

Images in *Thorax*

Home nebulisers can affect the colour of domestic gas flames

A number of home nebuliser users in Salford have reported that they have consistently observed a yellow or orange colour in the flame of gas fires or gas cooking hobs if a nebuliser was used in the same room as the gas burning device. To investigate this phenomenon, we used a standard jet nebuliser to nebulise 2.5 ml of 0.9% saline close to a butane-propane gas flame. The flame turned from a pale blue colour to a bright orange-yellow colour within seconds of starting the nebuliser, even if the device was 2 metres or more away from the gas flame (fig 1). The flame remained coloured for at least 10 minutes after nebulisation was completed. Moving the gas device to a different room caused the flame to clear, but the orange colour returned if the

device was brought back into the room where a nebuliser had been used in the previous 10 minutes.

The orange colour is due to the emission of light of a characteristic wavelength during the combustion of sodium which is a constituent of saline. The nebuliser creates a fine mist of saline (sodium chloride) droplets in the room air. This principle is used in the scientific technique of flame photometry or flame atomic emission spectrometry. Flame photometry can detect very tiny traces of metal in a solution. Nebulisers are used to introduce liquids into the flames of spectrometers; this technique was central to the development of atomic physics in the 19th century. The first pneumatic nebuliser was invented by Guoy in 1877 for this purpose and nebulisers are still used for atomic emission spectrometry and on mass spectrometers.

Vaporisers and atomisers were used by doctors in the 19th century for the delivery of "antiseptic solutions" to the lungs. Jet nebulisers have been used widely in medicine since the mid 20th century, mostly for the delivery of bronchodilator agents to the airways. It is ironic that the reports of our patients have made us aware of a property of nebulisers that has been used by scientists in other disciplines for more than a century. Our patients were alarmed by the change in the colour of the gas flames and at least two of them had called out gas maintenance engineers to check the safety of their gas apparatus. One patient had bought a new gas heater because of this problem.

This phenomenon is quite dramatic and it seems sensible to warn patients that the colour of the flame on any gas burning devices is likely to change during and after nebuliser use in the vicinity of the flame, but this change in flame colour is totally harmless provided it only occurs during and immediately after nebuliser use. Abnormal flame colours at other times could indicate incomplete combustion with risk of carbon monoxide emission and should be reported urgently to the gas supplier. This experiment also confirms that trace amounts of nebulised agents can spread widely in an indoor space and linger in the air for several minutes. This confirms the importance of using proper exhaust systems for potentially sensitising nebulised drugs such as nebulised antibiotics.

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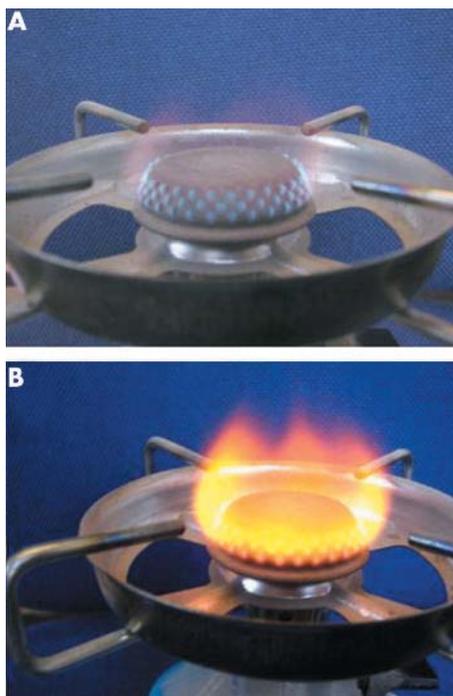


Figure 1 (A) Blue colour of a butane-propane gas flame before the nebuliser was started. (B) Yellow-orange colour that appeared while a nebuliser was running in the room close to the gas burner.