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Stem

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Clay Masks

Recipe:

|  |  |  |
| --- | --- | --- |
| Ingredient | Amount used | Cost per gram (dollars) |
| White sand | 1 gram | $0.0039 |
| Mint candies (altoids) | 0.67 grams | $0.023 |
| Aloe Vera juice | 3 grams | $0.0765 |
| Distilled Water | 6.5 grams | $0.065 |
| Glycerin | 0.049 grams | $0.023 |
| Fuller’s Earth Clay | 5 grams | $0.066 |
|  | 16.219 | $ 0.2574 |

Procedure:

1. Crush the altoid with the mortar and pestle.
2. Measure 5 grams of Fullers Earth Clay in a weigh boat using an electronic scale.
3. Pour the 5 grams of Fullers Earth Clay into the mortar with the altoid.
4. Measure 1 gram of white sand in a weigh boat using an electronic scale.
5. Pour the white sand into the mortar.
6. Measure 3 grams of aloe vera using a pipet.
7. Pour aloe vera into the mortar.
8. Add one drop of glycerin (0.049 grams) into the mortar, using a dropper.
9. Measure 6.5 grams of distilled water using a pipet.
10. Pour distilled water into the mortar,
11. Stir ingredients using pestle until mixed well.

Justification:

The ingredient, white sand, was chosen because it was concluded that white sand would help make the clay mask less of a liquid, and it would help make the mask dry fast. White sand was chosen over the flaxseed and soy cereal because the flaxseed and soy cereal made the mask clumpy. Furthermore, the decision was made to use an altoid in the clay mask because that was the item that would be used to make the clay mask smell good. The smell of the clay mask matters because someone would not want to have a mask that smells bad sitting on their face for a long period of time, and therefore the altoid is a good ingredient to use because it makes the mask smell minty an fresh. The tea extract was not used because it made the mask smell bad. The decision to use aloe vera was made in order to meet the constraint of not leaving residue. The aloe vera helps to not leave a residue because it makes the mask more like a liquid, which makes it come off the skin easier because there are not clumps of the mask drying on the skin and not coming off. No other ingredients were tested to see if they helped with the residue of the mask. The distilled water helped to make the mask easy to spread and not too clumpy. It was mandatory to use the water. The glycerin helped increase how liquid-like the mask was, and it was added at the end because the mask was too solid, so it is unknown if a different ingredient would have worked better. Fuller’s earth clay was used instead of green clay or Kaolin clay because it did not leave a residue, it looked nice, and it exfoliates the pores. All of the previously listed benefits of Fullers Earth Clay show that it is a quality ingredient to use. The mask did fit within the constraints. It did not leave a residue, and it is smooth. When testing it on the skin, the mask was very easy to wash off, and when it was first put on, the person could easily spread the mask to put it on certain areas. Also, the product absorbed into the person’s skin, which was shown by the fact that it clean the person’s pores because the mask could not clean a person’s pores if it did not get into the pores, which would mean it has to absorb into the skin. It is known that the mask cleaned the person’s pores because when looking at a picture of the person’s skin before the mask was put on under a microscope, the skin looks dirty and dark. Then, when looking at a picture of the skin after the mask was put on, the skin looks more clear and smooth, which is shown by the lightness and the absence of particles. Finally, the mask fell within the assigned budget because the cost was under 3 cents per gram of mask. In conclusion, the mask worked very well on the person’s skin because of the carefully selected ingredients, and it meets all of the provided constraints.

Cost Analysis:

Pareto Chart Data:

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| --- | --- | --- | --- | --- |
|  | **Pareto Chart Data for Mask Ingredients** | | |  |
|  | Ingredient | Value | Percentage | Cumulative Percentage |
|  | Aloe Vera Juice | $0.0765 | 29.7% | 29.7% |
|  | Fuller's earth clay | $0.066 | 25.6% | 55.4% |
|  | Distilled Water | $0.0650 | 25.3% | 80.6% |
|  | Glycerin | $0.023 | 8.9% | 89.5% |
|  | altoids | $0.023 | 8.9% | 98.5% |
|  | white sand | $0.0039 | 1.5% | 100.0% |
|  |  |  | 0.0% | 100.0% |
|  |  |  | 0.0% | 100.0% |
|  |  |  | 0.0% | 100.0% |

Chart:

* Initial analysis of the seven ingredients showed that each clay mask would cost $ 0.2574 based on retail purchase of ingredients.
* A Pareto analysis showed that the three most important ingredients to focus on are Fullers Earth Clay, water, and aloe vera. Instead of bulk buying all ingredients at one store a focused effort was made to improve the cost of those three items. The results were as follows:
* The aloe vera juice is the most expensive item. It can be purchased from Wal-Mart at $7.44 for 1 gallon, which means the cost per gram would be $0.0255. At <http://www.bulkapothecary.com/product/raw-ingredients/other-ingredients-and-chemicals/aloe-vera/>, 8 pounds can be bought for $13.65. This means that the cost per gram would be $0.0037, which is less expensive than the cost at Wal-Mart. Therefore, it is better to buy the aloe vera on the website.
* The Fullers earth clay can be bought at Mountain Rose Herbs for 0.0132 dollars per gram. At <http://www.cineshoppe.com/fullers1.htm>, of Dallas, Texas, a 50 pound bag can be bought for 75 dollars, resulting in a cost of 0.0033 dollars per gram, which is less than 0.013 dollars per gram which is what it is at Mountain Rose Herbs (see calculations page). This would mean 4545.454 batches could be made.
* For water, see the “other observations” section.
* If the discounted ingredients are used then the total cost would be clay was used then the total cost would be $0.214266.
* Other observations/ open questions:
* If one wants to make a mast with more than 270,220.0369 grams, than they should use the machine. (see calculations page)
* If one wants to make a mask with less 270,220.0369 grams, than they should buy the water from the store. (see calculations page)