EFFECT OF GUNJA (ABRUS PRECATORIUS LINN) SEED POWDER ON ORGANS BY ACUTE TOXICITY STUDY

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ABSTRACT
LD 50 dose is also called as acute toxicity study; it means the dose which kills the 50 percent of the animals in a single step. By evaluating the LD50 (Lethal dose) value of the drug, it will help during the treatment that it will give the effective dose(ED) of the toxic drug. One tenth of the LD50 will be the safer dose of the drug. In this present study the animal study was conducted as per the OECD guidelines 423 acute toxicity studies, to rule out the LD50 of the Gunja seed powder. Gunja (Abrus precatorius. Linn) is a poisonous drug which contains abrin. But after adopting proper purificatory measures it attains excellent therapeutic effects. Here raw unpurified seed powder was administered in the dose of 5, 50, 300, 2000 and 5000 mg per kg body weight succeeding. Signs of mortality were observed for a period of 14 days. And died animals were subjected for histopathological examination to rule out the organ toxicity.

KEYWORDS: LD50, effective dose, gunja, toxicity study.

INTRODUCTION
In Ayurveda for treatment the drugs are used from various origin, which includes the drugs from plant, animal, and mineral origin. Among these some are poisonous, while using these drug as medications, many measures are being adopted like, shodhan, bhavana, anupan etc. after considering these when used judiciously the drug will act as nectar though poisonous otherwise.

Gunja (Abrus precatorius.Linn) is one such poisonous drugs mentioned in classics as Upavisha[1]. Though one among Upavisha it has abundant therapeutic effects by adopting shodhanaadi process like swedan process by using godugda, kanji etc.

Knowingly or unknowingly if person comes in contact with this Gunja seeds (without shodhana) it leads to various toxic effects /complications. Ingestion of impurified Gunja seeds produces toxic effects like severe gastroenteritis, hemorrhage, convulsion ,shock, CNS depression etc. Redness, inflammation seen where it comes in contact with skin[2].
Under Acute toxicity\cite{3} study OECD Guidelines 423 explains about the LD50 (Lethal Dose, which kills 50% of animals during each step) value for evaluating the drug toxicity which kills the 50% of animals in every step. As per this guidelines in each step 3 animals are taken and dosed as 5, 50, 300, 2000 and 5000 mg/kg body weight succeeding. Female rats were used of weighing 200+-20 gm body weight.

Here the study was carried out to evaluate the lethal dose of *Gunja* seed powder in animal module by following OECD guidelines 423 in female wistar rats.

**MATERIALS AND METHODS**

**Pharmaceutical Study**

*Gunja* seeds were collected from KLE U’s Shri B M K Ayurveda Mahavidyalaya and Research centre, Belgaum. And authentified in Central research Faculty KLE U’s Shri B M K Ayurveda Mahavidyalaya and Research centre, Belgaum. It was powdered by passing it through 60 size mesh.

**Experimental Study**

Nine healthy Female wistar rats of weighing 200+- 20 gm body weight were procured from authorized dealer and took approval from Institutional Animal Ethics committee to perform this acute toxicity study.

**Methodology**

Animal study is conducted by following CPCSEA, OECD 423 Guidelines. Three healthy female wistar rats of weighing 200+- 20gms were used in each step and they kept in separate stainless steel cage under standard laboratory conditions at ambient temperature with natural day and dark cycle. Adequate clean water provided and food (pellets) provided ad libitum. But food was withheld overnight, prior to the animal experiment. The experiment was carried out after getting approval from Institutional Animal Ethics Committee (IAEC)

**Preparation of drug**

*Gunja* seed powder suspension was prepared by using gum acacia. Dose 5, 50, 300, 2000, 5000mg/kg body wt. was given in succedingly and observations were done till 14 days. Observations were done on body weight, water intake, and food intake and acute toxic symptoms including death.

**OBSERVATIONS AND RESULT**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Dose = oral route</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 mg/kg body weight</td>
<td>No toxicity signs were seen. No any changes in weight, food and water intake etc.</td>
</tr>
<tr>
<td>2</td>
<td>50 mg/kg body weight</td>
<td>No toxicity signs were seen. No any changes in weight, food and water intake etc.</td>
</tr>
<tr>
<td>3</td>
<td>300 mg/kg body weight</td>
<td>No toxicity signs were seen. No any changes in weight, food and water intake etc.</td>
</tr>
</tbody>
</table>
2000 mg/kg body weight | Slight toxicity signs were seen like reduced in activity, food and water intake, reduced in weight but recovered after 2 days.
---|---
5000 mg/kg body weight | Toxic symptoms were seen and two animals were died on after 24 hrs, and one animal showed symptoms like reduced in activity, food and water intake, reduced in weight but recovered after 2 days.

After single oral dose administration, animals were observed for a period of 14 days. And animals were dissected and organs were collected and subjected them for histo-pathological examination to evaluate the organ toxicity.

**DISCUSSION**

From 1st to 3rd group animal did not show any toxic symptoms, in 4th step, 2 animals showed reduced in activity, food and water intake but it was recovered within 48hrs. 3rd animal was normal. In 5th step one animal was died after 30hrs of dosing, and another animal was died after 32 hrs of dosing. 3rd animal showed a reduced activity reduced water and food intake and reduced in its weight but it was recovered after 2 days.

Histo-pathological reports are also revealed that involvement of organs. In stomach and intestine showed mucosal congestion, edema, and hemorrhages and cellular degeneration. In liver showed congestion, hemorrhage, ballooning hepatocyte and necrosis. Kidney showed tubular congestion, glomerular congestion, interstitial oedema, haemorrhage and intravascular haemolyses. Lung showed congestion, edema, and emphysema. Heart showed congestion, edema, and inflammation.

Gunja is a toxic drug which contains abrin, haemagglutinin, fat-splitting enzymes etc. Abrin is a ribosome inactivating protein which blocks protein synthesis. A-polypeptide chain enters the cytoplasm and it acts on 60s ribosomal subunit and that prevent binding of elongation factor EF2. Abrin exerts its action by attaching itself to the cell membrane. Its direct action is on the parenchymal cells of Liver cells, kidney cells etc. It causes agglutination of RBCs and haemolyses, leads to haemoglobinuria. And also it causes damage to vascular endothelial cells, interstitial edema, and extravasation of fluids and proteins\(^4\).

Type I pneumocyte is the target cell for the abrin, wher it binds to cel surface receptor and initiates acute alveolities and necrosis of the lower Respiratory tract epithelium. Rapidly pulmonary edema develops that produces hypoxia and death.

**CONCLUSION**

To conclude this by considering the Histopathological reports shown that the involvement of all organs are named as stomach, intestine, liver, lungs, kidney and heart shows a extreme damage by oral administration of unpurified Gunja Seed powder in female wistar rats.
REFERENCES

3. OECD Guidelines 423

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