ACTIVITY 8 Who's Been Drinking?

Background

The original Breathalyzer was developed by Borkenstein and operates using a chemical method where a breath sample suspected of containing ethanol is bubbled through a glass ampoule containing acidified potassium dichromate. Any ethanol present is oxidized to acetic acid with a corresponding reduction in the dichromate concentration. The colour change is directly proportional to the concentration of ethanol present in the breath.

Instructions and Safety Notes

You have been given solutions prepared from 'breath' samples collected from two drivers, one of whom has been drinking and one who hasn't. It is your job to determine which driver was drinking by performing the following experiment:

1. Empty one sample into one petri dish and empty the second sample into the other petri dish. Don't worry, the vials are small enough so the dishes won't overflow! Write the sample numbers on the paper beside each dish.

2. Add (CAUTION – WEAR GLOVES) about 30 drops of the 0.1M potassium dichromate solution ($K_2Cr_2O_7$) which has been acidified with 2M sulphuric acid (H_2SO_4) to each petri dish (Figure 2) and gently swirl each dish to mix. Don't lift up the petri dishes, keep them flat on the paper.

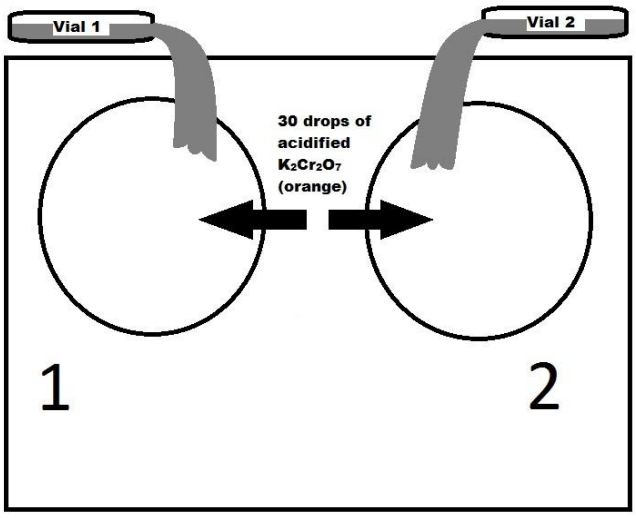

Figure 2: Testing for the presence of alcohol.

3. Record the initial colour of each solution in each petri dish in the following table. Make sure you know which sample corresponds to each petri dish!

4. Let the reaction take place and go on to the next investigation.

5. After at least 20min, record the final colour of each solution.

Observations

Sample #	Initial colour (t = 0 min)	Final colour (t = at least 15min)
1		
2		

Conclusion

Who’s been drinking?