Screening the antibacterial activity of *Scutellaria baicalensis* against human and animal pathogens.

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Abstract - Aquaculture represents one of the fast growing food producing sectors of the world and aims in increase the productivity per unit space. Recently due to intensive farming practices infectious diseases pose a major problem in aquaculture industry causing major problem. Hence an attempt has been made to study the invitro antibacterial activity of *Scutellaria baicalensis*. The study revealed that among the organisms tested *V*.chloerae showed maximum zone of inhibition against the methanol extract of *Scutellaria baicalensis* (40±1). Thus the study revealed that *Scutellaria baicalensis* good antibacterial activity.

Key Words: Invitro, inhibition zone, diameter, pathogen, animal, human.

1. INTRODUCTION

Aquaculture represents one of the fast growing food producing sectors of the world and aims in increase productivity per unit space. Among various kinds of cultivated organisms, many marine and freshwater finfish and shellfish species constitute an important industry with their production increasing every year. Recently due to intensive farming practices, infectious diseases pose a major problem in aquaculture industry, causing heavy loss to farmers. In order to address this problem, several studies have been conducted on the modulation of fish immune system in order to prevent the outbreak as reviewed recently (Sakai 1999). Disease outbreaks are increasingly being recognized as a potential constraint on aquaculture production and trade and probiotics and bio augmentation methods for the improvement of aquatic environmental quality as major for further research in disease control in aquaculture (Subasinghe 1997). The use of expensive chemotherapeutics and antibiotics for controlling disease have widely been criticized for their negative impacts like accumulation in the tissue as residues development of the drug resistance, immuno suppressant and reduced consumer preference for food fish treated with antibiotics.

Plants or their by products are preferred since they contain several phenolic, polyphenolic, alkaloid quinone, terpenoid, lectine and polypeptide compounds, many of which have been shown to be very effective alternatives to antibiotics, chemicals, vaccines and other synthetic compounds. In aquaculture, the herbal medicines are also known to exhibit anti-microbial activity facilitate growth and maturation of cultured species besides under intensive farming, the antistress characteristics of herbs will be of immense use without posing any environmental hazard.

*Scutellaria baicalensis* George is widely distributed throughout the world, mainly in Asia known as Hanging in Chinese and organ in Japanese. The local/Regional name of *Scutellaria baicalensis* is called as imbra used as an healing agent for wound or any inflammation. (Guo et al., 1999). For several thousands of years herbal products have been used as medicines in Asia. *Scutellaria baicalensis* is one of the important medicinal herbs widely used for the treatment of various diseases such as viral hepatitis, bronchitis as well as tumours contemporary. Based on traditional Chinese medicine this drug is considered to be a detoxification and damp removing agent and unblocks the lung and stomach meridians. Therefore it can be used to treat diseases related to respiratory and digestive systems (Huang (1999; Kubo et al., 1994).


2. MATERIALS AND METHODS

The flesh part of plant species namely *Scutellaria baicalensis* were collected from paddy fields of Pattukkottai (10.425°N,79.3140°E) of Thanjavur district of Tamil Nadu, India. About one gram of sterilized plant parts were ground in mortar and pestle with 10 ml aqueous and organic solvent (Ethanol, Methanol). It was filtered and the supernatant was stored for an evaluation of an antibacterial activity of *Scutellaria baicalensis*. Cong et al., (2012) analysed the synergistic antibacterial effects of Nanoparticles encapsulated with *Scutellaria baicalensis*. Hence an attempt has been made to study the invitro antibacterial activity of *Scutellaria baicalensis* against animal and human pathogens.
monodon (Chandrakala and Ayyavoo, 2006) were used for the study. The antibacterial activities of leaf part of plants were tested against the selected pathogen the nutrient agar and TCBS agar plates were prepared (Himedia, Mumbai pH 7±0.1, 8±0.2) swab was made with fresh bacterial culture with 10-4. Cfu/ml (18hrs old). The discs were impregnated with various extracts and impregnated over the lawn. The plates were incubated for 24 hrs and after 24 hrs the plates were observed and the zone of inhibition was measured. Distilled water was used as negative control and ciprofloxacin was used as positive control. (Bauer et al., 1962).

3. Results

The study on the antibacterial activity of Scutellaria baikalensis revealed the following observations. The antibacterial activity against the human pathogen such as E.coli against ciprofloxacin (positive control) showed the inhibition zone of 16±1 mm diameter and the Staphylococcus aureus showed the animal pathogen V.cholerae showed the diameter 24± 1mm. The V.cholerae showed the diameter of 38± 1 mm and 40±1 mm diameter. V.parahaemolyticus revealed the presence of 27± 1 mm diameter zone. The staphylococcus aureus showed 15±1 and 14.7±1.7 mm zone of inhibition against ethanol and methanol extract. The study revealed that among the pathogens tested V.cholerae showed maximum zone of inhibition (Table I).

Table 1: ANTIBACTERIAL ACTIVITY OF Scutellaria baikalensis

<table>
<thead>
<tr>
<th>S.No</th>
<th>Bacteria</th>
<th>Zone of inhibition (mm)</th>
<th>Ethanol X ± SD</th>
<th>Ethanol X ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E.coli</td>
<td>Negative control - 16±1</td>
<td>24±1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Staphylococcus aureus</td>
<td>Positive Control - 19±1</td>
<td>15±1</td>
<td>14.7±1</td>
</tr>
<tr>
<td>3</td>
<td>V.hiruria</td>
<td>Aqueous Extract - 28±1</td>
<td>38±1</td>
<td>40±1</td>
</tr>
<tr>
<td>4</td>
<td>V.parahaemolyticus</td>
<td>Ethanol X ± SD - 23±1</td>
<td>29±1</td>
<td>27±1</td>
</tr>
</tbody>
</table>

Note: X = mean
X ± SD - Deviation from mean

4. Discussion

Adonizio et al., (2006) Anti-quorum sensing activity of medicinal plants Scutellaria baikalensis Georgi, also named Huang-qin has been used since ancient time in China to treat allergic and inflammatory diseases by the mechanisms known as “Cleansing heart” drying moisture and removing toxins. Ikemoto et al., (2000) analysed the T-Antitumor effects of Scutellariae radix and its components baicalein, Scutellaria baikalensis is a traditional chinese medicine frequently infectious and inflammatory diseases for thousands of years.

Cai et al., (2008) analysed the protective effects of baicalan on ligature-induced periodontitis in rats, previous studies have confirmed that baicalin, a flavonoid compound isolated from SB, possesses marked anti-inflammatory, antioxidative and immunomodulating effects, Jang et al., (2014) discussed the combination effects of baicalein with antibiotics against oral pathogens, a recent study indicates that the combined use of another compound baicalein present in SB with antibiotics has synergistic effects against oral bacteria. Kong et al., (2009) analysed the spectrum effect relationships between ultra-performance chromatography, incubation of E.coli B with S.baicalensis produced reduction zones in addition to the kill zones. The reduction zone was an area that, although not entirely clear of microbial growth, was still far clearer than the areas of the plate with uninterrupted microbial growth. Mehendale et al., (2007) Scutellaria baikalensis and a constituent flavonoid, baicalen, attenuate ritonavir-induced gastro intestinal side effects. The major phytochemicals isolated from Sbaicalensis are chrysin, baicalin, baicalein-7-O-D glucopyranose, Wogonin, Wogonoside,5,6-dihydroxy-7-O-glucosideflavone. Makino et al., (2008) analysed the comparison of the major flavonoid content of S.baicalensis, the tenaxin- I, tenaxin- II, Scutevurin, Scutarien, Eriodicytol, Methoxyflavone, skullcapavone II Viscidulin III, Salvigenin, Tetrahydroxyflavone, ganhuian genin, isoscutellarien B-O-D glucuridine, wogonin-5-O-D-glucoside, dihydrobaicalin, dihydroxyflavon A, Cathadiinid, Carthamidin 7-O-D glucuridine isocarthamidin, isocarthamidin-7-O-D-glucurone , dihydrohipsidulin, martynoside, salidrosiside, darenoside A and B, scutebacalin, scutaplin L. Scutellaria baikalensis is the most widely used medicinal plant in traditional Eastern medicine. The antibacterial activity of S. baikalensis revealed that the plant showed maximum zone of inhibition against animal and human pathogen. The study further revealed that the plant posse bioactive compound that elicit antibacterial activity.

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REFERENCES


