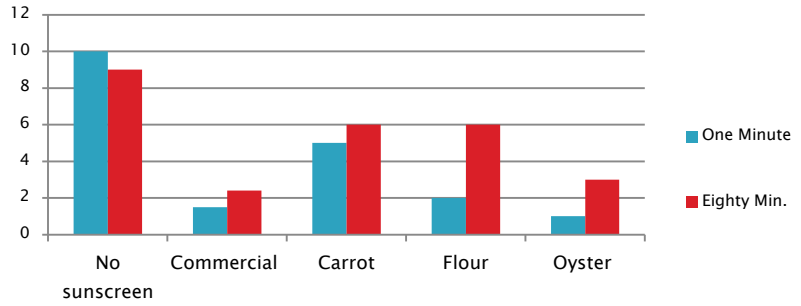
Culinary Protection from UV Devastation

Q1: Research Question

- Which of the following mixes can block UV rays as effectively as commercial sunscreen to potentially create a natural sunscreen; oysters, carrots, or flour?

Q3: Data Analysis & Results



Q2: Methodology

- Blend the oysters, carrots and flour equally with water.
- Place UV stickers on 5 index cards, and cover the UV sticker on 4 of the cards with the mixes plus commercial sunscreen.
- After the cards have been exposed to the sun for 1 minute, take a picture of each card. Repeat at 80 minutes.
- Edit each photo by masking around the UV sticker and setting the white point to the material beside the sticker.

Q4: Interpretation and Conclusions

- In this experiment the oyster worked better than all the other food mixes.
- These results supposedly happened because of the zinc content which was in the oysters but not present in the carrot and flour mixes.
- To improve this project more tests should have been completed to insure good results and a way to measure UV light quantitatively should have been used.
- In this experiment the hypothesis was accepted because of the results found

Introduction

- The sun emits an ultraviolet light that, though invisible to the human eye, can damage or destroy skin. The most common protectant for ultraviolet rays is known as sunscreen.
  - There are two types of sunscreen: mineral and chemical sunscreen.
  - Some mineral sunscreen contains zinc oxide. Some people say that zinc oxide blocks the sun by reflecting it but others say that zinc oxide absorbs the UV rays.
- Zinc is found in foods like meat, fish, nuts and more.
  - Anthea Levi says that zinc is found in "animal proteins like fish and meat [which] are among the best sources of zinc, but plant-based foods, like seeds and fortified cereals, also contain the essential mineral" (Levi). People have been encouraging others to eat zinc before coming in contact with the sun.
- If food can be eaten to fix the damage done after the sun's rays, it's possible it could be put on skin to protect them before the rays.

Research Question and Hypothesis

- Research Question 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.

Methods

1. Put on any safety equipment like a hair tie an apron. Cover surface if desired.
2. 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. Then blend it with 6floz in a food processer. Place in a bowl with lid and wash blender.
3. Do the same for 50g of carrots and 50g of oysters and then refrigerate each mix for 2 days.
4. Write the start time, the date, and mix name on five index cards. The mix names are No Sunscreen, Commercial, Flour, Carrot, and Oyster. Put one UV sticker on each. Apply a mix to each according to their names.

Methods (continued)

5. Place the cards outside and take a picture of each after one minute and eighty minutes.
6. Clean up by throwing away cards, cleaning counters and washing dishes. Properly dispose of mixes.
7. Using photo editing software, create a mask on each photo and set the white point to a portion of the picture with the mix but without the sticker underneath.
8. Find the dependent variable, which was the range of the color of the sticker, of the independent variable which was the different mixes (flour, carrot, and oyster). Compare the independent variable to the control group which was zinc mineral commercial sunscreen.

Results

- The oyster worked better than any mix for the first minute mark but the commercial was better than any for the eighty minute mark.
  - The carrot's sticker was very purple in both pictures.
  - The commercial's sticker stayed the most constant.
  - The flour's sticker was a medium purple and became more purple throughout the experiment.
  - The no sunscreen's sticker was very purple throughout the experiment.
- The data was collected in the form of pictures with a total of twenty pictures. These pictures are qualitative data

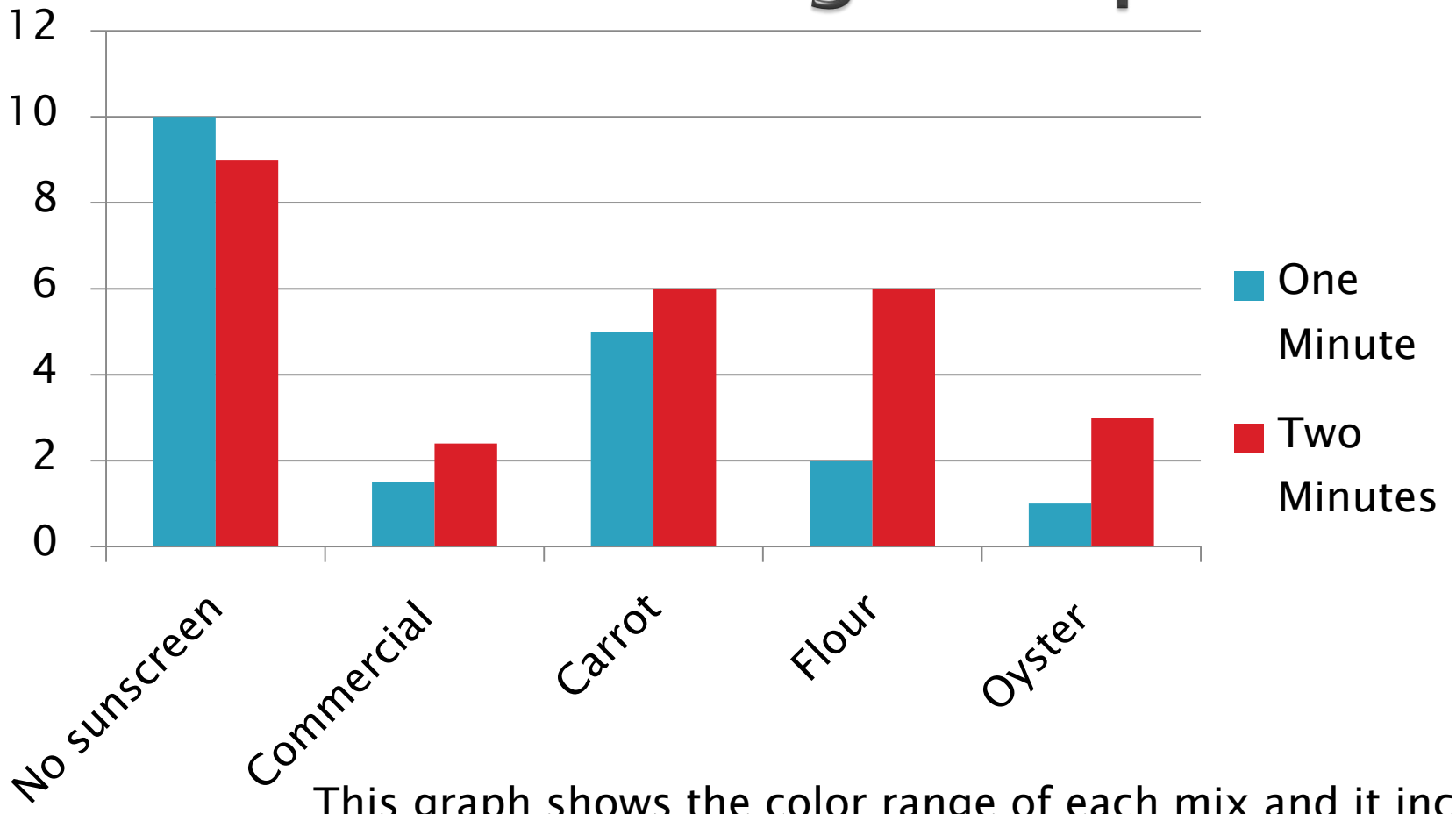
Color Analysis Chart

Color Analysis Chart

	No sunscreen	Commercial	Carrot	Flour	Oyster
One minute	10	1.5	5	2	1
Eighty minutes	9	2.4	6	6	3

This is a chart which gives the color range for the stickers based off of the edited pictures. The numbers from one to ten is a range with one being the lightest purple and ten, the darkest.

Color Range Graph



This graph shows the color range of each mix and it includes the one-minute and eighty-minute marks. Oyster blocks the most UV rays at the one-minute mark, but commercial blocks the most UV rays at the eighty-minute mark. The data is based off of the edited pictures.

Figure 1

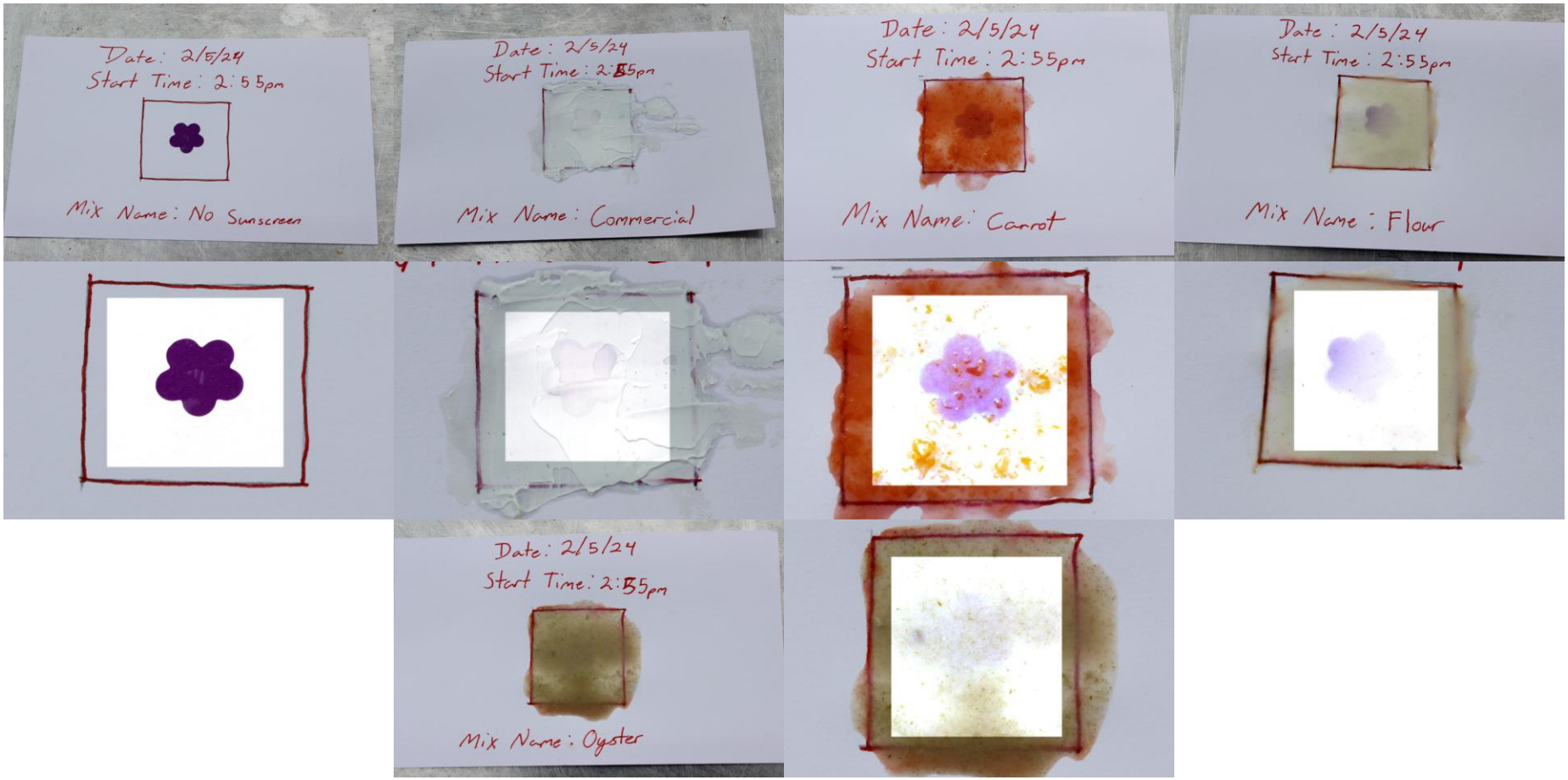


Figure 1 depicts the test after one minute of being exposed to UV rays. The date is 2/5/24 and start time is 2:55pm. Reading from left to right, top to bottom, the pictures read No Sunscreen, Commercial, Carrot, Flour, No Sunscreen edited, Commercial edited, Carrot edited, Flour edited, Oyster and Oyster edited.

Figure 2

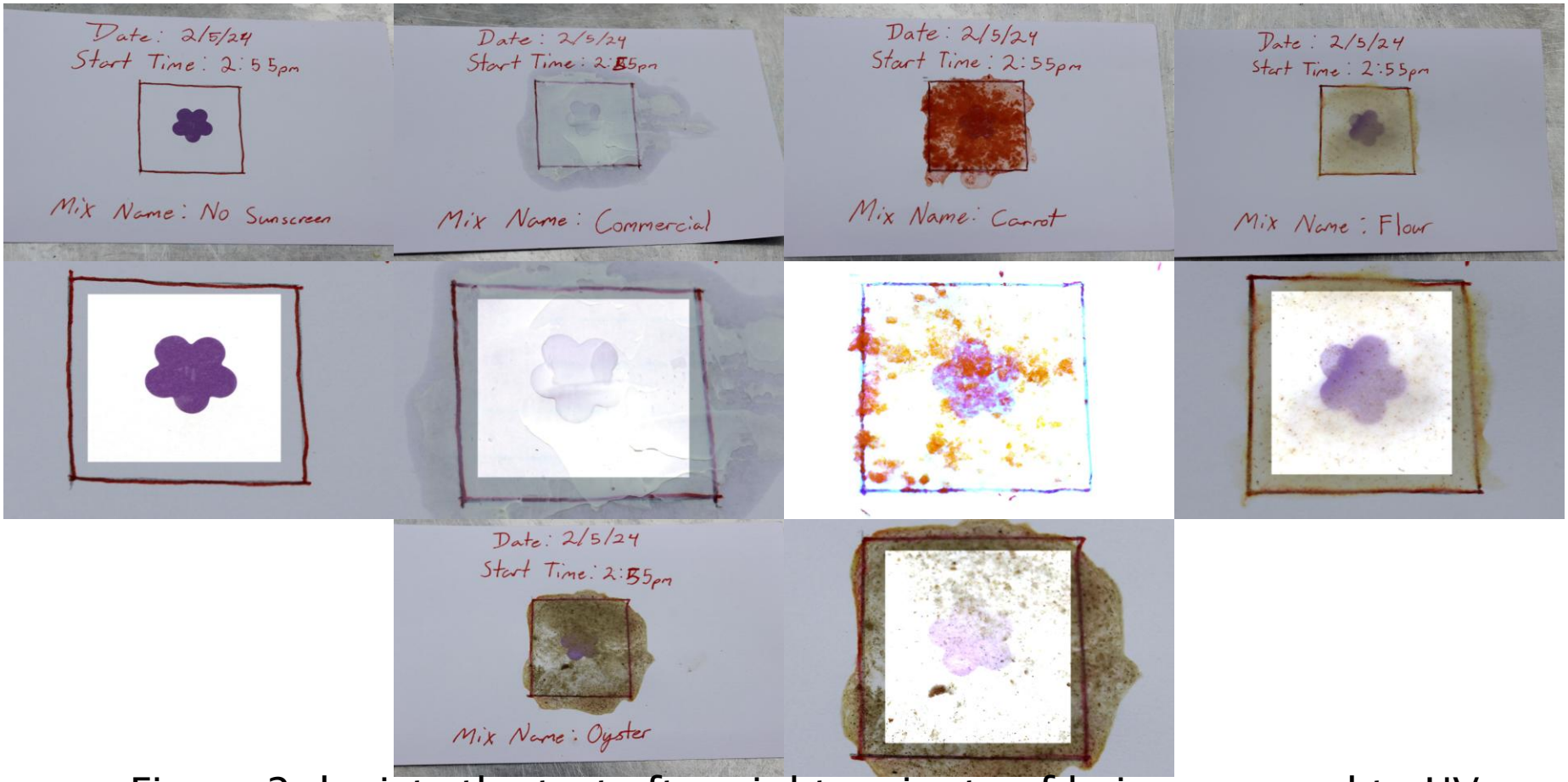


Figure 2 depicts the test after eighty minute of being exposed to UV rays. The date is 2/5/24 and start time is 2:55pm. Reading from left to right, top to bottom, the pictures read No Sunscreen, Commercial, Carrot, Flour, No Sunscreen edited, Commercial edited, Carrot edited, Flour edited, Oyster and Oyster edited.

Discussion

- In this experiment the oyster worked better than all the other food mixes. It was found that it was more efficient in blocking ultraviolet rays than commercial sunscreen but it didn't last as long as the commercial and so at the eighty-minute mark its sticker was more purple than the commercial's.

- These results supposedly happened because of the zinc content which was in the oysters but not present in the carrot and flour mixes. Zinc oxide was present in the commercial sunscreen, and zinc was in the oysters.

- "The inorganic metal oxide sunscreens titanium dioxide and zinc oxide have been considered to protect against sun burning ultraviolet radiation by physically reflecting/scattering the incident photons and thus protecting the skin. Earlier publications suggested, however, that the primary action of UV protection by these sunscreen agents is through absorption and not by reflection" (Cole). So this is supposedly why the test with zinc (oyster mix) worked well.

Discussion (continued)

- The results were based off of the edited photos. According to these photos, the hypothesis was correct in that the oysters are a good substitute for commercial sunscreen. However, oyster mix does not last as long as commercial.
- To improve this project more tests should have been completed to insure good results and a way to measure UV light quantitatively should have been used.
- In this experiment the hypothesis was accepted because of the results found.

Implications and Ideas for Future Research

- Sunscreens are used all the time; in fact they are used every summer and sometimes in winter as well. So it would be very useful to have a type that could easily be concocted at home. This is what these discoveries could potentially do. Even in personal homes a simple mixture can be made to block out a huge fire ball. As said in an article; “Who needs sunscreen? Everyone.” (Sunscreen).

- Future research: adding more preservatives and testing the ability of oysters to resist water will take this project a step closer to becoming usable sunscreen.

References

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