

Encapsulation

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Acknowledgements

This resource was originally developed by the University of Reading to support outreach work delivered as part of the Chemistry for All project.

To find out more about the project, and get more resources to help widen participation, visit our Outreach resources hub: rsc.li/3CJX7M3.

Encapsulation: teacher notes

Available from rsc.li/3aT2RsW

Guidance notes

This activity is best carried out in a domestic science lab or food technology classroom, where learners can eat the fruit beads they make. Learners should not eat their beads if the activity is carried out in a lab with science equipment.

This activity should take approximately one hour to complete in full. It was initially created for 11–14 year-old learners but can be adapted for other age groups.

Download the PowerPoint presentation, technician notes and student workbook that accompany this resource at rsc.li/3aT2RsW.

Read our health & safety guidance, available from rsc.li/3IAmFA0, and carry out a risk assessment before running any live practical.

Safety goggles should be supplied for all learners.

The safety equipment suggested is in line with CLEAPSS requirements. For non-hazardous substances, wearing lab coats can help to protect clothes. The safety rules might be different where you live so it is worth checking local and school guidance.

Learning objectives

- Describe the role of probiotics in the gut.
- Describe the need for encapsulation of probiotics.

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Introduction: probiotics and encapsulation

Use PowerPoint **slides 3–7** to introduce probiotics and other uses of encapsulation. See the slide notes for additional information.

Slide 4 includes a video on probiotics, which is also available at bit.ly/3X8S93V.

Career link

Use **Slide 8** to introduce learners to careers with our Making the Difference: changing lives video, available from rsc.li/3X1uBOq. You can also share the different study options available to them on the A Future in Chemistry website: rsc.li/3RE11MA.

Activity 1: encapsulation of fruit juices

The instructions for this activity are provided in the student workbook.

Learners can work individually or in pairs for this experiment. Each pair will have three fruit juices (blackcurrant, orange and lemon), producing three different coloured beads.

Use **slide 6** to describe the purposes of the two chemicals used in encapsulation.

Learners mix fruit juices with sodium alginate and then drop this into calcium lactate to produce fruit beads.

Learners then place some of the beads into sparkling water and record their observations. Encourage your class to think about the causes of any changes they are observing.

Once learners have made one set of beads, encourage them to explore making different colours, shapes and sizes of beads to see which fruit juice is the best for making jelly beads.

Slide 10 of the PowerPoint features the questions from the student workbook that learners should answer as they prepare and test their jelly beads. Learners should record their answers in their workbooks.

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At the end of the session, bring the learners back together and use **slide 11** of the PowerPoint to discuss the expected observations and answers to the questions in the student workbook. Invite individuals to show what they have produced.

Answers

- (a) The appearance of the jelly beads produced will vary depending on the learner's technique, but generally the beads should look spherical and be coloured depending on the fruit juice used. Some learners will be successful in forming different shapes; however, this does not always work. Show off some good examples (such as large beads and snaked beads) either from those produced by the learners or by using the images on **slide 11**.
- (b) When sparkling water is added to the beads, the learners should observe the beads floating and sinking in the water. This movement happens because as carbon dioxide enters the beads, their density decreases and the beads rise to the surface. At the surface, the gas escapes from the beads, so their density increases again and the beads sink. This cycle repeats.
- (c) The answers here will be dependent on the choices of fruit juice used and the technique applied by the learner. They may want to include details of the colour, size and shape of the beads produced.