Comparison of *in-vitro* anti-inflammatory activity of various extracts of *Solanum tuberosum*

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**ABSTRACT**

Medicinal plants are vital and have been used in traditional systems of medicine of India. Their importance is not restricted to direct usage in the treatment. Still, also their chemical constituents were used as leads for many potential synthetic drugs that are drugs of choice to treat dangerous diseases. Inflammations are the significant sources of diseases and deteriorations in the body that result in body pains, and brain damages too. The inflammation is a body responding to the stimulus that causes harm to the body. Solanum tuberosum is a common staple crop available in the kitchen of every house and is used as a food. It had a rich source of starch and anthocyanins. Even though it is used as a food crop, the pharmacological activities of potato had been investigated as IBD (Inflammatory Bowel Disease), various cancers, Hyper-lipidemia and growing cardiovascular complications etc. the potato has been selected for the current study to compare the anti-inflammatory activity of various extracts of the plant. The action of the extracts was tested using two methods invivo using albino rats. The extracts showed a better movement, but when compared to the standard, they are less potent. But in consideration of the side effects and toxicity of standard synthetic drug the anti-inflammatory action can be compromised a bit to give a safe and potent activity including diabetes, chronic inflammations etc. [1].

Inflammations are the significant sources of diseases and deteriorations in the body that result in body pains, and brain damages too. The inflammation is a body responding to the stimulus that causes harm to the body [2]. It usually results in rubor, which means redness, a tumor which means swelling, colour meaning raise in the temperature and dollar, indicating excessive pain. Several methods were designed to analyze the anti-inflammatory profile of the medicinal plants. There had been various researches that show plants as potential sources to produce lead molecules that have anti-inflammatory principles.

**INTRODUCTION**

Medicinal plants are vital and have been used in traditional systems of medicine of India. Their importance is not restricted to direct usage in the treatment. Still, also their chemical constituents were used as leads for many potential synthetic drugs that are drugs of choice to treat dangerous diseases. Plants have been serving us as ailments for illnesses including diabetes, chronic inflammations etc. [1]. Solanum tuberosum is a common staple crop available in the kitchen of every house and is used as a food. It had a rich source of starch and anthocyanins. Even though it is used as a food crop, the pharmacological activities of potato had been investigated as IBD (Inflammatory Bowel Disease), various
cancers, Hyperlipidemia and growing cardiovascular complications etc. considering this, the potato has been selected for the current study to compare the anti-inflammatory activity of various extracts of the plant [3]. The plant has already been tested for anti-inflammatory potential and has been considered for the activity. In the current research, anti-inflammatory activity of various parts of the plant using extracts would be investigated.

**METHODOLOGY**

**Collection & Extraction**

Plants parts like leaves and tubers were collected from an agricultural farm and were appropriately authenticated. The leaves were dried under shade and powdered. The tubers were cut into pieces and sun-dried and powdered. These powdered drugs were extracted using ethanol and distilled water by cold maceration method. The filtrate was collected and dried in an evaporator and desiccated to form a thick paste and named as follows, SLE-solanum ethanol extract of leaves, SLA-solanum aqueous extract of leaves, STE-solanum ethanol extract of tubers, STA-solanum aqueous extract of tubers where the percentage yield was calculated as 15.36%, 16.34%, 13.64% and 18.69% w/w respectively.

**Activity**

The activity of the extracts was tested using two methods in vivo using albino rats. The rats were brought from a seller and kept in cages and acclimatized in air conditioning and controlled humidity for two days before the experiment. In both the methods animals were divided into groups and evenly distributed based on weights which ranged from 140-180 gm. Group 1 was a control which was given only inducing agent for inflammation and groups 2-6 received standard drug (Indomethacin 10mg/kg in 2% tween 80), SLE, SLA, STE, STA at doses of 500mg/kg respectively orally [4].

**Carrageenan method**

Acute inflammation was induced using carrageenan as an inducing agent. The animals fasted for one day and they have induced oedema by injecting 0.1ml of 1% Carrageenan solution in saline in right hind paw to the rats. 1hr after induction of carrageenan, extracts and drugs were administered orally as per designed doses. The volume of the leg was noted after specified intervals of 30mins, 1hr, 2hr, 4hr and 6hr after administration of the extracts (Akindele et al., 2007). The percentage of the activity was calculated using a formula as below

\[
\% \text{ activity} = \left[1 - \left(\frac{V_t}{V_c}\right)\right] \times 100,
\]

where \(V_t\)-volume of the paw in the extract group and \(V_c\)-volume of the paw in the control group.

**Cotton pellet method**

The animals were induced with inflammation in cotton pellet method. Sterile cotton pellets were dried and sterilized in an oven and weight was noted. The rats were anaesthetized using ether and the pellets were installed under the skin of rats. Four pellets installed in axillae and groins under aseptic conditions. The drugs and extracts were administered for a week and then the animals were sacrificed to extract the pellets/. The pellets were dried and cleared off the tissues and weight was noted [5, 6]. The \% activity was calculated as

\[
\% \text{ activity} = \left(\frac{W_c - W_t}{W_c}\right) \times 100;
\]

\(W_t=\)weight of the cotton pellet of the test; \(W_c=\)weight of the cotton pellet of control.

**RESULTS & DISCUSSION**

The data of the experiments in the carrageenan method was presented in table 1. The results state that the tubers of the plant had a better activity overall than the leaves of the plant. This might be due to the accumulation of food and chemical constituents in the tubers when they are in their full growth. Young tubers would probably not compete good enough with the leaves as the leaves are in their entire growth cycle during the development of tubers (Table 1).

![Figure 1: % activity in cotton pellet method](image-url)

The extracts showed a better activity, but when compared to the standard, they are less potent. But
Table 1: Anti-inflammatory activity of potato in carrageenan method

<table>
<thead>
<tr>
<th>Treatment</th>
<th>30min Volume %</th>
<th>1hr Volume %</th>
<th>2h Volume %</th>
<th>4h Volume %</th>
<th>6h Volume %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>0.172± - 0.0038</td>
<td>0.221± - 0.0026</td>
<td>0.252± - 0.0019</td>
<td>0.298± - 0.0087</td>
<td>0.325± - 0.0025</td>
</tr>
<tr>
<td>Standard</td>
<td>0.171± 6.26 0.0058</td>
<td>0.188± 14.28 0.0047</td>
<td>0.168± 38.48 0.0067*</td>
<td>0.142± 51.72 0.0066*</td>
<td>0.139± 68.08 0.0060</td>
</tr>
<tr>
<td>SLE</td>
<td>0.164± 3.126 0.0044</td>
<td>0.206± 2.38 0.008</td>
<td>0.241± 7.89 0.0072*</td>
<td>0.263± 10.34 0.0096*</td>
<td>0.274± 12.9 0.0057*</td>
</tr>
<tr>
<td>SLA</td>
<td>0.173± 6.26 0.0067</td>
<td>0.208± 4.78 0.0067</td>
<td>0.183± 30.79 0.0055*</td>
<td>0.163± 44.82 0.0022*</td>
<td>0.155± 51.61 0.0036</td>
</tr>
<tr>
<td>STE</td>
<td>0.175± 3.543 0.0073</td>
<td>0.218± 2.76 0.024</td>
<td>0.231± 8.13 0.0121*</td>
<td>0.22± 10.99 0.0071*</td>
<td>0.322± 13.6 0.0073*</td>
</tr>
<tr>
<td>STA</td>
<td>0.161± 6.61 0.0098</td>
<td>0.202± 4.89 0.0082</td>
<td>0.200± 31.25 0.0069*</td>
<td>0.168± 45.10 0.0081*</td>
<td>0.192± 51.83 0.0054</td>
</tr>
</tbody>
</table>

in consideration of the side effects and toxicity of the standard synthetic drug, the anti-inflammatory activity can be compromised a bit to give a safe and potent activity.

CONCLUSION

The Solanum Extracts showed better anti-inflammatory activity in the tubers than leaves. This difference might be due to the different growth cycle timings of the plant. Also, the tubers are rich in starches which might have helped for better activity.

CONFLICT OF INTEREST

Authors declared no conflict of interest.

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REFERENCES


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