Nyctanthes arbor-tristis Linn. (Harsinghar): A potential medicine

Prabhat¹, Navneet¹, Sanjeev² and Pramod²

Received on: 13-12-2008 Revised on: 03-03-2009 Accepted on: 25-04-2009

Abstract

Nyctanthes arbor-tristis Linn. is widely used in the traditional medicinal systems of India. It possesses hepatoprotective, antileishmanial and antiallergic, antiviral and antifungal activities. The petroleum ether, ethanol and water extract of stem, root, flowers, seeds and leaves of the plant were screened for the antibacterial activity against Escherichia coli, Bacillus subtilis, Staphylococcus aureus and Klebsiella pneumoniae by using well diffusion method. The results were compared with reference antibiotic ampicillin. The water extract of root shows minimum inhibition zone (10 mm) against S. aureus and B. subtilis and petroleum ether extract of leaves against E.coli and ethanolic extract showed the maximum activity against S. aureus and B. subtilis.

Keywords:- Nyctanthes arbor-tristis, Antibacterial activity, Pathogens

Introduction

The development of bacterial resistance to presently available antibiotics has necessitated the search for new antibacterial agents (Prabhat and Navneet, 2007). The Gram-positive bacteria such as S. aureus are mainly responsible for post operative wound infection, toxic shock syndrome and food poisoning. The Gram-negative bacteria such as E.coli are present in human intestine and causes lower urinary tract infection, coenocytes or septicemia. Several plants are indicated in folk and other traditional systems of medicine that act as aseptic agents. Nyctanthes arbor-tristis commonly known as Harsinghar belongs to the family Oleaceae (Chitravansi et al., 1992). The tree is small in size and found in abundance in the forests of central India and sub-Himalayan region. Traditionally in India the plant is used in snake bite, animals, bites cancer, sores, ulcers dysentery, menorrhagia (Badam et al., 1987) and obstinate sciatica. The leaf of Nyctanthes arbor-tristis is very active from the immunologic point of view. It strongly stimulates antigen specific and non-specific immunity as shown by increase in humoral and delayed type hypersensitivity response to sheep erythrocytes and in macrophage migration index (Puri et al., 1994). In the present study the antibacterial activity of different parts i.e. seeds, root, stem, leaves and flower against E. coli, B. subtilis, S. aureus and K. pneumoniae were carried out.

Materials and Method

The plant material of Nyctanthes arbor-tristis was collected from Hardwar and the plant was identified by the Botanical Survey of India, Dehradun (Uttarakhand). The each part of the plant was dried separately in shade and powdered by using grinder. The 100 gm of powdered plant material was loaded in soxhlet assembly extracted successively with petroleum ether, ethanol and water (400 ml of each solvent). By removing the solvents with vacuum evaporator crude extract was used for antibacterial activities. The Mueller Hinton Agar media (Hi media No. M 173) was poured (25 ml) into sterilized Petri plate and left for solidification at room temperature and used to test the antibacterial activity of the extracts prepared from the plant against S. aureus, B. subtilis, E. coli and K. pneumoniae by well

Author’s Address

¹Department of Botany and Microbiology
²Department of Chemistry
Gurukula Kangri University, Hardwar

Copyright by ASEAA
All rights of reproduction in any form reserved
diffusion or cup plate method (Ahmad et al., 1998 and Prabhat et al., 2005a,b). 8mm diameter wells were punched in the agar media by borer and filled with extracts and antibiotic ampicillin (100 mg/ml) was used as positive control and solvent as negative control. The plates were incubated at 37°C for 24 hours to obtain inhibition zones.

Results and Discussion
Table 1 enumerates the effect of the different solvents and aqueous extract of the plant against 4 pathogens. All plant extracts showed significant activity against the bacteria. Similar results of biological activity of plant against fungi and bacteria were reported by Ahmad and Beg (2001).

The methanolic extracts showed the strong activity against both gram positive and gram negative bacteria. In general gram +ve organisms were more sensitive than gram-ve, similar differences in the sensitivity were also observed by Suresh and Chauhan (1992). The extracts are tested for their antibacterial activity against the Gram-positive and Gram-negative bacteria. The activity was compared with the antibiotic ampicillin. All the extracts show activity against E.coli, K.pneumoniae, S.aureus and B.subtilis. The inhibition zones of all parts of the plant extracts are found to be less as compared to ampicillin. The results indicate that the petroleum ether extracts exhibit the lower degree of antibacterial activity as compared to aqueous and ethanol.

Table 1: The antibacterial activity of Nyctanthes arbor-tristis extracts in mm

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Root P.E.</th>
<th>EO.</th>
<th>W</th>
<th>Leaves P.E.</th>
<th>EO.</th>
<th>W</th>
<th>Seeds P.E.</th>
<th>EO.</th>
<th>W</th>
<th>Flowers P.E.</th>
<th>EO.</th>
<th>W</th>
<th>Stem P.E.</th>
<th>EO.</th>
<th>W</th>
<th>Ampicillin</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.C.</td>
<td>12</td>
<td>17</td>
<td>16</td>
<td>10</td>
<td>18</td>
<td>14</td>
<td>13</td>
<td>20</td>
<td>20</td>
<td>16</td>
<td>22</td>
<td>20</td>
<td>14</td>
<td>20</td>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>K.P.</td>
<td>14</td>
<td>16</td>
<td>15</td>
<td>11</td>
<td>20</td>
<td>20</td>
<td>14</td>
<td>20</td>
<td>21</td>
<td>17</td>
<td>20</td>
<td>19</td>
<td>15</td>
<td>19</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>S.A.</td>
<td>13</td>
<td>15</td>
<td>10</td>
<td>12</td>
<td>23</td>
<td>20</td>
<td>14</td>
<td>21</td>
<td>20</td>
<td>18</td>
<td>21</td>
<td>20</td>
<td>14</td>
<td>22</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>B.S.</td>
<td>12</td>
<td>14</td>
<td>10</td>
<td>14</td>
<td>23</td>
<td>21</td>
<td>12</td>
<td>20</td>
<td>20</td>
<td>17</td>
<td>20</td>
<td>21</td>
<td>11</td>
<td>19</td>
<td>19</td>
<td>25</td>
</tr>
</tbody>
</table>


maximum inhibition zone measured for antibiotic control is (25 mm) against B. subtilis. The minimum inhibition zone is (10 mm) of water extract of root and petroleum extract of leaves for S.aureus, B.subtilis and E.coli respectively. The ethanolic extract of leaves show maximum inhibition zone is (23 mm) against S.aureus and B.subtilis.

The inhibition zone by flowers extracts in ethanol and stems extract in water against E. coli was very effective nearly exhibition with ampicillin. Similarly water extracts of seeds, leaves, flowers and a stem inhibition is almost resembles inhibition in ampicillin against K. pneumoniae. The leaves extract with ethanol shows inhibition against S.aureus was found to be the same with ampicillin. The use of leaves, seeds, and stem can be used in place of ampicillin antibiotic against some diseases caused by these bacteria.

References


