Abstract

Plants are a source of herbal remedies. Various medicinal plants have been used for years in daily life to treat diseases all over the world. Endophytes are ecological group of fungi also a major potential source for various natural products that shows a unique structure and bioactivity. The bioactive metabolites such as alkaloids, benzopyranones, benzoquinones, flavonoids, phenols, steroids, terpenoids and others are well known to show biological activities. In the present study, total content of phenol are estimated from some Endophytic fungi provided by department of Biotechnology. Phenolic content was obtained from all the fungi, in which Aspergillus flavus showed the highest amount of phenol content and penicillium sp. Showed lower amount of phenol content from other fungi.

1. Introduction

Endophytes are ecological group of fungi that colonize living, internal tissue of plants without any discernible features of their presence (Gehlot and Soytong et al, 2008; Hyde et al, 2008) [1,2]. They are ubiquitous, share symbiotic relationships with their hosts ( Tejesvi et al, 2005) [3]and are found in all plant species examined to date (Naik et al, 2008; Stone et al, 2000) [4,5]. In mutualistic or symbiotic associations, infected plants benefit by exhibiting increased resistance to herbivore grazing through the production of various alkaloids (Naik et al, 2008; Owen and
Hundley, 2004) [4,6] improved growth and competitive ability by increasing the mineral uptake potential, plant phenotypic traits, temperature and drought tolerance, leaf chemistry, tolerance to heavy metals in soils, propensity for vegetative reproduction (Naik et al, 2008; Malinowski et al, 2002; Redman et al, 2002; Suryanarayanan et al, 2009) [4,7,8] and defence against microbial pathogens ((Tejesvi et al, 2005; Naik et al, 2008; Rubini et al, 2005; Arnold et al, 2003) [3,4,9].

2. Introduction of Phenol
Phenol also known as carbolic acid is an aromatic organic compound with the molecular formula C6H5OH. It is a white crystalline solid that is volatile. The molecule consists of a phenyl group (-C6H5) bonded to a hydroxyl group (-OH). It is mildly acidic, but requires careful handling due to its propensity to cause burns.

Phenol was first extracted from coal tar, but today is produced on a large scale (about 7 billion kg/year) from petroleum. It is an important industrial commodity as a precursor to many materials and useful compounds (Weber, Manfred; Weber, Markus; Kleine-Boymann, Michael 2004) [10] its major uses involve its conversions to plastics or related materials. Phenol and its chemical derivatives are key for building polycarbonates, epoxies, Bakelite, nylon, detergents, herbicides such as phenoxy herbicides and numerous pharmaceutical drugs.

3. Uses of phenol
Phenol is also a versatile precursor to a large collection of drugs, most notably aspirin but also many herbicides and pharmaceutical drugs. Phenol is also used as an oral anaesthetic/analgesic in products such as chloraseptic or other brand name and generic equivalents, commonly used to temporarily treat pharyngitis..

4. Materials and methods
Isolation of endophytic fungi: Pure cultures of the endophytic fungi used for phenol estimation study were obtained from the Dept. of Biotechnology, Pravara Institute of Medical Sciences (PIMS), Loni.

5. Determination of phenolic content
Filtrates of isolated fungi were taken for estimation of phenol content present in given mixture. The amount of total phenolic was determined using the Folin-Ciocalteu’s reagent. 1 ml sample was dissolved in 2 ml distilled water and 0.5 ml Folin-Ciocalteu’s reagent. After 3 min., 2 ml 20% sodium carbonate solution was added and keep the tubes in boiling water bath for 1 min. Cool the tubes properly than take the absorbance of the mixture at 760 nm (Thimmiaiah S. R. 2009) [11].

6. Results and Discussion
Estimation of phenol from some endophytic fungi were done. The findings of this study coincide with the findings of many researchers. Fungal endophytes contents phenolic compounds. (Devi et al; 2012), (Sharma and Kumar 2012) reported determination of total phenol content from endophytic fungi. All the endophytic fungi showed presence of phenol, as their host plants are synthesized. Aspergillus flavus containing highest amount (53.5 ug/ml) of phenol followed by Aspergillus sp.. Penicillium sp. containing lower amount (9.5 ug/ml) of phenol followed by Periconia. The results are as follows,
Yogesh W. More, Madhuri G. Sharma, Ranjit R. Raut: Estimation of Total Content of Phenol From Some Endophytic Fungi

Table 6.1: Total concentration of phenol from some endophytic fungi

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Endophytic fungi</th>
<th>Concentration in μg/mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Penicillium sp.</td>
<td>9.5</td>
</tr>
<tr>
<td>2</td>
<td>Aspergillus sp.</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>Periconia</td>
<td>29.25</td>
</tr>
<tr>
<td>4</td>
<td>Aspergillus flavus</td>
<td>53.5</td>
</tr>
<tr>
<td>5</td>
<td>Nigrospora</td>
<td>35.5</td>
</tr>
</tbody>
</table>

Figure 6.1: Estimation of Phenol from endophytic fungi.

7. Conclusion
Phenol compounds seem to have an important role in antioxidant activity. Therefore in this study we determined total phenol compounds. There in a report that the metabolites from the host, and it is possible that the medicinal property imparted by the plant is attributed by the endophytes within the host. Further detailed study is needed to investigate the metabolites and also other bioactive metabolites to take endophytes as an excellent source of natural products.

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References
Estimation of Total Content of Phenol From Some Endophytic Fungi

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