

## Research Plan/Project Summary

Rationale - Sunscreen, a widely used protectant against UV rays, is crucial in the avoidance of diseases. It is usually made in factories but it's possible it could be made at home. Some mineral sunscreens are made using zinc. Some foods contain zinc. So this experiment strives to make a UV block out of zinc-based foods. Because of sunscreen's importance, the experiment could be used in significant ways.

Research Question, Hypothesis, Engineering Goals, Expected Outcomes - Which of the following mixes can block UV rays as effectively as commercial sunscreen to potentially create a natural sunscreen; oysters, carrots, or flour? I hypothesize that oysters will block UV rays and be a good substitute for commercial sunscreen to block UV rays because of their zinc content and because zinc is used to block the sun.

Procedures –

1. Put on the apron and hair tie. Cover surface if needed.
2. Using the red pen, draw a 3cm-by-3cm box on each of the index cards.
3. Measure out 50g of all-purpose flour by placing a coffee filter on the scale, tearing it, and then placing flour in the coffee filter until the desired amount.
4. Using the fluid ounce measuring device, measure out 6floc of water and put the water and the flour into the food processor. Blend for 90 seconds and time using the timer. Put the mix into one of the plastic bowls and wash blender.
5. Measure out 50g of carrots by cutting them with the knife and cutting board and using the same method as the flour. This is done with the other coffee filter and the scale.
6. Using the fluid ounce measuring device, measure out 6floc of water and put the water and the carrots into the food processor. Blend for 90 seconds and time using the timer. Put the mix into one of the plastic bowls and wash the blender.
7. Measure out 50g of oysters using the glass bowl with no lid and the scale. Using the fluid ounce measuring device, measure out 6floc of water and put

- the water and oysters into the food processor. Blend for 90 seconds and time using the timer. Put mix into one of the plastic bowls.
8. Put each mix into a glass bowl with a top and refrigerate for about two days. Stir the mixes after they are removed from the fridge.
  9. Write the start time, the date, and mix name on each of the five index cards. The mix names are No Sunscreen, Commercial, Flour, Carrot, and Oyster. Put one sticker on each.
  10. Put all the cards on a baking sheet and spread each mix, using the butter knife, on a card inside the 3cm-by-3cm square. The paste should be even and every card should have the same thickness. One card should be blank, and the mixes should be about as thick as the amount of liberally applied sunscreen. Wipe the knife after each application.
  11. Bring the timer (set for 1 minute) and the baking sheet with cards outside and place the sheet in a spot that has nothing overhanging it and no shadows. As soon as the card comes in contact with UV rays, start the timer.
  12. When the timer goes off, reset it for seventy-five minutes and take a picture of each card.
  13. When the timer goes off again, take picture of each card then bring the tray inside.
  14. Clean up by throwing away cards, cleaning counters and washing dishes. Properly dispose of mixes.
  15. Using photo editing software, create a mask and set the white point to a portion of the picture with the mix but without the sticker underneath. Do the same for the eighty-minute photos. Compare the photos of oneminute mixes to their relative eighty-minute mixes by making a color range from one to ten. Ten is the card with the most purple and one is the one with the least.
  16. Remove the apron and hair tie as well as any other safety precautions.

Risk and Safety – There was no risk.

Data Analysis – The color of the stickers was made into a range that was then translated into graphs and charts. The results were found based off of the pictures and charts/graphs.

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