CalliColander

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The conventional tissue culture technique for mass propagation of plants uses solid culture medium, solidified by gelling agents. This not only increases the production cost of the micropropagated plants, but also has some weak points that limit the proliferation rate. The major disadvantage is that the basal part of the microshoots has limited absorbance of the nutrient medium. Suspension or liquid culture system was developed to address inefficiency in the solid system (Tarmizi *et al*., 2016) and it has been well established for oil palm production (De Touchet *et al*., 1991; Teixeira *et al*., 1995). The liquid medium offers close contact of the tissue with the medium to stimulate and facilitate the uptake of nutrients, phytohormones and vitamins for better culture growth. In general, tissue culture involves subculturing or passaging of callus or cell aggregates from old media to fresh growth media. This process is required because the cell aggregates cannot be held in culture indefinitely as growth leads to gradual rise in toxic metabolites, loss of nutrients and increase in cell number. Subculture is therefore important in producing a new culture with a lower density of cells than the originating culture, fresh nutrients and non-toxic metabolites, allowing continued growth of the cells without the risk of cell death (George *et al*., 2008). During subculture, cell aggregates will be separated based on their size, type or/and stage prior to transferring them into an appropriate fresh media. This project describes our effort to facilitate the subcultring process and to increase its efficiency by fashioning a sieving apparatus named *CalliColander*. The invention is practical, inexpensive and able to avoid losses of precious sample materials.

PROBLEM/CHALLENGES

In a single day of subculturing routine, each operator needs to use more than 20 (single size) or 40 individual pieces of strainers (two sizes) to avoid contamination during the process. To separate cell aggregates of different sizes, operators need to stack strainers with different pore sizes together to accelerate the process. However, commercial strainers that can be stacked stably and firmly are expensive and usually cost more than RM 500 per piece.

OBJECTIVE

To fashion autoclavable and economical strainers from used baby jar lids and wire mashes of desired pore sizes as well as a holder with multiple arms to keep the strainers in place during sieving process.

BENEFITS AND ADVANTAGES

- Cheaper alternative to commercial stackable strainers.
- Improve cell sieving and prevent sample loss through the sieving process.
- Colour-coded strainers for different pore sizes.
- Increase the efficiency of subculturing process.

THE PRODUCT

CalliColander consists of two components, namely the economical strainers/colanders with wire mesh of various pore sizes and a smart holder to firmly secure the strainers in place during the sieving process. The strainers are made of autoclavable plastic caps/lids of approximately 65 mm in diameter and 18 mm in height. Each cap is hollowed in the middle with spared edges of approximately 5 mm. A round shape wire mash of desired pore size is fitted to the edges. Two sizes of strainers, 1 mm and 300 μM, are commonly used in MPOB for the subculturing process. For easy identification, the 1 mm and 300 μM strainers are colour-coded in red and blue, respectively (*Figure 1*). The use of the economical strainers alone is not stable and risks of losing samples if they fell off. To securely hold

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the strainers in place during the process, a holder is used. The holder is made of 100% stainless steel for durability. The design of the holder features L-shape backbone, attached with multiple arms. The dimension of the L-shape backbone is 200 mm in height and 70 mm in width. The diameter of an arm is 65 mm and can be slightly stretchable if required (*Figure 2*). *Figure 3* illustrates *CalliColander* in use to differentiate cell aggregates. The product has been submitted for patent application under the name of CalliColander. The aforementioned features of the product are optimal for oil tissue culture protocol, however any possible variations in its features or industrial use derived from the product are also protected under the applied Intellectual Property.

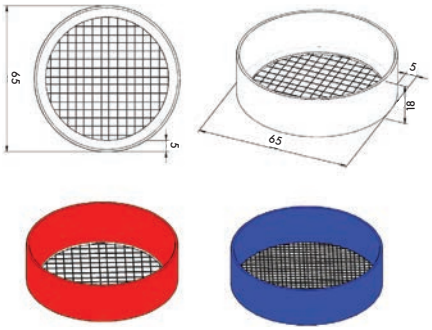

Figure 1. A schematic diagram representation of an economical strainer. The red strainer represents 1 mm pore size and the blue strainer represents 300 μM pore size.

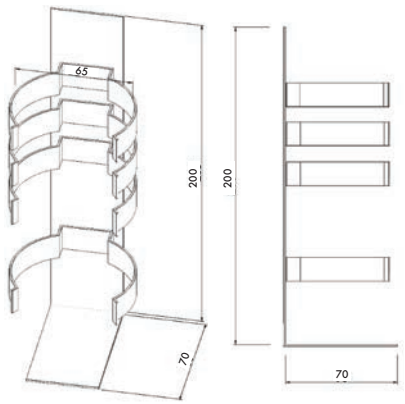

Figure 2. A schematic diagram representation for a smart holder.

NOVELTY OF THE PRODUCT

A practical and economical sieving apparatus for tissue culture procedure.

POTENTIAL USERS

- Research and commercial tissue culture laboratories for crop/plant or animal species.
- The invention is also applicable to the field of microbiology.

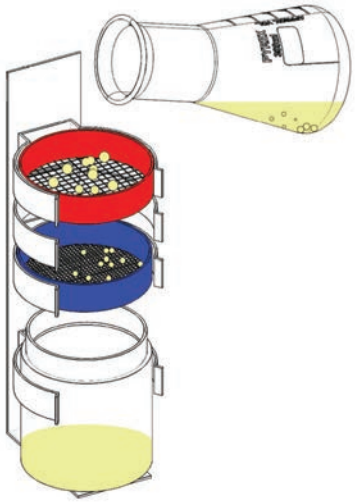

Figure 3. CalliColander *in use as a sieving apparatus.*

To differentiate cell/callus aggregates, the 1 mm strainer (red) is placed on the top, followed by the 300 μM strainer (blue). A collection jar is placed at the bottom arm to collect spent media.

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