

### **Experiment Reflection:**

1. The plant material I chose was purple potatoes. They were probably grown in upstate New York or possibly Idaho because I know they're famous for their potatoes. Each potato takes about 17-24 ounces of water to grow. I used 3 potatoes for my dye so it used 51-72 ounces of extra water to make the dye possible. It took approximately 300 miles to reach Manhattan if the potatoes were grown somewhere upstate.
2. The colors were slightly different between the oily and clean wool. The oily one is lighter because it didn't absorb much of the color while the clean one has obtained more of the color.
3. The difference between these samples is the color and saturation of the dyes on the cotton. For the piece that was dyed and unwashed it seems to have retained less color than the one that was dyed and washed. This was surprising to me but it kind of makes sense because the water could have possibly set the dye into the cotton fabric. The different mordants also significantly changed the colors of the cotton samples and wool that didn't even seem possible to have originated from a dark purple dye. For example, the sample that had tartaric acid as a mordant turned a bright pink and the one that had an iron mordant turned a greenish-orange color. And because the dye was not very strong in the first place I actually think the sample with tartaric acid turned out the best. For the mystery mordant, I chose to use two tablespoons of vinegar which turned the dye into a blueish color and I think I would want to explore this one more. Overall I was really shocked with the different colors that the dye and mordants created and even though the dye wasn't very strong, I think that it could still have a lot of potential.
4. I think on synthetic fibers, the dye will work better because they will have a stark white base rather than a tan color which the wool and cotton have. I tried my natural dye on a piece of white fabric and it came out the most purple and it was the color I thought the cotton pieces were supposed to look like.
5. When I was cutting the potatoes for the dye, the cutting board was already turning purple so I thought the dye would be really strong. But when I was boiling the potatoes, the color wasn't coming out as much so I had to smash the potato in the water. After that, the dye seemed to get darker but after straining out the potato, the dye was not as strong. When I dyed the wool and cotton, it didn't seem like the dye would adhere but it did end up dyeing the material. It was still quite faint but I think there is beauty in the subtlety.
6. Water picked up potato, wool, cotton, soda ash, alum, tartaric acid, iron, and vinegar. And all of this except the potato, wool, and cotton went down the drain. To make the solutions have a balanced pH, we added ammonia because most of the mordant solutions were very acidic.
7. It is not okay to put all of this down the drain without properly testing the pH. This applies to industrial processes because the water we used for this natural dye experiment was already a large quantity so if this was on a much grander scale, so much more water would be used. If the pH wasn't considered here and even if so, if so many chemicals were being dumped into bodies of water, it would greatly affect the natural life and system in these areas.

8. One innovation could be selling the products with its natural color instead of dyeing. It could be possible to create a whole collection where no chemical dyes were used and instead they stayed the colors they came in. I think this could be successful because any color you can think of, someone will be able to incorporate it into their designs and this would eliminate the need to dye the fabric they need when it comes naturally. Also I think there can be another line of products where materials are colored with the dyes but the step of bleaching the material to a stark white would be eliminated. I think a lot of interesting colors could come from this process too and it would take away the need to use bleach.

9. Overall I think this experiment was very interesting because now it is possible to create dyes at home and dye whatever you want. And if you use safe materials that aren't toxic, you can feel better about what you're making. I think I would try natural dyeing again but not using this wool and maybe using a natural ingredient that smells good because after this experiment, everything smelled really bad and because the cotton and wool sat in liquid for such a long time, a little mold grew in some areas and everything just smelled really bad. And potatoes don't smell all that great and I wouldn't want to smell like cooked potatoes. I think this should be taken into consideration when using natural dye, especially for clothing because you don't want to smell bad yourself. Another thing that wasn't really mentioned was whether the dye will fade after washes because clothes need to be washed and although all dye will fade eventually, I think the natural one might do so faster.