

# MAKERS MANUAL #9

## Midushi Kochhar



### INTRODUCTION

Learn how to convert calcareous food waste like eggshells into an innovative biomaterial. “Eggware,” as coined by its maker, is a crafting technique, similar to ceramics, developed by combining processed eggshells and a bio binder. The results are rigid, long lasting and compostable. Participants are encouraged to utilize commonly found objects as moulds, to create their own simple Eggware objects, which are “designed to disappear.” This exercise concentrates on guiding you through one recipe and is open to experimentation and further development. You can even try using natural dyes/food colouring once you get the hang of it.

#### STEP 1

Collect as many eggshells as you can from your home, neighbours, cafés, etc.

Once you decide on your mould, proportionately increase the recipe ingredients as per your mould size.

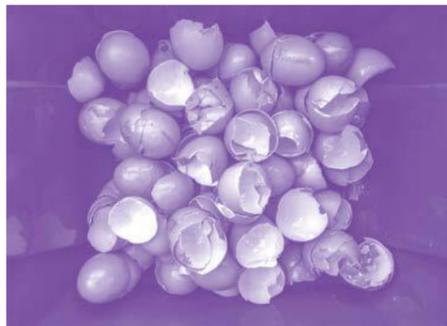
#### Measurement Reference:

→ One 9cm x 9cm x 1cm coaster is made from 15 eggshells. The original recipe is multiplied by 3: Water- 75ml, Eggshell Powder- 75g, Alginate-15g.

→ To make two 5cm x 5cm x 4cm candle holders the original recipe is multiplied by 5.

→ To make a big candle holder 7cm x 10cm multiply the original recipe is by 8

→ You can always add a few extra ml of water while mixing if the consistency becomes too thick.



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#### STEP 2

Wash the eggshells thoroughly. Fill a bowl with water and gently rub each eggshell to remove any egg residue.

#### STEP 3

Then boil them for about 15 minutes to kill all bacteria.

#### STEP 4

To dry the eggshells, place the eggshells in the oven at 100 degrees for 10 minutes, turn them around and put them back for 10 minutes more.



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#### STEP 5

In a blender, grind the eggshells down to the tiniest possible particles and pass the powder through a sieve. Try to achieve the finest powder that you can.

(If you don't have a blender, you can use a pestle and mortar and grind the eggshells by hand.)



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#### STEP 6

Before mixing all the ingredients together, first sieve the alginate in a bowl.



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### LIST OF THINGS

#### MATERIALS

→ (These are the minimum quantities needed. You will have to increase the amounts proportionately to fit your moulds.)

- Water - 25ml
- 5 Eggshells - 25g
- Calcium Alginate - 5g (common binding agent with applications in dental and ceramic casting)

#### TOOLS

- Microwave/Oven
- Stove/Hotplate
- Grinder/Blender
- Weighing Scale
- Sieve
- Spoons
- Mixing Bowl
- Mould\*
- Sanding Paper

\*Use something which is small and hollow you can find around your house. Old packaging containers work well to make candleholders or coasters. To maintain strength, do not go less than 1.25cm in material thickness.

\*PLEASE NOTE - These steps need to be completed within around 2 minutes, before the alginate starts to cure.

#### STEP 7

Add water to the alginate and mix thoroughly so that no lumps remain.

#### STEP 8

Gradually add the eggshell powder into the water-alginate mixture until a thick slurry\* is formed and all the ingredients are mixed well.

\*Slurry is a semi-liquid mixture, typically of fine particles suspended in water.



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#### STEP 9

Pour the mixture into a mould or use a spoon to transfer all of the mixture contents.

#### STEP 10

Optional - In case you want to make a candle holder, quickly push a candle into the centre of the mould. Carefully remove after 5 minutes, making sure there is hollow shape remaining.



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### BIO OF THE DESIGNER

Midushi Kochhar is a designer and material researcher who works between Amsterdam and New Delhi. With the mindset of solving problems she gives priority to material over object. She has co-founded Makers on the Move, Netherlands, which is an innovative educational program based on hyper-local recycling systems. Scientific processes and an underlying theme of green design drive her creativity and her latest projects have been exhibited at V&A Museum, London Design Festival, Architekt@Work and at material libraries like Materiom and Material Driven.

### FURTHER READING

→ The Chemarts Cookbook by Aalto University (Free PDF)  
<https://shop.aalto.fi/p/1193-the-chemarts-cookbook/>

→ Radical Matter by Kate Franklin and Coaroline Till  
 Available at STORE STORE

→ Why Materials Matter by Seetal Solamki  
 Available at STORE STORE

Makers Manual is a collaborative project between exciting makers and STORE STORE. Participation is free and no design background is necessary. You can share your creations using #makersmanual. We will pick our favourite submissions and publish the results in a limited printed edition of all of the manuals. Everyone who makes it into the book will receive a free copy.

This project is supported by Coal Drops Yard.

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#### STEP 11

Let the composite dry and do not touch. Depending on the thickness of the mould, the drying time can vary.

→ Drying options as follows:

OVEN: At 100° with fan for 5 min.

Check, change sides and repeat as per requirements as all ovens are slightly different.

AIR DRY: Can take 24 hrs+

\*After drying, the size will reduce by about 10%.

#### STEP 12

Once it is completely dried, you can use sand paper (600grit or above) to smooth off any rough edges. Alternatively, leaving the shape rough also gives it an interesting look.

#### STEP 13

Since the size reduced a little during the drying process, the indent you made to fit the candle would also have reduced in size. To make it bigger, gently use sand paper to increase the size.

#### STEP 14

Now, to remove any powdery residue, dip your Eggware in water for a few seconds, a couple of times and let it dry.

#### STEP 15

Optional- Cut a base of felt/cork sheet and stick it to the bottom of your piece. This would avoid scratching your table and complete your object.



