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Anti Inflammatory Activity of *Glycrrhiza glabra* Extract-An *in vitro* Study

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Abstract:
Aim:
To estimate the Anti-inflammatory effects of *Glycyrrhiza glabra* extract.

Background:
There is an increasing demand for herbal medicines, health products, pharmaceuticals. *Glycyrrhiza glabra* inn is a plant used in traditional medicine across the world for its ethnopharmacological value. It is found to contain important phytoconstituents such as glycyrrhizin, glycyrrhizinic acid, glabrin A and B and isoflavones. It is effectively used as anti-inflammatory, anti-bacterial, anti-fungal, anti-diabetic, anti- viral, anti-ulcer, antitussive, anti-oxidant, skin whitening, anti-diuretic agent.anti-inflamatory drugs such as aspirin, Ketorolac (Toradol), Celecoxib (Celebrex), have various side effects such as vomiting,nausea,constipation,diarrhea,reduced appetite ,headache,dizziness,rash, and drowsiness. The most serious side effects are ulcers, bleeding, kidney failure, and, rarely, liver failure.

Methodology:
The anti-inflammatory activity of *Glycyrrhiza glabra* was screened by protein denaturation assay using aspirin as control.

Result:
Glycyrrhiza glabra showed a very good anti-inflammatory activity when it was screened by protein denaturation assay using aspirin as control

INTRODUCTION:

Medicinal plants are of great importance to the health of individuals and communities. The medicinal value to these plants lies in some chemical substances that produce a definite physiological action on the human body. The most important of these bioactive constituents of plants are alkaloids, tannins, flavonoids and phenol compounds (Hill, 1952). It is well known that infectious diseases account for high proportion of healthy problems, especially in the developing countries. Microorganisms have developed resistance to many antibiotics and this has created immense clinical problem in the treatment of infectious diseases (Davis, 1994). This resistance has increased due to in discriminated use of commercial antimicrobial drugs commonly used in the treatment of infectious diseases. This situation forced scientists to search for new anti-microbial and anti-inflammatory substances from various sources, such as medicinal plants (Karaman et al., 2003).

β-glycyhrritinic acid has displayed antiinflammatory properties in different animal models [1- 3]. β-glycyhrritinic acid is the major metabolite of glycyrrhizin [4]. Two mechanisms have been recommended for t h e antiinflammatory effects of β-glycyhrritinic acid, First, it inhibits glucocorticoid metabolism and potentiates their effects. This potentiation was reported in skin and lung after co-administration of them with β-glycyhrritinic acid [5, 6]. Since, β-glycyhrritinic acid is a potent inhibitor of 11 - hydroxysteroid hydroxygenase [7], it causes an accumulation of glucocorticoids with antiinflammatory properties. Oral administration of β-glycyhrritinic acid or glycyrrhizin confirmed this result [8]. Second, it inhibits classical complement pathway activation and its activity is dependent on its conformation [9]. Thus, it is suggested that co medication of it with hydrocortisone in the treatment of inflammatory lung disease will be useful [10]. Glycyrrhizin inhibited reactive oxygen species (ROS) generation by neutrophils which are the potent mediator of tissue inflammation in the in vitro study. It wasthought that one of its antiinflammatory effect was due to this inhibitory effect [11,12]. Also, the generation of (ROS) was also suppressed by glabridin treatment in (RAW 264.7) cells [13]. *Glycyrrhiza glabra.* and glyderinine, a derivative of glycyrrhizic acid, showed an antiinflammatory effect [14, 15]. It also reduced myocardial inflammatory edema in experimental myocardial damage [16]. In addition, glabridin and lichochalocone A have shown an anti-inflammatory effect in in vivo studies [13].

MATERIALS AND METHOD:

Inhibition of protein denaturation (Shravan kumar et al., 2011) The reaction mixture (0.5ml) consisted of 0.45ml bovine serum albumin (5% aqueous solution) and 0.05ml of the methanol extract of turmeric (100-500µg/ml). pH

was adjusted to 6.3 using a small amount of 1N HCl. The samples were incubated at 37°C for 20min and then heated at 57°C for 3min. After cooling the samples, 2.5ml phosphate buffer saline (pH 6.3) was added to each tube. Turbidity was measured spectrophotometrically at 660nm. For control tests 0.05ml of distilled water was used instead of extracts while product control tests lacked bovine serum albumin. The percentage inhibition of protein denaturation was calculated as follows.

Percentage inhibition
= 100 – ((O.D of test – O.D of product control)/O.D of Control) x 100

The IC50 value was defined as the concentration of the sample extract to inhibit 50% of protein denaturation under assay condition.

RESULTS AND DISCUSSION

Glycyrrhiza glabra is one of the important medicinal plants. The whole plant and its root mainly have been used as a folk medicine in many countries, for the treatment of Rheumatic pain, Addison's disease, Asthma, Bronchitis, Peptic ulcer, Arthritis, and allergic complaints.

In this present study,the anti-inflammatory activity of control concentration (aspirin) is compared with sample concentration(glabra extract) and the results were tabulated in table.When the sample concentration is 100 µg,percentage activity is 9.15 ± 0.72 when compared with control concentration(50 µg) percentage activity was 17.97±0.50 which has a dramatic difference.And then sample concentration(200 µg) percentage activity was 27.78 ± 1.85 comparing with control concentration (100 µg) percentage activity was 32.68±0.57 there is decrease in difference in percentage activity .As the concentration increased exponentially , there is a decrease in difference between percentage activity.

Glycyrrhiza glabrahas a very good anti inflammatory activity. It has very less side effects or even nil side effects as it is a natural extract whereas aspirin as various side effects(black, bloody, or tarry stools;coughing up blood or vomit that looks like coffee grounds;severe nausea, vomiting, or stomach pain;fever lasting longer than 3 days;swelling, or pain lasting longer than 10 days; or hearing problems, ringing in your ears.) and various drug interaction.

Table 1 :Protein denaturation Inhibitng activity of ethanolic extract of *Glycyrrhiza glabra*

Sample concentration (µg)	Percentage activity %	Control (Aspirin) Concentration(µg)	Percentage activity %
100	9.15 ± 0.72	50	17.97±0.50
200	27.78 ± 1.85	100	32.68±0.57
300	39.45 ± 0.95	150	47.39±1.50
400	58.43 ± 1.25	200	63.07±1.49
500	72.95 ± 1.50	250	77.12±1.42
Ic_{50} (µg/ml)	350.35±1.99	Ic_{50} (µg/ml)	160.78±0.50

Values are means of three independent analyses of the sample ± standard deviation (n = 3).

CONCLUSION:

The present results therefore offer a scientific basis for traditional use of extract of *Glycyrrhiza glabra* on anti-inflammatory activity.The *Glycyrrhiza glabra* extract has a significant anti-inflammatory action when compared with aspirin.It can also used in oral products such as toothpaste,mouthwashes etc as is has significant effect on gingival inflammation.And has comparatively has lesser side effectss as compared with aspirin and other anti-inflammatory drugs. The anti-inflammatory activities could be enhanced if active components are purified and adequate dosage determined for proper administration. With additional research, there definitely will be a niche for herbal treatments.

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