International Journal of Applied Pharmaceutical Sciences and Research

Original Research http://dx.doi.org/10.21477/ijapsr.v1i1.10174

Antiulcer Effect of Formulation of Aloe Vera & Liquorice Againt Aspirin Induced Peptic Ulcer.

V. Tejasvi Reddy[1*], S. Hari Hara Kumar[1], Dr. Vasudha Bakshi[2]

1. Dept. of Pharmacy, Lalitha College of Pharmacy, Anurag Group of Institutions, Ghatkesar, Hyderabad, Telangana, India.
2. Principal, Lalitha College of Pharmacy, Anurag Group of Institutions, Ghatkesar, Hyderabad, Telangana, India.

Corresponding author: V. Tejasvi Reddy
Email address: tejasvireddy93@gmail.com
Address: Dept. of Pharmacy, Lalitha College of Pharmacy, Anurag Group of Institutions, Ghatkesar, Hyderabad, Telangana, India.

Article History:

Received: 1 Feb 2016
Accepted: 15 Feb 2016
Available online:

Keywords:
Antiulcer; Effect; Formulation;Aloe Vera; Liquorice; Aspirin; Induced; Peptic Ulcer.

ABSTRACT:

Gastric ulcers are the bowel diseases which develop chronically through a span of time because of acidity and disorderliness in eating habits as well. The aforementioned work is the novel approach to evaluate the antiulcer activity of the aloe vera and liquorice herbal formulation which never been reported before. The anti-ulcer activity of Herbal formulation of Aloe Vera and Liquorice was studied in rats and was compared with Omeprazole as standard. Ulcers was induced in rats by means experimental model using aspirin. The Anti-ulcer Herbal formulation is having significant activity in animal models used, as compared to the standard drug Omeprazole..

1. Introduction:

Peptic ulcer is an excoriated area of the gastric or duodenal mucosa caused by action of the gastric juice. It is a chronic and recurrent disease, and is the most predominant of the gastrointestinal diseases (Garg et al., 2014). Nonsteroidal anti-inflammatory drugs (NSAIDs) including aspirin are widely used as anti-inflammatory and analgesic agents, and are commonly prescribed by physicians. However, gastrointestinal toxicity associated with NSAIDs is an important medical problem. Gastric mucosal injury is thought to result when aggressive luminal factors (such as acid, NSAIDs, or *Helicobacter pylori*) overwhelm mucosal protective mechanism (Allen et al., 1993, Flemstrom et al., 1982, Choudhary et al., 2012). Number of drugs including proton pump inhibitors, prostaglandins analogs, histamine receptor antagonists and cytoprotective agents are available for the treatment of peptic ulcer. But most of these drugs produce several adverse reactions including toxicities and even may alter biochemical mechanisms of the body upon chronic usage (Ariyphisi et al., 1986). Hence, herbal medicines are generally used in such cases when drugs are to be used for chronic periods. Several natural drugs have been reported to possess anti-ulcerogenic activity by virtue of their predominant effect on mucosal defensive factors (Sairam et al., 2001a, Sairam et al., 2001b).

Liquorice extracts have been used to treat chronic hepatitis, and also have therapeutic benefit against other viruses, including human immunodeficiency virus (HIV), cytomegalovirus(CMV) and Herpes simplex. Topical Liquorice preparations have been used to sooth and heal skin eruptions, such as psoriasis and herpetic lesions (Kumar Anil et al., 2012) The most Common medical use of liquorice is for treating upper respiratory ailments including coughs, hoarseness, sore throat and bronchitis (Lakshmi et al.,2011)

Aloe vera has been used externally to treat various skin conditions such as cuts, burns and eczema. Aloe has been marketed as a remedy for coughs, wounds, ulcers, gastritis, Diabetes, Cancer, headaches, arthritis, immune-system deficiencies, and many other conditions when taken internally (Rajeswari et al., 2012).

The PHF (Aloe Vera and Liquorice) is used for treatment of abdominal cramps and gastroprotective

effect (Metowogo et al., 2011). The aim of present study was to evaluate the antiulcerogenic properties of marketed polyherbal formulation (PHF).

2. Materials and methods:

2.1 Plant Extracts :

- *Aloe vera gel* – 150 mg/kg
- *Liquorice* - 150mg/kg

2.2 Formulation of Herbal Formulation:

2.2.1 Preparation of Vehicle :

Dissolve 2g of Acacia in 100 ml of water to get 2% Acacia which is used as vehicle

2.2.2 Preparation of Standard solution :

Dissolve 0.04g of Omeprazole in 10 ml of Vehicle

2.2.3 Dose preparation :

Aloe Vera dose preparation –Dissolve 5g of Aloe Vera gel extract in 25ml of vehicle

Liquorice dose preparation - Dissolve 5g of Liquorice extract in 25ml of vehicle

2.2.4 Preparation of Herbal formulation:

25ml of Aloe Vera preparation and 25ml of Liquorice preparation are taken into a beaker and kept for stirring under mechanical stirrer at 400 rpm for about 10 mins

2.3 Experimental Animals :

Swiss Albino rats adult of either sex were divided randomly into 4 groups of 6 rats each. Group I: Aspirin Control Group, Group II: Omeprazole Group, Group III: Herbal formulation+Aspirin, Group IV: Herbal formulation (double dose) + Aspirin. Each rat weighed between 150-200 gm was housed separately (Four rats per cage). The animals were left for 48 hrs to acclimatize to the animal room conditions. They were maintained in standard laboratory conditions of temperature 22±2^{o}c, humidity, 12 hours light and dark cycles fed with standard pellet diet and adequate tap water. The experimental protocols were approved by the Institutional Animal Ethics Committee and conducted according to the guidelines of Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA).

2.4 Chemicals Required:

Aspirin - 400mg/kg , Omeprazole - 20mg/kg , NaOH ,Topfers reagent , Formalin 10% , Acacia 2%, Distilled water

2.5 Antiulcer Activity:

2.5.1 Induction of Ulcer by Aspirin:

Albino rats weighing 150-200g are taken for this experiment. The rats are administered either the appropriate vehicle or the cytoprotective drug (formulation) orally 30mins prior to administration of aspirin. This process is done for 3days and on the last day, the animals are euthanized with chloroform the stomachs are excised, cut along the greater curvature, and gently rinsed under tap water. The stomachs are stretched on a piece of foam core mat and examined under a 3-fold magnifier (Wang et al., 2011).

2.6 Statistical Analysis:

The data of biochemical estimations were reported as mean SEM. The statistical significance was determined by using one way analysis of variance (ANOVA) followed by Dunnett's multiple comparison tests. $P<0.05$ was used to determine statistical significance.

3 RESULTS:

PHARMACOLOGICAL STUDIES :

3.1 Acute toxicity studies

The extract of Aloe Vera and Liquorice, when orally administered in the dose of 2000 mg/kg body wt. did not produce any significant changes in the autonomic or behavioral responses, including death during the observation period

3.2 Aspirin Induced Ulcers

3.2.1 Effect of Gastric Volume :

Administration of the omeprazole and extract significantly decreased the gastric volume in comparison with Aspirin Control Group. Comparing the gastric volume and gastric acidity, the gastric volume gets decreased; simultaneously the gastric acidity also decreased significantly Table 1.

3.2.2 Effect of Free Acidity and Total Acidity :

The free acidity and total acidity was determined based on the titre values. The free acidity and total acidity of omeprazole and extract on albino rats decreased significantly in comparison with the Aspirin Control group Table 2.

3.2.3 Ulcer index :

The ulcer index was calculated by taking the mean ulcer score of each group. Then the mean ulcer score graph was plotted with groups on x-axis and ulcer index on y-axis. The histograms of different groups were then interpolated by comparing the ulcer index of group I with group II, III and IV. It was noticed that the ulcer index of Treatment group (Group II, Group III and Group IV) was significantly less when compared to the Aspirin Control group (Group-I) Table 3.

.

Table 1: Effect of Formulation on Gastric Volume

Groups	Body wt. of rats	Drugs given	Gastric volume (ml)
GROUP I	177.2 ± 1.15	Aspirin + Acacia	5.17 ± 0.38
GROUP II	161.2 ± 2.15	Omeprazole + Aspirin	2.57 ± 0.29***
GROUP III	172.5 ± 4.45	Herbal formulation + Aspirin	4.07 ± 0.08*
GROUP IV	164.4 ± 1.16	Herbal formulation (double dose) + Aspirin	3.4 ± 0.17**

Values are expressed as mean ± SEM of n=6 animals. Superscript letters represents the statistical significance done by ANOVA, followed by Dunnett's multiple comparision test.

***p<0.001, **p<0.01,*p<0.05 indicates comparison with Group I (Control Aspirin)

Table 2:Effect of Formulation on Free Acidity and Total Acidity

Groups	Body wt. of rats	Drugs given	Free Acidity (mEq/liter)	Total Acidity (mEq/liter)
GROUP I	177.2 ± 1.15	Aspirin + Acacia	14.70 ± 0.15	29.6 ± 0.39
GROUP II	161.2 ± 2.15	Omeprazole + Aspirin	4.6 ± 0.19***	9.5 ± 0.34***
GROUP III	172.5 ± 4.45	Formulation + Aspirin	8.8 ± 0.17###	15.56 ± 0.4***
GROUP IV	164.4 ± 1.16	Formulation (double dose) + Aspirin	7.3 ± 0.18$$$	12.56 ± 0.39***

Values are expressed as mean ± SEM of n=6 animals. Superscript letters represents the statistical significance done by ANOVA, followed by Tukey's tests.

***p<0.001 indicates comparison with Group I (Control Aspirin)

Table 3: Effect of Formulation on Ulcer Index

Groups	Body wt of rats	Drugs given	Ulcer index
GROUP I	177.2 ± 1.15	Aspirin + Acacia	3.7 ± 0.08
GROUP II	161.2 ± 2.15	Omeprazole + Asprin	1.33 ± 0.38***
GROUP III	172.5 ± 4.45	Formulation + Aspirin	2.2 ± 0.05**
GROUP IV	164.4 ± 1.16	Formulation (double dose) + Aspirin	1.91 ± 0.05***

Values are expressed as mean ± SEM of n=6 animals. Superscript letters represents the statistical significance done by ANOVA, followed by Tukey's tests.

***p<0.001, **p<0.01 indicates comparison with Group I (Control Aspirin)

4. DISCUSSION

It is evident from the result of the present investigation that the formulation of *Aloe vera and Liquorice* possesses antiulcer activity in aspirin induced acute ulcer model. It has shown a significant reduction in the gastric lesions in both the models. Although the etiology of gastric ulcer is not known in most cases, it is generally accepted that it results from an imbalance between aggressive factors and the maintenance of mucosal integrity through the endogenous defence mechanisms. To regain the balance, different therapeutic agents including plant extracts are used (in experimental animals) to inhibit the gastric acid secretion or to boost the mucosal defence mechanisms by increasing mucus production, stabilizing the surface epithelial cells/or enhancing prostaglandin synthesis (Raju et al., 2009). Omeprazole the proton pump inhibitor play an important role in the reduction of gastric volume and total acidity and thus perform a cytoproective effect (Kedika et al., 2009). The present results demonstrate that the formulation of *Aloe vera and Liquorice* protect the rat gastric mucosa against hemorrhagic lesion produced by aspirin. This inducing method of gastric lesions is rapid and convenient way of screening plant extracts for antiulcer potency and cytoprotection in macroscopically and microscopically visible lesions. Aspirin induced gastric ulcers has been widely used for the experimental evaluation of antiulcer activity. Aspirin induced gastric lesion formation may be due to stasis in gastric blood

flow, which contributes to the development of the hemorrhagic and necrotic aspect of tissue injury.

4 SUMMARY & CONCLUSION

From the results discussed above it can be summarized that the Formulation of *Aloe vera and Liquorice* possess the antiulcer activity against the Aspirin induced gastric ulceration animal model of rats. At the dose level tested it does not show any signs of toxic effects in treated mice as well as rats. In the present study, using combination of herbal drugs has proved that these are effective alternatives for chemical drugs. Thus the Anti-ulcer Herbal formulation shows significant activity in aspirin induced Peptic ulcer.

5 REFERENCES :

1. Allen A, Flemström G, Garner A, Kivilaakso E. Gastroduodenal mucosal protection. Physiol Rev. 1993; 73:823–857.
2. Ariyphisi I, Toshiharu A, Sugimura F, Abe M, Matsuo Y, Honda T (1986). Recurrence during maintenance therapy with histamine H_2 receptors antagonist in cases of gastric ulcers. Nikon University J Medical. 28: 69-74.
3. Flemstrom G, Garner A. Gastroduodenal HCO3(-) transport: characteristics and proposed role in acidity regulation and mucosal protection. Am J Physiol. 1982;242:G183–G193.
4. GP. Choudhary (2012). Anti-ulcer activity of the ethanolic extract of Terminalia belerica Roxb. International Journal of Pharmaceutical and Chemical Sciences. 1(4): 1293-1297.
5. Kedika, R. R., Souza, R. F., & Spechler, S. J. (2009). Potential Anti-inflammatory Effects of Proton Pump Inhibitors: A Review and Discussion of the Clinical Implications. *Digestive Diseases and Sciences*, *54*(11), 2312–2317. http://doi.org/10.1007/s10620-009-0951-9.
6. Kumar Anil, Dora Jyotsna (2012). Review on Glycyrrhiza Glabra (Liquorice). Journal of Pharmaceutical and Scientific Innovation. 1(2): 1-4.
7. Lakshmi T, Geetha R.V (2011). Glycyrrhiza Glabra Linn commonly known as Licorice: A Therapeutic Review. International Journal of Pharmacy and Pharmaceutical Sciences. 3(4): 20-25.
8. Metowogo, K., Eklu-Gadegbeku, K., Agbonon, A., A. Aklikokou, K., & Gbeassor, M. (2011). Gastroprotective Effect of Hydroalcoholic Extract of Aloe *buettneri*. *Iranian Journal of Pharmaceutical Research : IJPR*, *10*(1), 69–74.
9. Raju D. et al (Evaluation of Anti-ulcer activity of methanolic extract of Terminalia chebula fruits in experimental rats. J. Pharm. Sci & Res. 3: 101.
10. R. Rajeswari, M. Umadevi et al (2012). Aloe Vera: The Miracle plant its medicinal and traditional uses in India. Journal of Pharmacognosy and Phytochemistry. 1(4): 118-124.
11. Sairam K, Rao CV, Goel RK (2001a). Effect of Centella asiatica linn on physical and chemical factors induced gastric ulceration and secretion. Indian J Exp. Biol. 39: 137-142.
12. Sairam K, Rao CV, Goel RK (2001b). Effect of Convolvulus pluricaulis Chois on gastric ulceration and secretion in rats. Indian J Exp. Biol. 39: 350-356.
13. Sunil Garg, Kishan Pal, Alok Sharma, Kavita Garg (2014). Ethanopharmacological evaluation of antiulcer activity of Caralluma attenuta. Int. J. of Pharm. Life Sci. 5(6):3585-3589.
14. Wang, Z., Hasegawa, J., Wang, X., Matsuda, A., Tokuda, T., Miura, N., & Watanabe, T. (2011). Protective Effects of Ginger against Aspirin-Induced Gastric Ulcers in Rats. *Yonago Acta Medica*, *54*(1), 11–19.

How to cite this article:

V. Tejasvi Reddy, S. Hari Hara Kumar, Dr. Vasudha Bakshi (2016). Antiulcer Effect of Formulation of Aloe Vera & Liquorice Againt Aspirin Induced Peptic Ulcer. Int J App Pharm Sci Res. 1(1); 42-45.
http://dx.doi.org/10.21477/ijapsr.v1i1.10174