

INNOVATIVE HEAVY METAL WASTE DISPOSAL SYSTEM: MODULAR APPROACH FOR SENIOR SECONDARY CHEMISTRY TEACHERS

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Handling and disposal of waste generated during laboratory experiments is prime concern to school education. Most of the waste chemicals generated from laboratories are hazardous so their disposal waste must be given special consideration. This innovative disposal system guides for proper waste management and also helps in minimising the risk of exposure to maintain a safe school environment. The several experiments at school laboratory waste contain heavy metal ions. After completion of experiment the segregation and safely disposal of waste containing heavy metal ions is the main challenge. The readily available glassware was utilized to have easy, fast, cost effective and safe laboratory practice for heavy metal disposal.

Key word: Lab practices, waste disposable, lab safety

Introduction

Handling and disposal of waste generated during laboratory experiments is prime concern to school education (Barakat, 2011). Most of the waste chemicals generated from laboratories are hazardous so their disposal must be given special consideration (Akpore, et al., 2010). In several school laboratory experiments, the generated waste contains heavy metals in solid form. This waste mixture has immiscible components having difference in gravity. It is in common practice that waste is generally disposed through sink (Sonali,

et al., 2013). This waste not only causes choking of sink but also causes environmental pollution.

An effort can be made to overcome such a problem by the use of this innovative waste disposal system (Figs. 1a and 1b). This system is developed with the basic principle of science, i.e., gravity. When there is a difference in the gravity of the component of mixture, heavier component settles down at the bottom and lighter component comes to the top. In this system the readily available glassware was utilised to have an easy, fast and cost effective laboratory

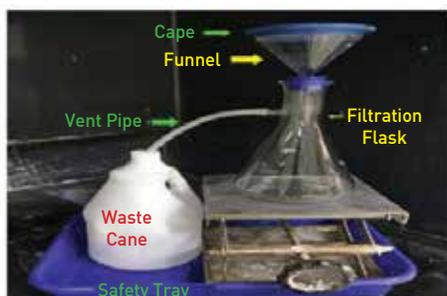


Fig. 1a. Innovative waste disposal system before use



Fig. 1b. Innovative waste disposal system after use

practice for waste disposal. This innovative disposal system guides for proper waste management and also helps in minimising the risk of exposure to maintain a safe school environment.

Methods and Procedure

A funnel is fitted in filtration flask and the vent of the flask is connected to waste can via vent tube. This setup is kept in a way that top liquid can flow via vent tube to waste can. A safety tray arrangement is also made so that in case of any overflow, waste will not spread. Waste mixture generated after laboratory experiments is slowly transferred through funnel followed by fresh water to the filtration flask and then funnel is covered by

cap to avoid escape of fumes or smell. After some time, a heavy part of the waste mixture settles down at the bottom and the lighter part comes to the top and goes to the waste can through the vent pipe. In this way solid-liquid or liquid-liquid waste get separated. This waste can now be disposed off as per their nature.

Set up Requirements: Filtration flask, funnel and its cover, stop cock, waste can, tray

Use: This idea may be implemented for handling and disposal of the following type of laboratory waste:

1. Immiscible solid-liquid mixture
2. Immiscible liquid-liquid mixture



Fig. 1c. Immisible solid-liquid mixture



Immisible liquid-liquid mixture

Results and Discussion

To keep the school laboratory's environment safe and clean, laboratory waste generated after various experiments should be handled and disposed off safely, easily and in a cost-effective manner. This innovative disposal system guides for proper waste management and also helps in minimising

the risk of exposure to maintain a safe school environment. Students will be able to know the use of the concept of gravity and immiscibility and they may also utilise this idea for separating immiscible mixtures without the use of the separating funnel. This system may also be used for miscible metal solutions but for this we have to add some amount of basic solution so that metal precipitates in solid form.

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