Encapsulation

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

ROYAL SOCIETY OF CHEMISTRY

Learning objectives

By the end of this session, you will be able to:

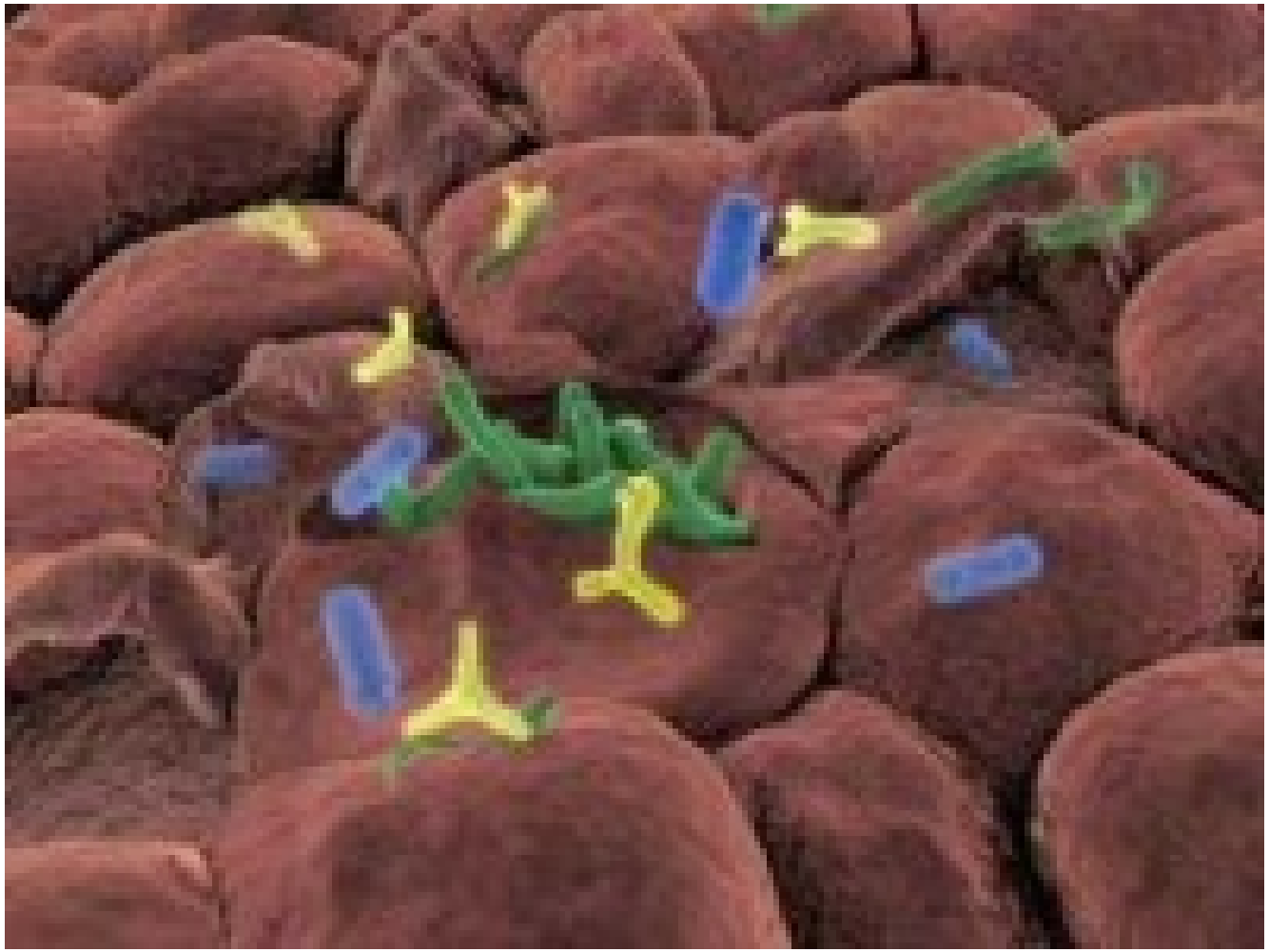
- Describe the role of probiotics in the gut.
- Describe the need for encapsulation of probiotics.

How many bacteria do you think there are in your gut?

There are approximately 100 trillion bacteria in your small intestine. This is called your ‘gut flora’.

Probiotic microorganisms help the growth of bacteria that are beneficial to your health.

Probiotic action



How to protect probiotics from the acid in your stomach

Hydrochloric acid in your stomach dissolves most probiotics, which means that they do not get through to your small intestines where they are needed.

Encapsulation gives probiotics a slimy coat that protects them from the hydrochloric acid for the one to two hours while food is in the stomach.

This helps the probiotics to pass through to the small intestine intact.

Chemicals used in encapsulation

- **Sodium alginate** extracted from seaweed forms a gel in the presence of calcium ions. It is commonly used as a thickener, emulsifier and texture improver.
- **Calcium lactate** reacts with the sodium alginate to form a gel.

Other uses of encapsulation

Bubble tea contains fruit juice beads.

These are made by the same encapsulation process used to protect the probiotics.

Follow the method in the student workbook to make your own fruit beads.

Career link

Careers in chemistry

Watch the video to learn about some of the chemistry careers that can make a real difference to daily lives.

Activity 1

Encapsulation of fruit juices

See student workbook

Activity 1

Encapsulation of fruit juices

While you are making and testing your fruit beads, record your answers to the questions in your workbook

(a) Describe the appearance of the jelly beads you collected in step 8.

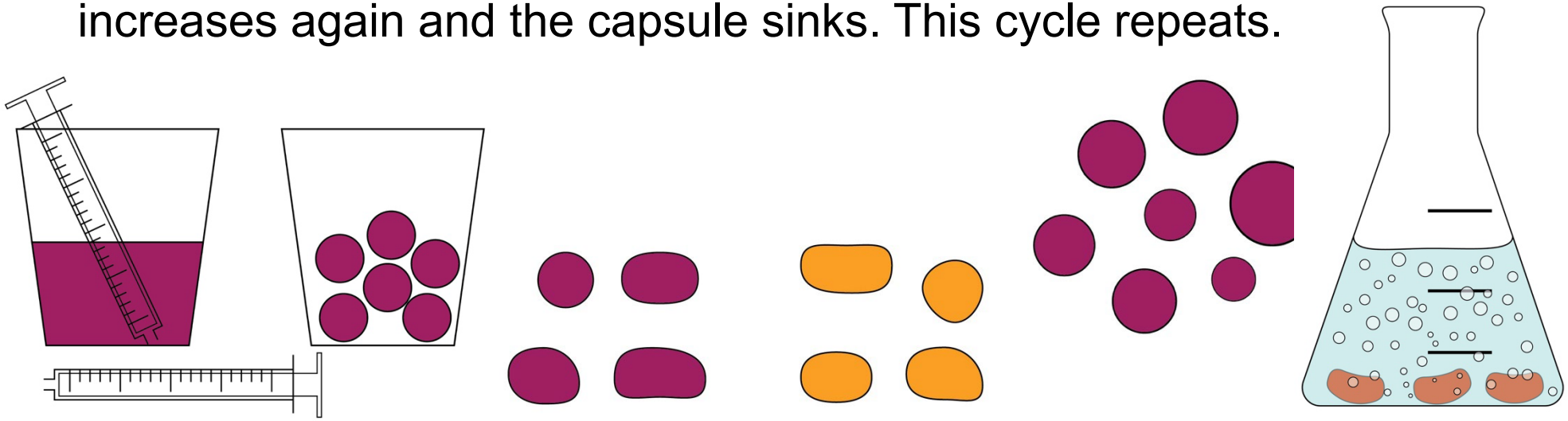
(b) Describe what happens when you add sparkling water to your jelly beads.

(c) Which fruit juice made the best jelly beads and why?

Answers

(a) The appearance of the jelly beads produced will vary depending on your technique.

(b) When sparkling water is added to the beads, the beads float and sink in the water. As carbon dioxide enters the capsules, their density decreases. The capsules rise to the surface. At the surface, the gas escapes from the capsule, so its density increases again and the capsule sinks. This cycle repeats.



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.