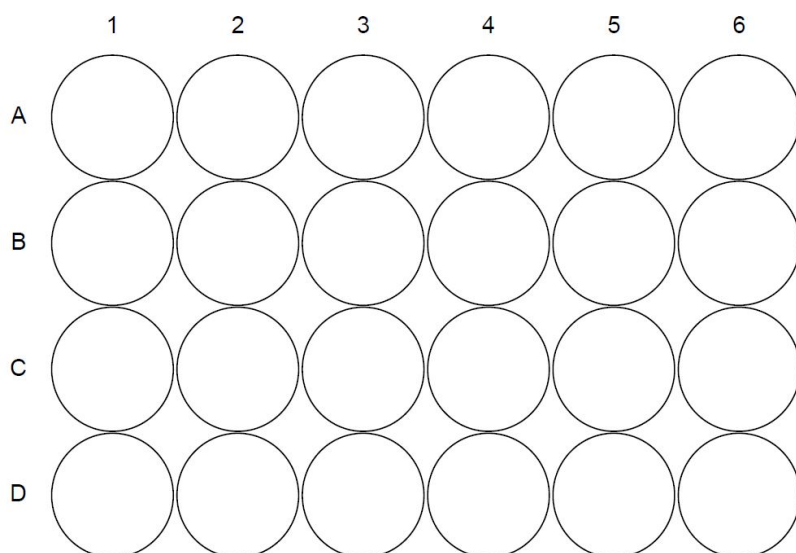


## Brady's test for aldehydes and ketones – student sheet

In this experiment you will be adding various liquid aldehydes and ketones to 2,4-dinitrophenylhydrazine to form solid derivatives. To show that the reaction does not occur with alcohols you will also do the test with methanol and ethanol.

### Instructions

1. In a well-plate, add 10 drops of 2,4-dinitrophenylhydrazine solution to each of the wells A1–A5 (see diagram).
2. Carefully add three drops of ethanal to well A1 (ethanal is very volatile!).
3. Repeat adding three drops of the other liquids to wells A2–A5.
4. Observe any changes over the next few minutes.



### Questions

1. Can you write equations for any reactions occurring?
2. Why do you think that these reactions serve such a useful purpose in identifying aldehydes and ketones?
3. Aldehydes and ketones will also form derivatives with hydrazine itself. What is the purpose of using 2,4-dinitrophenylhydrazine in this experiment instead of hydrazine?

### Health, safety and technical notes

- Wear eye protection throughout (splash-resistant goggles to BS EN166 3).

- 2,4-dinitrophenylhydrazine,  $(\text{NO}_2)_2 \text{C}_6 \text{H}_3 \text{NHNH}_2$  (s), is FLAMMABLE and HARMFUL if swallowed. It is also dangerous in contact with oxidising agents, and can potentially become explosive if allowed to dry out completely. Avoid skin contact.
- Sulfuric acid, concentrated  $\text{H}_2 \text{SO}_4$  (aq), is CORROSIVE and OXIDISING.
- Propanone is highly FLAMMABLE and IRRITANT to eyes and the respiratory system.
- p-Methoxybenzaldehyde is of low hazard.
- Methanol is highly FLAMMABLE, TOXIC by all routes and causes damage to organs (particularly CNS and optic nerve). Propanol could be used as a safer alternative to methanol. It is FLAMMABLE.
- Ethanal (acetaldehyde) is Highly FLAMMABLE, a carcinogen and an eye/respiratory IRRITANT. Protect face when opening containers and ensure laboratory is well-ventilated. Avoid contact with sulfuric acid – violent polymerisation occurs.