

Potato dextrose agar (PDA) has been used traditionally as a general purpose medium for yeasts and fungi detection and enumeration. Generally, it is used for plate count methods for foods, dairy and cosmetic products.

Palm kernel expeller (PKE) is an agro commodity by-product that is produced throughout the year in Malaysia amounting to an average of 2.3 million tonnes. PKE contains 16.8% protein, 8.0% glucose, 1.8% xylose, 1.4% arabinose, 2.3% galactose, 41.7% mannose, 10.2% klason lignin and 4.4% ash (sugar in anhydrous form) and 5%-10% residual oil (Jørgensen *et al.*, 2010).

The use of legumes as protein sources for microbial culture is limited. It is a challenge to produce a comparable standard culture media (Uzeh *et al.*, 2006). Palm protein dextrose agar (PPDA) is a potential medium for yeasts and fungi enumeration and alternative to PDA. It contains comparable nutrient value as that of commercial PDA (Table 1).

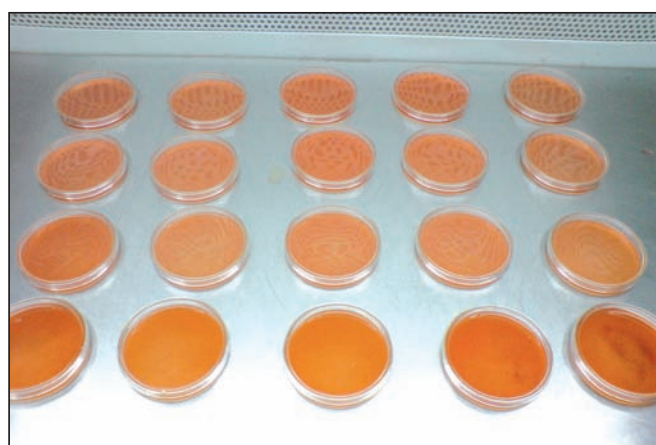


Figure 1. PPDA on microbial plates.

TABLE 1. PROXIMATE ANALYSIS OF PPDA

Proximate analysis (%)	PPDA
Moisture	5.71
Crude fibre	0.19
Crude protein	4.31
Fat	1.38
Ash	2.91

THE PRODUCT

Performances of selected fungi on PPDA is shown in Table 2. All fungi tested showed positive growth in the PPDA medium. No other inorganic supplement is needed to enhance fungus sporulation.

ECONOMIC EVALUATION

The estimated fixed cost for a plant producing 50 000 packets per year of PPDA is RM 3.22 million. The payback period is three years with an internal rate of return (IRR) of 132%. The net present value (NPV) at 10% discount rate is RM 13 446 388, with a B:C ratio of 4.15. The investment is financially feasible.

BENEFITS

- An alternative medium for yeasts and fungi detection and enumeration.
- Able to support growth performance of yeast and fungi.
- Easy procedure technique.
- Non-toxic, safe to use.

TABLE 2. RESPONSE OF SELECTED FUNGI ON PPDA

Microorganism	Approx. inoculum (CFU)	Response
<i>Aspergillus oryzae</i> ATCC® 10124	Point inoculation	Growth
<i>Candida albicans</i> ATCC® 10231	10 - 100	Growth
<i>Rhizopus oryzae</i> EPKi	Point inoculation	Growth
<i>Aspergillus niger</i>	Point inoculation	Growth
<i>Ganoderma</i> sp.	Point inoculation	Growth

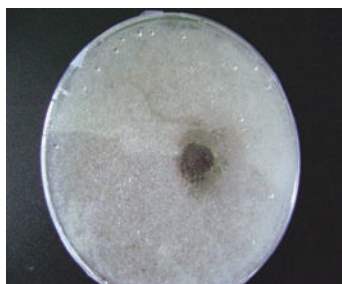


Figure 2. *Rhizopus oryzae* EPKi on PPDA.

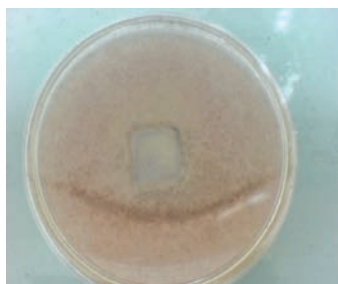


Figure 3. *Rhizopus* sp. on PPDA.



Figure 4. *Ganoderma* sp. on PPDA.

CONCLUSION

PPDA has the potential to be an alternative growth medium for detection and enumeration of fungi and yeasts in general microbiological tests.

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