Making plastic from potato starch

From: rsc.li/3XDyQTR

ROYAL SOCIETY OF CHEMISTRY

In this session

- Discover how bioplastics offer an alternative to some plastics made from crude oil.

- Make a bioplastic and discuss the advantages and disadvantages of plastics made from renewable materials, such as food.

About me

Brief intro

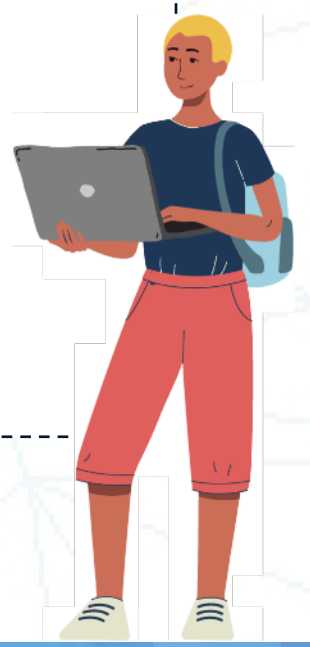
Where I work

Company name and what I do

Why I do it

What is the impact of what I do, what inspired me to choose my career and what I enjoy about it

Add a photograph that best describes what you do



‘Chemistry is shaping the future’

© NotPla

‘A project I work on uses packaging made from a material combining seaweed and plants. It can hold drinks such as water, juice, alcohol or condiments. It’s 100% edible and it can degrade in 4–6 weeks.’

Océane, R&D chemist at NotPla

© Florence Gschwend

‘We have developed a low-cost, sustainable chemical process that converts renewable resources like wood and sugarcane bagasse (a fibrous material left behind in the sugarcane harvesting process) into chemicals and products like (bio)plastic.’

Florence, Company co-founder at Lixea

From RSC’s *A future in chemistry* job profiles: edu.rsc.org/job-profiles/

Which decomposes the quickest?

A

B

C

D

E

F

G

H

Source: Practical Action Plastics Challenge

Which decomposes the quickest?

1 month	6 weeks	2 months	1 year	20 years	50 years	450 years	1000 years
							
D	H	F	E	A	G	B	C

Fastest to decompose → Slowest to decompose

Source: Practical Action Plastics Challenge

Where does it go?

- Approximately 5000 items of plastic pollution have been found per mile of beach in the UK.
- UK households are throwing away 1.7 billion pieces of plastic – every week.
- Roughly half the plastic produced is single-use.

Source: Pixabay

Source: Our World in Data, Statista, Greenpeace (correct in 2024)

What happens to our plastic waste in the UK?

- 11% buried
- 14% exported
- 17% recycled
- 58% burnt

Source: The Big Plastic Count 2024

Source: Pixabay

Towards more sustainable plastics

- Most of the plastic we use originates from crude oil (not renewable) and takes a long time to degrade.

- Bioplastics are polymers that are manufactured into a commercial product from a natural source or renewable resource.

Source: Pixabay

- Bioplastics made from fruit or vegetables degrade much quicker and if they do find their way into the environment, they are far less of a hazard.

Making plastic from potato starch – equipment

- Water
- Potato starch
- Vegetable glycerine
- Vinegar
- Teaspoon
- Tablespoon
- Bowl
- Spatula
- Pan
- Food colouring (optional)
- Stove
- Greaseproof paper
- Foil

Safety and hazards

- Wear eye protection (safety glasses or goggles) throughout.
- Handle the hotplate / pan with care and allow to cool before handling.
- The mixture is a burn risk as it gets very hot.
- Glass beakers and glass rods are a burn and shatter risk.
- Don’t let the mixture boil dry.
- Don’t exceed the amounts stated in the method.
- Potato plastic should not be eaten.

Method

1. Take 1 level tablespoon of potato starch.

2. Add 7 tablespoons of water and mix in a bowl.

3. Add 2 teaspoons of vinegar.

4. Add 2 teaspoons of glycerine (optional 2 drops of food colouring), then mix.

Method part 2

5. Pour in a pan on a medium-high heat with continuous stirring.

6. Stir with a plastic spatula until the mixture thickens (2–5 minutes).

Do not let the mixture boil dry

7. When jelly-like, pour onto greaseproof paper with foil underneath.

8. Flatten with a spatula to roughly 8 inches in diameter.

Try to get the same thickness all over

Method part 3

9. Leave to dry for 7–14 days, depending how thickly you spread the potato plastic.

Day 5

Day 10

- What would be the best use for these plastics?
- Can you think of some advantages and disadvantages of bioplastics?

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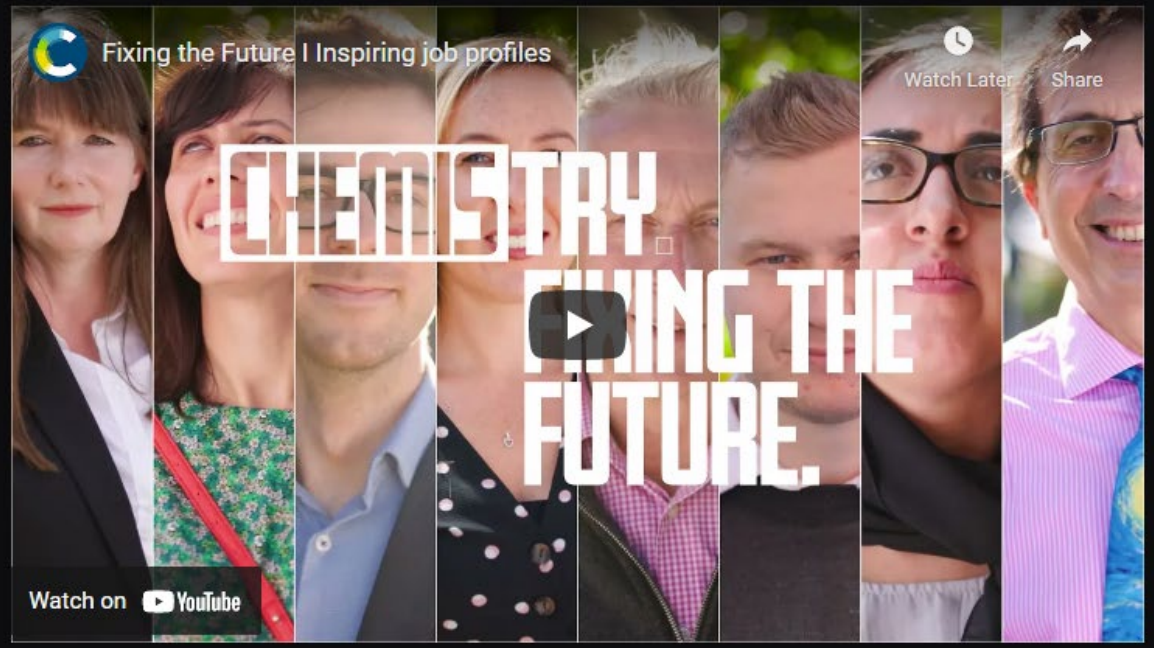

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Research fellow, battery recycling


Market development manager

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