World Journal of Environmental Research

Volume 05, Issue 1, (2015) 118-121

www.awer-center/wjer/

Comparison of corncob and corn using as fungal culture medium

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Suggested Citation:
Chutrtong, J. (2015). Comparison of corncob and corn using as fungal culture medium. *World Journal of Environmental Research. 5*(1), 118-121.

Received February 08, 2015; revised March 23, 2015; accepted April 05, 2015
Selection and peer review under responsibility of Dr. Nehir Varol, Near East University, Cyprus.

Abstract

Corn or maize is the most widely grown grain crop. It is very practical. It is used as staple food, major source of cooking oil and grown to feed for livestock. Starch from maize can be made into syrups plastics, fabrics, adhesives, and many other chemical products and also fermented and distilled to produce alcohol. This research aims to compare pigment synthetic of Neurospora sp., widely used as a model organism in genetics research, when use corn, dry corncob and potato dextrose agar as culture medium. After fully grow up, extracted mycelium pigment with 95% ethyl alcohol. Then measure the absorbance of the pigment by spectrophotometer at wavelength 450.5 nanometer. The results showed that the best growth of Neurospora cultured on dry corncob was sample which added water (for moisture) 90 % w/w. While the best growth of Neurospora cultured on corn was sample which added water only 15 % w/w. When compare the intensity of mycelium pigment, it was found that corncob is the best medium for pigment synthetic of Neurospora. Absorbance of pigment extract from mycelium culture on corncob was 0.64(diluted 5X). As the absorbance of pigment extract from mycelium culture on corn and PDA were only 0.34(diluted 5X) and 0.35(diluted 2X).

Keywords: corn, corncob, fungal, medium.

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1. Introduction

Agricultural products produce many types of wastes in its daily operations. It is important that these wastes must be managed properly to protect community as well as the environment. Corn or maize is one of the most widely grown grain crop. It is very practical. It is used as staple food, major source of cooking oil and grown to feed for livestock. Starch from maize can be made into syrups plastics, fabrics, adhesives, and many other chemical products and also fermented and distilled to produce alcohol. So each year there is a lot of waste from corn, corncob. Useful of corncob has been studied by many researcher such as implemented to eliminate industrial pollution (Chandran, Nigam, & Robinson, 2002), produce xylooligosaccharide (Garrote, Dom & Parajó, 2002), produce activated carbons (Tseng & Tseng, 2005) and produce bio-oil (Worasuwannarak, Sonobe & Tanthapanichakoon, 2007) etc.. The results can produce value-added products from farm waste and transferring that knowledge to industry. Therefore, this research conducted to evaluate the useful of corncob by using as fungal culture medium for Neurospora sp., widely used organism as a model in genetics research.

2. Method

2.1. Prepared of corncob

The experiment used sweet corn (*Zea mays* convar. *saccharata* var. *rugosa*). Pull back the outer leaves of cob to expose the kernels. Strip off any of the silky threads. Cut off the ends of the cob, then wash. Place cob in unsalted boiling water. Covered the pan and return it to a boil. Cook corn for 3-5 minutes or until tender. Get all **kernels off** a **corn** on cob. Keep **kernels in refrigerator. Cob was broken into chips and dried at 60 ^{o} C in hot air oven 48 hours.**

Fig. 1 (a) **kernels of corn**

(b) **dried corncob**

2.2. Strain and media

The fungi *Neurospor*a sp. was obtained from industrial microbiology department, Suansunandha Rajabhat University. It was performed using potato dextrose agar (PDA).

2.3. Effect of moisture

The experiments were established using 500 ml laboratory glass bottle (Duran) containing prepared corncob with sterile water (w/w) at various ratios (35: 65, 40:60, 45:55, 50:50, 55:45, 60:40, 65:35,

70:30, 75:25, 80:20, 85:15, 90:10 and 95:5). Other set of bottle contained **corn kernels** with sterile water (w/w) at various ratios too. Inoculated *Neurospor*a sp. in those prepared bottle (triplicate). Observe growth rate of fungi.

2.4. Pigment synthetic

After fully grow up, mycelium from *Neurospor*a sp. on PDA, oven-dried chips corncob and **corn kernels** 2 gram was extracted pigment with 95% ethyl alcohol 10 ml. (Stamets, 2005). Measured pigment absorbance by spectrophotometer at wavelength 450.5 nanometer.

3. Result and discussion

3.1. effect of moisture on Neurospora sp. growth

After fully grow up, mycelium pigment was extracted with 95% ethyl alcohol from *Neurospor*a sp. on PDA, oven-dried chips corncob and **corn kernels**. Measured pigment absorbance by spectrophotometer at wavelength 450.5 nanometer.

Fig. 2 (a) *Neurospor*a sp culture on **kernels** (b) *Neurospor*a sp culture on dried corncob

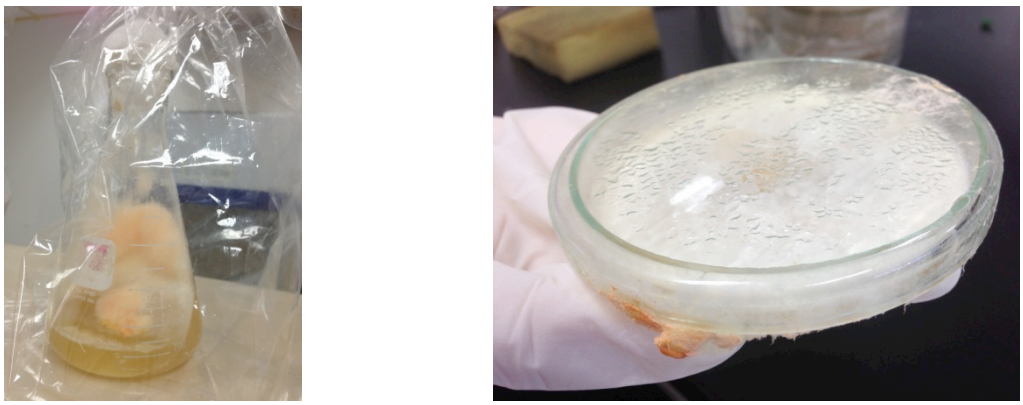


Fig. 3 (a) *Neurospor*a sp culture on PDA (b) *Neurospor*a sp colony on PDA plate

3.2. Pigment synthetic of Neurospora sp.

When compare the intensity of mycelium pigment, it was found that corncob is the best medium for pigment synthetic of *Neurospor*a. Absorbance of pigment extract from mycelium culture on corncob (which diluted 5X) was 0.64 at ratio of moisture 90% (w/w). The absorbance of mycelium pigment which extract from culture on **kernels** of corn at ratio of moisture 15% (diluted 5X) was only 0.34. While absorbance of mycelium pigment from culture on PDA (which diluted 2X) was 0.35.

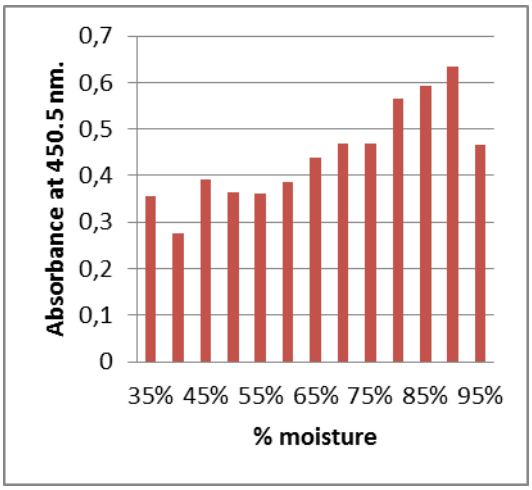
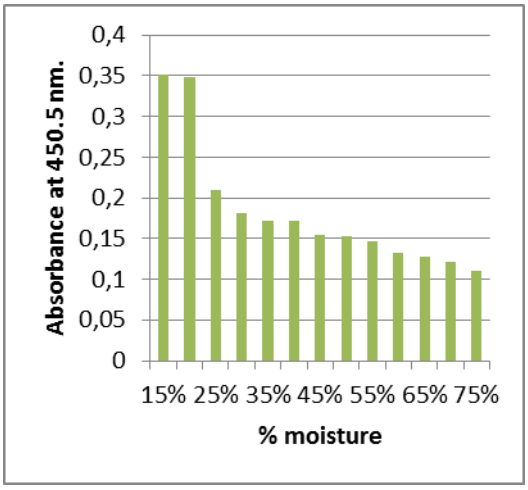


Fig. 4 (a) absorbance of *Neurospor*a pigment culture on dried corncob



(b) absorbance of *Neurospor*a pigment culture on **kernels**

Benefits of corn to use as solid medium for culture fungus are available in *Neurospora*. It is unnecessary to add anymore nutrients. Mold can grow well and can produce more color than culture with corn and PDA, which is more expensive. So if more researches have been applied, corncob may be a value added material. It will be increase in value, without having to allow it to be waste which creates pollution problems to the environment.

Acknowledgements

The author would like to thank the Suan Sunandha Rajabhat University, Thailand, for providing fund, necessary equipment and laboratory area.

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