

‘Bacteria Farm’ - safety alert!



Safety in Microbiology - A Code of Practice for Scottish Schools and Colleges.

1.1 All microbiological materials, cultures, media, environmental samples etc. from whatever source should be treated as though they were a potential source of pathogens.

‘Bacteria Farm’ is the name of a hands-on *Artec Science Series* kit (Science Series 196415) which until recently was for sale to schools via the *Scientific and Chemical Science Education Resources Catalogue* (September 2016 - September 2017), catalogue number HLB010040, for around £6.00 [1]. The resource is available from other suppliers including, for example, Amazon [2].

SSERC was alerted to the existence of the kit by a school technician who, while flicking through the catalogue, saw and recognised the inherent hazards associated with the activities mentioned in the product description which reads, “Try cultivating different kinds of bacteria. You will be surprised to see how many kinds of bacteria are surrounding us in our everyday lives! Place a clean and dirty finger in different cells, use a swab to take a sample of bacteria from your toilet, shoe, dustbin, mouth or nose and see the bacteria grow!” [3].

The ‘study guide’ that accompanies the kit, which is aimed at children ‘Age 6+’, outlines procedures and activities that anyone with even a passing familiarity with SSERC’s *Safety in Microbiology: A Code of Practice for Scottish Schools and Colleges* [4] would find alarming. However, after brief correspondence with SSERC, Scientific and Chemical’s marketing team commendably withdrew the product from their catalogue and destroyed their stock of the kits. It is reassuring to know that no kits have been purchased from *Scientific and Chemical* by Scottish schools.

It should be noted, however, that other providers, for example Amazon [2], do have the ‘Bacteria Farm’ kit for sale. For this reason we thought it would be worthwhile highlighting some of the potential hazards associated with ‘Bacteria Farm’.

Safety in Microbiology: A Code of Practice for Scottish Schools and Colleges (SSERC, 2012) is a set of risk assessed guidelines that teachers and technicians involved in delivering microbiology in Scottish local authority schools and SSERC member colleges and schools follow. In addition, personnel (technicians or teachers) trained to ‘Level 3’ in microbiological safety support the delivery of this aspect of the curriculum. Therefore, appropriately trained staff prepare sterile media and ensure the safe disposal of inoculated cultures by autoclaving.

In our view none of the activities associated with ‘Bacteria Farm’ are suitable to be carried out in schools because any media prepared using the instructions and equipment supplied in the kit would not be sterile.

Furthermore, ‘Bacteria Farm’ suggests that children could take samples, from toilets, bins, noses etc., using swabs to collect the samples and inoculate the (non-sterile) culture medium in the ‘cultivation plate’ that comes with the kit. **Alarm bells!**

The *Code of Practice*, Section 2.19, page 9, states [4]:

*Samples from carefully chosen areas of the environment may be used, but only to inoculate sterile solid media. In particular, samples **must not** be taken for culture from:*

- human or other animal body surfaces;
- body fluids and secretions;
- animal cages or aquaria;
- lavatories;
- faecal material;
- poultry, eggs or areas which have been in contact with poultry;
- meat or meat products;
- dead animals;
- milk which has not been pasteurised;
- soft, unpasteurised, cheeses;
- water sources likely to contain faecal or sewage pollution;
- soil fertilised by animal manure or fouled by animal faeces;
- mud (e.g. from a pond or field).

The problem is of course that the growth medium provides ideal growing conditions for microorganisms and by swabbing, or sampling, any of these areas and then inoculating a growth medium you may well culture human pathogens.



'Bacteria Farm' - a hands-on Artec Science Series kit.

In secondary schools, if students were to swab suitable areas, laboratory work surfaces for example, on to sterile media in Petri dishes, the resulting cultures would be disposed of by autoclaving carried out by a suitably trained person. Nowhere in the 'Bacteria Farm' study guide does it say how one might safely dispose of the 'cultivation plate' with its farm of unknown and potentially pathogenic organisms. The 'Bacteria Farm' study guide also advocates taping along the edge of the cultivation plate to seal it. Petri dishes containing inoculated media should never be sealed all the way round with tape as this excludes oxygen and thus encourages the growth of anaerobic organisms; these are more likely to be dangerously pathogenic than aerobic organisms.

There are several other issues with 'Bacteria Farm' we could mention, but suffice to say that, given the issues we have pointed out, 'Bacteria Farm' is an activity which should not be used in Scottish secondary schools. It is even more unsuitable for primary schools, where it is unlikely that there would be appropriately trained staff or suitable equipment such as autoclaves. The idea of young children and a supervising adult carrying out

these activities at home unaware of the hazards is very worrying indeed.

SSERC has shared this information with CLEAPSS [5], the organisation that performs the equivalent health and safety role for schools in England, Wales and Northern Ireland.

Thank you to the technician who brought this matter to our attention and thank you to *Scientific and Chemical's* marketing and sales staff who responded so swiftly and decisively to SSERC's advice.

References

- [1] Scientific and Chemical science education resources catalogue (September 2016 - September 2017), catalogue number HLB010040. Also available at <http://education.scichem.com/Catalogue/Search>.
- [2] www.amazon.com.
- [3] Scientific and Chemical science education resources catalogue (September 2016 - September 2017), page 139.
- [4] Safety in Microbiology: A Code of Practice for Scottish Schools and Colleges, (SSERC, 2012). Also available from the SSERC website at <http://www.sserc.org.uk/index.php/biology-2/health-a-safety-home151>.
- [5] CLEAPSS, www.cleapss.org.uk.

Topics in Safety - working with enzymes

The ASE Health and Safety Group (formerly the Safeguards in Science Committee) continues to revise the publication *Topics in Safety*. We understand that the task is now over halfway to completion and that good progress is being made.

In 2015 [1] we briefly discussed changes to the legislation that controls the way work with DNA is regulated and we highlighted that [2] revisions had been made to Topic 16 (Working with DNA).

Our colleagues at the National Centre for Biotechnology Education (NCBE) have recently alerted us to a new Topic in Safety 'Working with Enzymes' and this is available from the NCBE website [3]. This new document is a very useful source of health and safety advice about enzymes and their preparations.

Additionally the authors have sought, in our judgement very successfully, to provide a reference document with 'hints and tips' about the successful use of enzymes across school/college curricula.

Overall then, a very valuable and useful document - every department should have one!

References

- [1] Working with DNA (2014), SSERC Bulletin **250**, 10-11.
- [2] Topic 16: Working with DNA, *Topics in Safety*, ASE (2014), available at www.ncbe.reading.ac.uk/safety (accessed 22nd September 2016).
- [3] Topic 20: Working with Enzymes, *Topics in Safety*, ASE (2016), available at www.ncbe.reading.ac.uk/safety (accessed 22nd September 2016).