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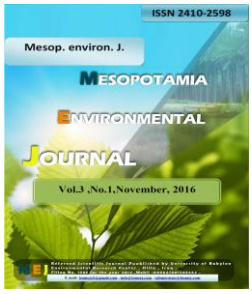

Bio declorization of Some Industerial dyes by use *Pencillium expansum* and *Aspergillus niger*

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Abstract

This research is interested in using the two species of fungi such as *Penicilliumexpansm* and *Aspergillusniger* for Biodegradation of Safranin dye as industrial and Carcinogenic dyes,The results showed that *P.expansum* was the more efficient from *Asp. niger* in Biodegradation of the Safranin dye. The percentage of Bio decolonization about 41.035% during incubation at 120 hours, while when use *Asp. niger*the percentage of Bio decolonization was about 38.952% during same time of incubation.

Keywords; fungi, Safranin; biodecolorization,pollution.

Introduction

Safranines are the azonium compounds of symmetrical 2,8-dimethyl-3,7-diamino-phenazine. They are obtained by the joint oxidation of one molecule of a para-diamine with two molecules of a primary amine; by the condensation of para-aminoazo compounds with primary amines, and by the action of para-nitrosodialkylanilines with secondary bases such as diphenylmetaphenylenediamine[1].

Biosurfactants are structurally and functionally diverseamphiphilic, surface active compounds which lower the surface andinterfacial tension between individual molecules at respective surfaces and interfaces. Thus, these are very important in the living systems and can be regarded as the backbone of the biological membranes which promise the transport and exchange of the various importantmaterials [2,3]. Biosurfactants are ecologically safe and can be appliedin bioremediation processes. The microorganisms which producebiosurfactants can also be used in the various bioremediationtechnologies like solubilisation and removal of oil from contaminated soil, sludge in oil storage tank etc [4].

Synthetic dyes are coloring agents mainly used in textile industries which generate a huge amount of waste water in the process of dying. It is estimate that these industries discharge around 28,000 tons of dyes worldwide every year in the environment [5].and variety of bacteria and few fungi are reported to producebiosurfactants using renewable sources [6,7].

In recent years, many fungi used in many of the studiesand intensively on removing dyes from wastewater [6]. From the textile industry can get a large amount of liquid waste that can cause serious environmental problems. It is estimated that the liberation of 10-15% of dyes in water treatment [7] is responsible for the color dyes that affect the photosynthetic activity of aquatic life by reducing the intensity of light propagation may also be toxic to some aquatic animals and plants due to the presence of aromatic substances, and metals, chlorides [8].

There are many factors that affect the ability and speed of fungus toxin analysis. The first is the physical properties or formalism of hydrocarbons. In general, the contaminants statistics molecular structure is broken and easier analysis of contaminants with complex structure. Second factor, which affects the speed of cracking pollutants, is the temperature. The degree low temperature leads to slow the process of analyzing contaminants while the high temperature to some extent speed up the process. Fungi prefer acidic environment on a neutral environment. And oxygen is an important element in the fungal metabolism processes. As the first step in the analysis of hydrocarbons is to add oxygen to it, and thus the lack of oxygen in the environment leads to the slow process of analysis [9].

It is clear that micro-communities in the environment works hand in hand with fungi to analyze and break down pollutants, and converted into carbon dioxide and water. The fungus that decomposition of the wood of the most effective types of aromatic pollutants in the analysis of (toxic components of oil), as well as some of the materials and compounds ,In addition to some of the materials and compounds added to it elemental chlorine (such as some types of pesticides that are difficult to get rid of them) [10].

If it is not controlled in the biological treatment process, it is possible not to break down organic pollutants occur fully, leading to obtain products more toxic and that can have a greater ability to move from primary pollutants[11].

In This research examination of the fungi toward biodegradation of as industrial and Carcinogenic dyes such as Safranindye by used the two species of fungi were *P.expansum*and *Asp.niger*.

Materials and Methods

Preparation thefungal inoculums

When isolate *P.expansm*from *P.expansm* isolate from fruits and vegetables,and*Asp.niger* was isolated from air,and after this incubated fungal isolates incubator for seven days at a temperature of 25° C and after the incubation period of fungal isolates were purified on the PDA media and incubated for seven days at a temperature of 25 ° C.
After incubation, the fungal inoculum was attended the audacity to take disk of a fungal culture seven days old by using a cork borer diameter of 5 mm and add 10 ml of sterile distilled water to the fungal disk [12].

Preparation Dye Solution

The Safranin (Chemical formula=C20H19ClN4, Formula weight=350.85 g•mol^{-1}) supplied by BHD Chemicals (Figure 1,2). The solution of Safraninwere prepared by dissolving appropriate amounts (accurate weighed) of dry powdered dye in double distilled water to prepare Stock solution (1000 mg L^{1}). The experimental solution was obtained by dilutions were made to obtain the working solution at desired concentrations [13].

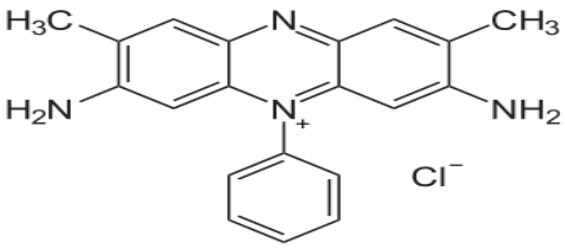

Fig. 1: The chemical structure of Safranindye

Fig. 2: Safranin in aqueous solution

Experimental

Effect of speciesfungion fungi species on the Dye

Add Thefungal inoculum Previously the record to 100ml of Safraninsolution was measured and added to the content in each conical flask. The content was shaken rigorously and continuously for 30,60,90,120,150, 180, 210, 240, 270, and 300 min(delete) respectively what?. The particles of the adsorbent was separation by centrifuged from solution to obtain the equilibrium concentration.

The final concentration of Safranin read was estimated for each sample spectrophotometrically at the wavelength corresponding to maximum absorbance for Safranin (λmax=530nm) using a spectrophotometer (UV/VIS-Jenway ,6800, German) as in the Figure 1. A graph of removal Safranin read percentage (g/L) versus time (hour) was plotted for Safranin. Generally the amount of dye removal was calculated from following equation:

Biodecolorization% = $(A° - A) / A° \times 100$

A^o and A is the absorbance of concentration of dye before and after Biodecolorization respectively[13, 14].

Results and Discussion

The results of this study show that more efficient use of *P.expansum*in BiodecolorizationSafranindye from the use of *Asp. niger*, The results showed that the amount of absorbance decreases with time treatment, so that the concentration of dye is decrease. When used *P.expansum*the absorption of Safranin during 120 hours of treatment become 0.2892 compared with control while the absorption when used *Asp. niger* at 120 hours about 0.5543 (figure 3). And then change in the color of the dye from red to colorless gradually has been observed when using*P.expansum*and*Asp.niger*. It was rated assessment of the deterioration and decolourization as the disappearance of the color of the plate Petri, through the development of fungal mycelium. Safranin dye has utilized to give the positive result and biodegradablefungus was showed. The color of this dye has turned to pale, finally the current yellow zone around the mycelium. The researchers results showed a small part of the some dyes have also accumulated used mushrooms fungi(all mushrooms word converted into fungi or fungus in all research), mycelium have turned to red[15].

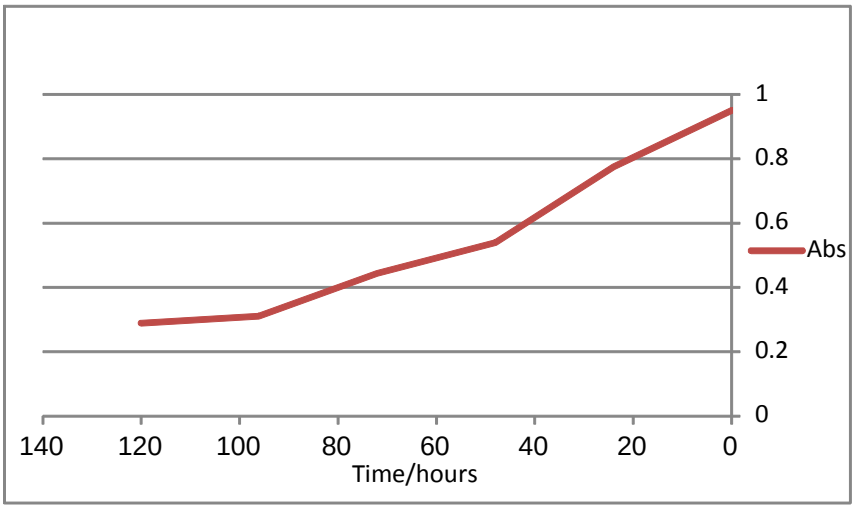

Fig.3: The absorption of Safranin byused *P.expansum*.

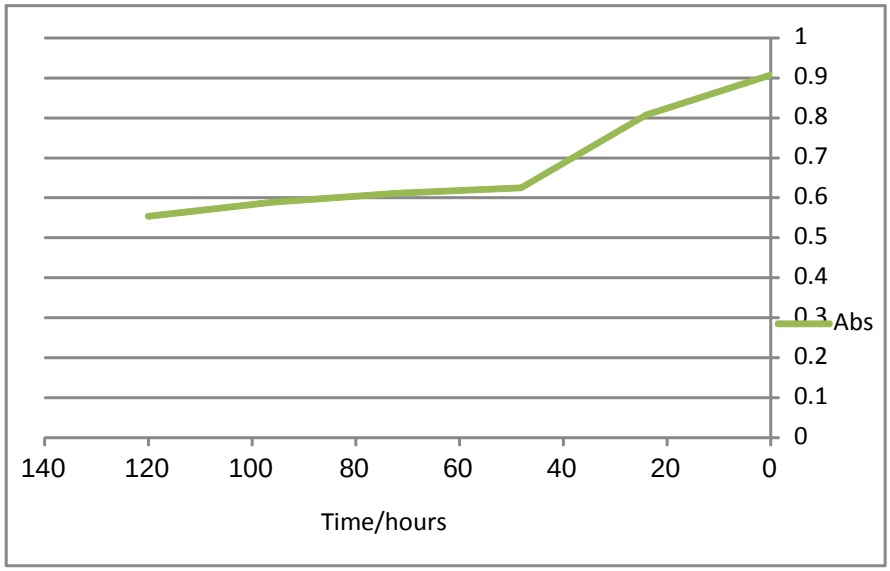

Fig.4: The absorption of Safranin by used *Asp. niger*

After using *P.expansum*was removal percentage of dye Safranindye about37.135% at120 hours from treatment compared with removal of dye on the first day of treatment using the same fungus it's about20.708%(Figure 5, Table 1), In recent years, fungi and bacteria used as an application or technique to remove or absorbing dyes that form risk on a health [16,17,18] ,While Biodegradation percentage of Congo red dye by using *Asp.niger* at 120 hours about 38.952%compared with exposing the dye to the same fungus during the first 24 hours of treatment it's about 17.035%(figure 6,Table 1). Others Fungal such as *Phlebiatremellus, Phanerochaetechrysosporium, Tranmetesversicolor, Fusariumoxysporum, Aspergillusflavus and Trichodermaviride* are also able to removes the dyes, and most research have been limited to the decolourization of a one dye or even to mixtures of dyes. Nevertheless, a biodecolourization system must sustain its ability upon exposure to real wastewater conditions[19].This study is consistent with another study, explained the role of fungi in the removal of carcinogenic chemical dyes[20].

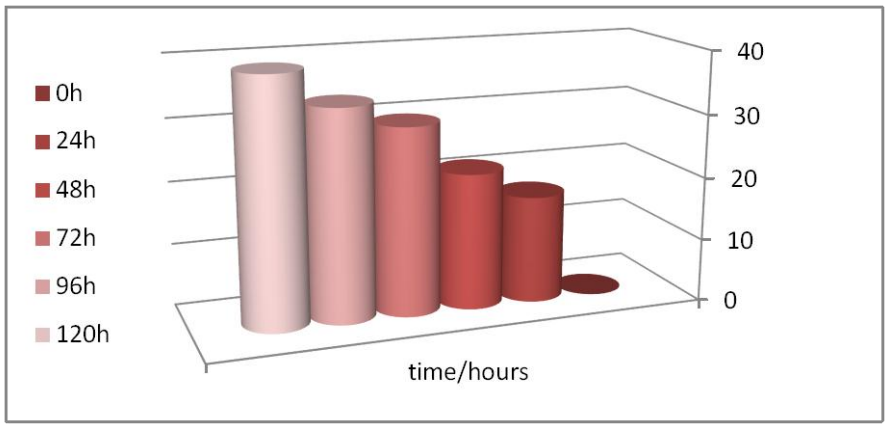

Fig.5: percentage of bio decolonization toSafranin dye treated by*Penicilliumexpansum.*

Table 1: percentage of bio decolonization to Safranin dye treated by *Penicilliumexpansum*,*Aspergillusniger***.**

Time/hours	percentage of Biodecolorization by fungi	
	Penicilliumexpansum	*Aspergillusniger*
24 h	20.708	17.035
48 h	25.831	21.630
72 h	32.678	29.802
96h	37.135	33.416
120h	41.035	38.952

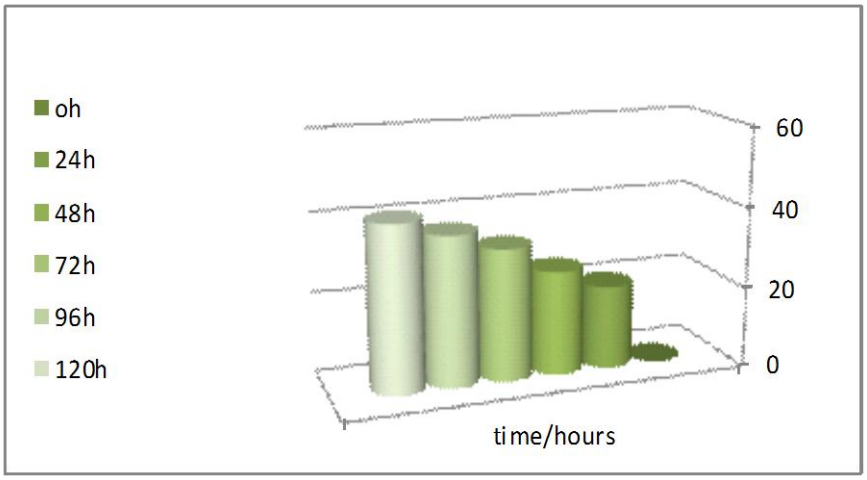

Fig.6: percentage of bio decolonization toSafranin dye treated by*Aspergillusniger*

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