

## Anti-ulcer mechanism of the aqueous extract of *Osyris quadripartite*

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### ABSTRACT

Peptic ulcer disease, otherwise called as Ulcers, is the most noted disease in the world today. A large population that is affected with the ulcer disease is the age group of people between 20-50 years of age. This disease is not dreadful on its own but is responsible for the causation of many other problems and diseases in the body. This may be due to various factors like the long-term usage of potent drugs like NSAID's, nutrition deficiencies, and unhealthy lifestyle habits like smoking, stress etc. Herbs are being used to treat many diseases, and almost 50% of the population in the world uses herbal-based medicine. Medicinal plants are the primary sources of a cure for those diseases. Numerous plants have been researched and investigated for the anti-ulcer property, and various publications were made too in this respect. Aqueous extract of the plant, *Osyris quadripartite* was extracted and investigated for the anti-ulcer activity in the ethanol-induced ulcer disease method. The extracts were tested in three doses and compared to the standard drug, Omeprazole. The extract at a higher dose exhibited more significant activity when compared to that at a lower dose and also the standard drug.



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### INTRODUCTION

Peptic ulcer disease, otherwise called as Ulcers, is the most noted disease in the world today. A large population that is affected with the ulcer disease is the age group of people between 20-50 years of age [1]. This disease is not dreadful on its own but is responsible for the causation of many other problems and diseases in the body. This may be due to various factors like the long-term usage of potent drugs like NSAID's, nutrition deficiencies, and unhealthy lifestyle habits like smok-

ing, stress etc. [2]. There are various mechanisms that the ulcer is forming and the majority of those include the stimulation of the gastric acid secretion, prostaglandin generation and Hypolite infection that makes the ulcers grow more and get infected to a vast extent. So the primary mechanism of the drugs to treat ulcer is to be the mucosal protection from the formation of ulcers, reducing the gastric acid secretion [2].

There are a lot of synthetic drugs that are used to treat ulcers and PUD. Those drugs are very potent to treat ulcers effectively but contain many side effects and cause other diseases [3]. Herbs are being used to treat many diseases, and almost 50% of the population in the world uses herbal-based medicine. Medicinal plants are the primary sources of a cure for those diseases [4, 5]. Numerous plants have been researched and investigated for the anti-ulcer property, and various publications were made too in this respect [6].

In this experiment, the plant methanol extract of *Osyris quadripartite* was investigated for the anti-ulcer activity [7], and the literature says that the

methanol is toxic compared to water. So in this work, the aqueous extract of the plant is tested for its anti-ulcer potential, and the same is reported.

## Procedure

### Animals

Albino rats of the strain of Wistar were used for this study, and the animals were kept in the standard laboratory conditions. They were exposed to general light and dark shifts which are of 24 hrs. They were maintained in their cages and also fed with pellets and water freely. They were ethically treated as per the guidelines by CPCSEA.

### Plant extracts

The herbal extracts of the plant were prepared using the distilled water. The plant parts were collected and dried for about four days under the shade and regulated temperature in a well-ventilated room. The dried parts were collected and powdered. This powder was then used for extract using maceration technique [8]. The maceration was performed for five days, and the macerate was filtered, and the filtrate was compressed, and the crude thick paste-like extract was separated and used further.

### Toxicity of extract

The rats were investigated for the acute oral toxicity at a dose of 2g for a kg of the rat as per the OECD regulation in the 423 methodologies. The rats were observed for the signs of toxicity like the rubbing, biting and abnormal behaviour. But the rats were normal. They were healthy and living and so it can be concluded that the extract was safe to use at that given dose and the ED50 value was fixed at 10% of the toxicity dose at 200mg/kg.

### Anti-ulcer assessment

#### Ethanol-induced gastric mucosal method

The anti-ulcer activity of the aqueous extract of the plant was used to test the gastric ulcers that are induced by the ethanol as the induction agent [9]. The rats were grouped for the experiment as follows.

#### Batch I

Received only normal saline at a dose of 1.6ml/kg which is of 1% weight to volume with distilled water.

#### Batch II

Received CMC at a dose of 10ml/kg BW this solution had CMC of 1% weight to volume of distilled water.

#### Batch III

Received Extract at a dose of the 200mg in the oral route per kg of the animal weight using and injector.

#### Batch IV

Received Extract at a dose of the 400mg in the oral route per kg of the animal weight using and injector.

#### Batch V

Received Extract at a dose of the 600mg in the oral route per kg of the animal weight using and injector.

#### Batch VI

Received a standard anti-ulcer drug, Omeprazole at a dose of the 30mg in the oral route per kg of the animal weight using and injector.

In all the batches except Batch I, the ethanol is ingested into the animals at a dose of 10ml/kg, which caused ulcers that are visible in batch II treated group [10].

After 14 days, the animals were sacrificed, and the stomachs were gently removed and are opened along the more significant curve of the stomach and measured for ulcer index.

The calculation of the ulcer index was according to the formula as below.

Ulcer index (UI) =  $\frac{\text{Ulcer surface of the control group} - \text{ulcer surface area of treated group}}{\text{Ulcer surface of the control group}} \times 100$

## RESULTS

The induction of ulcer using ethanol was successful, and the more excellent value of ulcers was noted in the untreated group and induced by ethanol that is Batch II. The aqueous extracts were compared in the three doses, as mentioned above in the experiment, and the results were tabulated in the table 1. The Batch V, which is the more generous dose of 600mg, showed the highest anti-ulcer property compare to the other two doses. The pH was also lowered using the extract when compared to the standard drug. There was a significant lowering of the gastric volume and contents also. This was compared with the standard drug and was significantly effective. From these results, it can be said that the extracts lowered the ulcer forming ability and prevented the gastric mucosa from the formation of the ulcers due to the exposure to ethanol [Table 1].

Usually, Ethanol mechanism of the ulcer formation is the free radical generation, and the effective formation of the ulcers in Batch II must be due to the generation of free radicals. These radicals destroyed the gastric mucosal membrane, thereby losing the integrity of the cellular membrane [10]. The formation of ulcers was inhibited by the extracts which show that there is a potential oxidant mechanism involved from the plant extract that was helpful for the combating the free radicals that are generated

**Table 1: Ulcer protective effect of the aqueous extract of the plant, *Osyris quadripartite***

Batches	Groups	Ulcer Index-UI	%inhibition of ulcers	Gastric Volume-ml/g	Gastric juice pH
I	Saline control	-	-	0.94± 0.011	2.13 ± 0.07
II	Induced batch	13.8± 4.21	-	5.42 ± 0.80	3.6 ± 0.56
III	Plant extract @200mg/kg	9.11± 2.76	28.19	3.16 ± 0.53	4.20± 0.84
IV	Plant extract @400mg/kg	7.41 ± 3.81	46.50	2.39 ± 0.47	3.75 ± 0.63
V	Plant extract @600mg/kg	5.19± 2.34	62.43	3.74± 0.65	4.42 ± 0.72
VI	Omeprazole-20 mg/kg	3.60±0.93	79.85	2.26±0.31	3.11+0.89

due to the ethanol. So establishing the mechanism of action of the anti-ulcer property of the plant extract it might be the free radical scavenging mechanism.

### CONCLUSION

The aqueous extract of the plant, *Osyris quadripartite* was extracted and investigated for the anti-ulcer activity in the ethanol-induced ulcer disease method. The extracts were tested in three doses and compared to the standard drug, Omeprazole. The extract at a higher dose exhibited more significant activity when compared to that at a lower dose and also the standard drug.

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### Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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