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Short Communication

Use of Tyvek Sheet as Microbial Filter Patch for Preparing Grain Spawn of Button Mushroom

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Tyvek is a nonwoven HDPE synthetic fiber and the name is a registered trademark of the DuPont Company (DuPont 2021). Because of its unique properties like lightweight, durable and breathable, yet resistant to water, abrasion, bacterial penetration and aging, it has many uses in daily Life. For example, most of the times important documents are shipped by courier company in a Tyvek envelope. Tyvek coveralls are one-piece garments, usually white, commonly worn by mechanics, oil industry workers, painters, and laboratory and clean-room workers.

It is difficult to tear but can easily cut with scissor or knife. Fibers in Tyvek fabric are 0.5- 10 µm (compared to 75 µm for a human hair) which allows only water vapour/gases to pass through, but liquid water cannot pass through it. Its fibers, bonded by heat and pressure, lead to this unique structure that gives Tyvek greater resistance to microbial penetration. It has neutral PH and is dimension stable and autoclave safe. These properties make Tyvek to be a suitable choice as microbial filter patch for spawn production.

The number-one priority in selecting microbial barrier materials for grain spawn bottle/bag is the ability of the material to maintain sterility from the point of sterilization until the product is opened for use. Filter patch of grain spawn bottle or bag must not only protect the contents from punctures and other damage, they must provide an effective microbial barrier. Microbial barrier is the measure of the ability of a porous substrate to prevent bacterial spore penetration. One standard test method, ASTM F1608, measures the "filtration" efficiency of a substrate to remove spores from an aerosol being forced through the substrate in an air stream. Tyvek® 1073B has a Log Reduction Value (LRV) of 5.2 and is the best porous substrate available for microbial barrier (details in DuPont TRG 2021).

In our experiments we have used this filter in the cap of glass bottles. The advantage of glass bottles is that these can be used again and again, do not pollute environment like polypropylene (PP) bags, are autoclave safe and the most important one is that the temperature inside glass bottle is more stable as compared to PP bag because of insulation property of glass. The disadvantage is that the glass bottle is fragile and needs to be handled with care and shaking of grain spawn is little bit difficult. However, for making mother spawn glass bottles are the best choice.

To use Tyvek as microbial filter during spawn production, about 600 g of boiled wheat grains are filled in 1000 ml glass bottles, that leaves ample space for shaking. About 100 x 100 mm Tyvek sheet is put below punctured crown cap and cap is closed tightly by hand (Fig. 1 a-d). Grain filled bottles are then autoclaved. For Inoculation, cap is opened only in laminar flow. Once inoculation has been done, the bottles are shifted to incubation rooms where air temperature of 23° C is maintained. The bottles are

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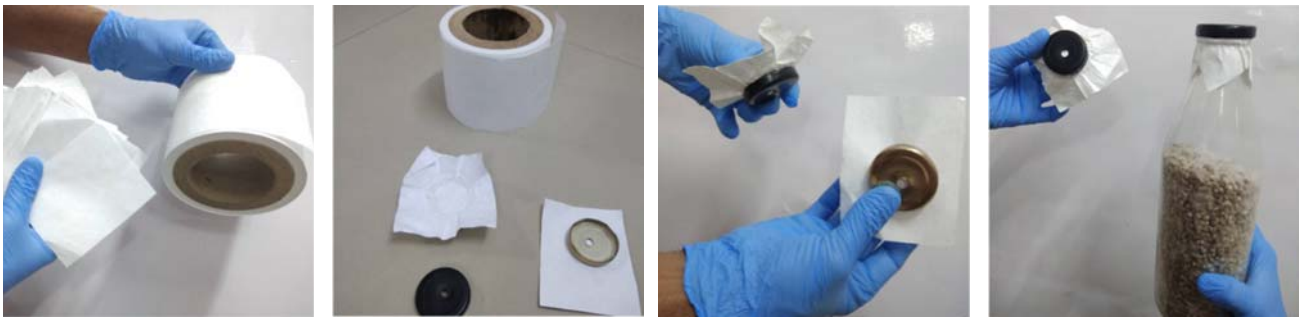

Fig. 1. (a) Tyvek roll (b) 100 x 100 cm piece (c) Piece inside lid (d) Lid on spawn bottle

shaken twice or thrice as per requirement after desired time and duration.

We have been using Tyvek filter since last 5 years for preparation of mother spawn and consistently getting better result as compared to those by using non absorbent cotton or polyfill which we had used earlier (Naveen & Amit, 2014). Our rejection level using Tyvek filter is very low (around 1%). It is more convenient to use and economical also. Glass bottles, cap and Tyvek filter patch could be re-used again and again. As already mentioned, glass bottles are more environment friendly than PP bags and most importantly, the temperature inside glass bottle is more stable than PP bags because of insulation property of glass.

Cost Analysis: The glass bottle of size 1000 ml costs around Rs. 16 to 18 and the 43 mm crown/cap used to close bottle costs around Rs. 1.40- to 1.50 depending on the quantity purchased. Tyvek® costs Rs. 80 to 90 per sq. m depending on the grade. So one filter patch of size 100x100 mm costs between Rs 0.8 to Rs 1.0. These caps and Tyvek filter can also be repeatedly used several times, which further reduces the cost drastically. Tyvek® of medical grade 1059B (65 GSM) or 1073B (75 gsm) is suitable for filter patch in spawn bottle.

REFERENCES

1. Naveen-Patwal and Amit-Sharma. 2014. Polyfill plugs for mushroom spawn production. *Mushroom Research* **23(1):** 125-126

2. DuPont 2021. What is Tyvek®. https://www.dupont.com

3. DuPont TRG. 2021. DuPont Technical Reference Guide for Medical and Pharmaceutical Packaging. https://www.jolybar.co.il/wp-content/uploads/2017/08/DuPont-Guide.pdf p8.