

Group Members: _____
Date: _____ Period/Class #: _____ Group #: _____

Spicy Perfume: Creation of a Mixture

Purpose:

1. To extract clove oil into ethanol, making a mixture.
2. To identify the components of the mixture.

Materials:

- Cloves
- Small vial with tightly closing lid
- Ethanol
- Masking tape
- Marker
- Cotton swab

Procedure:

1. Label the vial with masking tape. Write "Group members, date, Clove solution"
2. Place about 5 cloves into vial. Record the exact amount used.
3. Cover the cloves with 10.0 mL ethanol. Record the exact amount used to 0.5 mL.
4. Close the vial TIGHTLY.
5. Shake the vial vigorously (but carefully!) for one minute.
6. Leave the vial overnight.
7. Open and dip cotton swab into the solution.
8. Wave the cotton swab in the air to evaporate the ethanol.
9. Waft the scent from the cotton swab and record the scent observed.
10. Compare the intensity of the scent with one other group, and rate your group's "perfume" versus the other group's "perfume."

Data:

Number of cloves used: _____ cloves

Amount of ethanol used: _____ mL

Describe the scent on Day 2: _____

- Rate your group's scent versus another group's:

Your group: 1 2 3 4 5 (1—weak, 3—moderate, 5—strong)

Group #: 1 2 3 4 5 (1—weak, 3—moderate, 5—strong)

Conclusions and Questions:

Answer on a separate sheet of paper.

1. Was there difference in the intensity of the scent of your group's perfume and the other group? Why or why not?
2. You started with cloves and ethanol. Which of these is a pure substance and which is a mixture? How do you know?
3. You ended with perfume. Is this a pure substance or a mixture? How do you know? If it is a pure substance, is it a compound or an element? If it a mixture, what are the components of the mixture?
4. Refer to "Perfume Notes." What type of perfume technique did you use? Explain that technique, with reference to this procedure.

Error Analysis:

Answer on a separate sheet of paper.

1. Describe at least one way that your group could have improved its execution of this lab procedure, and how your results would have been different.
2. Describe at least one way that this lab procedure could be made clearer.

Group Members: Sample Responses

Date: _____ **Period/Class #:** _____ **Group #:** _____

Spicy Perfume: Creation of a Mixture – Sample Responses

Sample responses are shown in italics

Data:

Number of cloves used: 5 cloves

Amount of ethanol used: 10.0 mL

Describe the scent on Day 2: Like cloves, woody, spicy

- Rate your group's scent versus another group's:

Your group: 1 2 3 4 5 (1—weak, 3—moderate, 5—strong) *answers will vary*

Group #_ : 1 2 3 4 5 (1—weak, 3—moderate, 5—strong) *answers will vary*

Conclusions and Questions:

Answer on a separate sheet of paper.

1. Was there difference in the intensity of the scent of your group's perfume and the other group? Why or why not?

Yes. The other group (or we) used more (or less) of the cloves (or ethanol) than we (or the other group) did.

No. We followed the same procedure, and did the same things as the other group.

2. You started with cloves and ethanol. Which of these is a pure substance and which is a mixture? How do you know?

Cloves are a mixture because they are not all the same throughout (heterogeneous).

There are different parts to a clove (bud, stem, etc.). Ethanol is the same throughout (homogenous). Our teacher told us that ethanol is a pure substance, and that its formula is C_2H_5OH .

3. You ended with perfume. Is this a pure substance or a mixture? How do you know? If it is a pure substance, is it a compound or an element? If it is a mixture, what are the components of the mixture?

Perfume is a mixture. I know this because we started with ethanol, and ended with a yellowish liquid that resembled both ethanol, in look and texture, and clove oil, in scent.

The components are ethanol and clove oil.

4. Refer to "Perfume Notes." What type of perfume technique did you use? Explain that technique, with reference to this procedure.

I used extraction. In extraction, cloves were exposed to ethanol that dissolved the clove oil. The oil dissolved in the solvent, and then the solvent evaporated on the cotton swab, leaving the oils behind.

Error Analysis:

Answer on a separate sheet of paper.

1. Describe at least one way that your group could have improved its execution of this lab procedure, and how your results would have been different.

Answers will vary.

2. Describe at least one way that this lab procedure could be made clearer.

Answers will vary.

3. Perfume.ppt Outline

- 1) Perfume!
 - a) How is it made?
 - b) Where did it come from?
- 2) Jennifer Lopez Markets Perfume
 - a) In 2001, Jennifer Lopez started a line of perfumes, carrying on a long tradition of celebrities using their fame to influence how other people looked and smelled
 - b) Picture of Jennifer Lopez with "Still" perfume
- 3) Ziryab Starts Beauty School
 - a) "... (I)n the ... eighth to ninth centuries AD... a famous singer and musician of Muslim Spain known as Ziryab ('Blackbird') opened 'a genuine beauty institute where the arts of applying cosmetics, removing superfluous hair, using dentifrices, and dressing the hair were taught.'"
 - b) Picture of Ziryab playing the 'ud (lute)
- 4) How are these two types of perfume different? (Picture of Ancient Egyptian woman with wax perfume ball, picture of perfume bottle)
 - a) On the left, an ancient Egyptian woman offers a solid perfume ball to another.
 - b) On the right, a Turkish perfume glass is shown.
 - c) What is the primary difference between these two types of perfume?
- 5) Liquid Perfume!
 - a) How could we get liquid perfume?
 - b) Five techniques for obtaining scents:
 - i) First three result in solids:
 - (1) Expression
 - (2) Maceration
 - (3) Enfleurage
 - ii) Second two result in liquids:
 - (1) Steam Distillation
 - (2) Extraction
- 6) The oldest methods - Solid product
 - a) Expression:
 - i) An oil is "cold-pressed" from its source
 - ii) Oily skin of fruit is squeezed by hand, or in a press, then soaked up in sponges to use as a scent.
 - iii) ex. Orange oil, lemon oil
 - b) Maceration:
 - i) Flowers are immersed in warm fats, and mashed to release their oils.
 - ii) Ex. Orange blossom, hyacinth
 - c) Enfleurage:
 - i) Delicate flower petals are placed between two sheets of wax, or oily cloths, and their oils move into the wax. The flowers are removed and this process is repeated until the wax is saturated with scent.
 - ii) Only used for the most delicate flowers
 - iii) ex. Jasmine, tuberose
 - d) Products
 - i) In ancient times, all of these would lead to a solid, waxy scent. One type of these is called pomade.
- 7) The newer methods - Liquid products: Steam Distillation
 - a) Steam Distillation
 - i) "We do not come across this industry (the distillation of rose-water) in the older civilisations, nor in contemporary ones, and this has led historians to believe that it was a genuine Muslim industry that originated during the Islamic era."
 - (1) al-Hassan, p. 141
- 8) Steam Distillation
 - a) Distillation:
 - i) An alembic (seen to the left) was one of the pieces of equipment used for steam distillation.
 - ii) Picture of alembic
 - iii) A sturdy part of a plant (usually twigs, leaves, etc., but sometimes petals) were put into the bottom (labeled *a*) with water, and boiled

- iv) The steam and scented oils boil away from the plant matter, and go down the spout (labeled c).
 - v) The oil will float (generally) and the water will sink, and can be easily separated.
- 9) Steam Distillation, cont.
- a) Rose Water (picture of rose)
 - i) Oil of rose floats on top of the water, and is removed, according to the method previously discussed.
 - ii) Phenyl ethyl alcohol, another component of the scent of roses, stays behind in the water, giving rose water.
 - iii) Rose water was and is one of the, if not the most, popular scents in the Middle East. It is used as a perfume, as well as in many foods.
 - iv) Ziryab (remember Blackbird?) helped make rose water a popular scent and flavoring in Spain.
- 10) Steam Distillation, cont.
- a) Alembic to Retort
 - i) The alembic was an older device for distillation. (picture of alembic, again)
 - ii) Muslim scientists refined it into the more modern retort (picture of a retort) in the 16th century. Chemists today still use the retort in some distillations.
- 11) The newer methods - Liquid products: Extraction
- a) Extraction:
 - i) In extraction, the plant material (petals, bark, twigs, etc.) is exposed to a solvent that will dissolve the scented oils. The oils dissolve in the solvent, and then the solvent is evaporated, leaving the oils behind.
 - ii) Today, in modern factories, the solvent is forced through layers of the material, and collected at the end.
 - b) Extraction vs. Distillation
 - i) Extraction is the most common technique today for extracting oils for use in perfumes, because it can be done quickly, without damaging the oils.
 - ii) The high heat used in distillation may make the oils break down, which is why a sturdy part of the plant must be used.
 - iii) The solvents used in extraction, however, are more expensive than the water used in distillation.
 - iv) Under what conditions would each be more useful?

Perfume Notes

- ❖ What connection is there between Jennifer Lopez and Ziryab?

Who is Ziryab?

- ❖ How are these two types of perfume different?
 - What is the primary difference between these two types of perfume?

❖ **Liquid Perfume!**

- Five techniques for obtaining scents:
 - First three result in solids:
 -
 -
 -
 - Second two result in liquids:
 -
 -
- ❖ The oldest methods - Solid product
 - Expression:
 - An _____ is _____ from its source
 - Oily skin of fruit is _____, or in a _____, then soaked up in sponges to use as a scent.
 - ex.
 - Maceration:
 - _____ are immersed in _____, and mashed to release their oils.
 - Ex.
 - Enfleurage:
 - Delicate _____ are placed between two sheets of _____, or oily cloths, and their oils move into the wax. The flowers are removed and this process is repeated until the wax is saturated with scent.
 - Only used for _____
 - ex.
 - Products
 - In ancient times, all of these would lead to a _____. One type of these is called _____.
- ❖ Steam Distillation
 - Distillation:
 - An _____ was one of the pieces of equipment used for steam distillation.
 - Sketch a picture of an alembic

- A _____ (usually twigs, leaves, etc., but sometimes petals) were put into the bottom (labeled *a*) with _____, and boiled
 - The _____ and _____ boil away from the plant matter, and go down the spout (labeled *c*).
 - The oil will _____ (generally) and the water will _____, and can be easily separated.
- ❖ Steam Distillation, cont.
- Rose Water (picture of rose)
 - _____ floats on top of the water, and is removed, according to the method previously discussed.
 - Phenyl ethyl alcohol, another component of the scent of roses, stays behind in the water, giving _____.
 - Rose water was and is one of the, if not the most, popular scents in the Middle East. It is used as a _____, as well as in _____.
 - Ziryab (remember Blackbird?) helped make rose water a popular scent and flavoring in Spain.
- ❖ Steam Distillation, cont.
- Alembic to Retort
 - The alembic was an _____ device for distillation.
 - Muslim scientists refined it into the more modern _____ in the 16th century. Chemists today still use the retort in some distillations.
 - Sketch a retort below:
- ❖ The newer methods - Liquid products: Extraction
- Extraction:
 - In extraction, the _____ (petals, bark, twigs, etc.) is exposed to _____ that will dissolve the _____. The oils dissolved in the solvent, and then _____ is evaporated, leaving the _____ behind.
 - Today, in modern factories, the solvent is forced through layers of the material, and collected at the end.
 - Extraction vs. Distillation
 - Extraction is the most common technique today for extracting oils for use in perfumes, because _____.
 - _____, which is why a sturdy part of the plant must be used.
 - The solvents used in extraction, however, _____
 - Under what conditions would each be more useful?