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Handling cow manure in school science laboratories

Posted by Anonymous on Fri, 2016-10-21 12:43

Handling cow manure in school science laboratories: Can cow manure be used for practical activities in school science laboratories? Are there any regulations regarding handling cow manure?

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7
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9
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Senior Secondary
Laboratory Technicians:
Laboratory Technicians

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Answer by labsupport on question Handling cow manure in school science laboratories

Submitted by sat on 01 November 2016

Answer reviewed 19 January 2023

Science ASSIST does not recommend practical activities examining cow manure to be performed in the school science laboratory. Risks to students and staff include zoonotic diseases from unknown microorganisms (bacteria, fungi, viruses and parasites)[1].

School science laboratories do not have suitable containment facilities for the examination of cow manure. School laboratories designated specifically for science practical activities are usually, but not always constructed to a PC1 standard.

School science laboratories are classified as (PC1) Physical Containment level 1, if they comply with the requirements of AS/NZS 2243.3-2022. Safety in laboratories. Part 3. Microbiological safety and containment. *"Physical containment is the term used to describe procedures and structures designed to reduce or prevent the release of viable organisms into the outside environment."*[2]

A Physical Containment Level 1 (PC1) laboratory is a classification given to laboratories with certain physical structures that enable the safe handling of material likely to contain microorganisms that are classified as Risk Group 1 (RG1) microorganisms. These are infectious microorganisms that are "*unlikely to cause human or terrestrial animal disease*" and "*where laboratory or facility personnel can be adequately protected by standard laboratory practices and equipment*"[2].

Only risk group 1 microorganisms which are obtained as pure cultures from biological suppliers should be used in a PC1 laboratory. Cow manure should not be handled in the school science laboratory as the facilities are inadequate to safely handle the unknown and potentially pathogenic microorganisms which fall under Risk group 2 or 3 which are not to be handled in PC1 laboratories.[3]

Biological samples collected from cattle may contain microorganisms that can cause zoonotic diseases. These are diseases that can be transmitted from animals and their environments to humans.[4] Zoonotic diseases can be spread by indirect contact with animal faeces and bodily fluids or aerosols.

The most notable zoonotic diseases from cattle manure is Q fever. Transmission is by inhalation of aerosols that can be contaminated with faeces[4] containing infectious microorganisms. Q fever is a notifiable disease that can cause flu-like symptoms that can be treated with antibiotics.[5]

References:

[1] Centers for Disease Control and Prevention, (2021, July). *'Zoonotic diseases'* Centers for Disease Control and Prevention website https://www.cdc.gov/onehealth/basics/zoonotic-diseases.html

[2] Standards Australia. 2022. *Safety in Laboratories, Microbiological safety and containment.* Sydney, Australia. These excerpts are reproduced by ASTA with the permission of Standards

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[3] Kirk, John H, *'Pathogens in Manure'* School of Veterinary Medicine, University of California http://lshs.tamu.edu/docs/lshs/end-notes/uc%20davis%20pathogens%20in%20manure-2636453403/uc%20davis%20pathogens%20in%20manure.pdf (accessed January 2023)

[4] South Australian Department of Health. (2015). '*Animal contact guidelines. Reducing the risk of illness associated with animal contact'* South Australian Department of Health website: http://www.sahealth.sa.gov.au/wps/wcm/connect/e0947b00492e1a49ac0afd9006... (accessed January 2023)

[5] Queensland Department of Education (2018, V2). '*Q fever in the School Environment'* Fact sheet, Qld Department of Education website, https://education.qld.gov.au/sitesearch/Pages/results.aspx?k=Q%20fever (accessed January 2023)

National Health and Medical Research Council. 2013. '*Australian code for the care and use of animals for scientific purposes 8th Edition'*, NHMRC website, https://www.nhmrc.gov.au/about-us/publications/australian-code-care-and-use-animals-scientific-purposes/australian-code-care-and-use-animals-scientific-purposes-code (accessed January 2023)

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