbiological laboratory practice with an understanding of aseptic techniques, microbiological hazards and associated risks, contamination and sterilisation and decontamination procedures.

References

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