

Lipstick Chemical Analysis Continued

1.) Chromatography uses the distance traveled by different compounds. Calculate the R_f for each band in each sample. The R_f (Retardation factor) is the distance traveled by the band in question divided by the distance traveled by the solvent. Record your results below.

Sample A:

Band #	Distance traveled by band (mm)	Distance traveled by solvent (mm)	$R_f = (\text{Dist. traveled by band} \div \text{Dist. traveled by solvent})$
1			
2			
3			
4			

Sample B:

Band #	Distance traveled by band (mm)	Distance traveled by solvent (mm)	$R_f = (\text{Dist. traveled by band} \div \text{Dist. traveled by solvent})$
1			
2			
3			
4			

Sample C:

Band #	Distance traveled by band (mm)	Distance traveled by solvent (mm)	$R_f = (\text{Dist. traveled by band} \div \text{Dist. traveled by solvent})$
1			
2			
3			
4			

Sample D:

Band #	Distance traveled by band (mm)	Distance traveled by solvent (mm)	$R_f = (\text{Dist. traveled by band} \div \text{Dist. traveled by solvent})$
1			
2			
3			
4			

Use the information from these tables to compare the patterns found on each strip. Do any of the patterns appear to match? Which ones? Explain your answer.

While color is usually not measured in paper chromatography because it cannot be quantified objectively, you should record observations regarding the color patterns observed in the samples. Do the colors of the bands with similar R_f 's from different samples appear to match? Which ones?

What can you conclude about the suspects in this case? Which suspect(s) can you exclude (if any)? Which suspect(s) can you link to the crime scene?

Prepare how you would present your lipstick chemical analysis evidence to a jury.

Part Two: Visual Analysis of the Lip Print

Like fingerprints, impressions left by other parts of the body have been used to establish identity. Palm prints are routinely used, and there has been at least one case in which an ear print proved to be a crucial piece of physical evidence in convicting a criminal. Lip prints also have potential as a form of physical evidence.

Complete the following steps to determine whether the partial lip print recovered from the crime scene matches any of the suspects in this case.

1.) Open the envelope labeled "lip print : evidence". Examine this print under a dissecting microscope.

2.) Open the three envelopes containing lip prints of each of the suspects on paper (marked "A", "B", and "C"). Examine each of these under the dissecting microscope. Do any appear to match the partial print from the crime scene? Why? How would you describe the similarities in the prints?

3.) Based on the lip print evidence, can you exclude any suspect(s)? Can you connect any suspect(s) to the crime scene?

Prepare how you would present the lip print evidence to a jury. You may wish to present this evidence in conjunction with the lipstick chemical analysis.