



Research Article

EVALUATION OF SYNERGESTIC ANTIMICROBIAL EFFECT OF *ANOGEISSUS LATIFOLIA* AND *GLYCERRHIZA GLABRA* EXTRACT

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ABSTRACT

The present study was undertaken to investigate the synergistic effect of *Anogeissus latifolia* & *Glycerrhiza glabra* on microbial infections. It has been proposed that oxidative stress is the causative factor for causing microbial infection. Previous reports suggested that administration of antioxidants could prevent the microbial infections. However there is no report on synergistic effect of *Anogeissus latifolia* & *Glycerrhiza glabra* on microbial infections by MIC (Minimum Inhibitory Concentration) method.

Dried, powdered barks of *Anogeissus latifolia* Wall (family: Combretaceae) and roots and rhizomes of *Glycerrhiza glabra* (family: Leguminosae) were extracted with hydro-alcohol and alcohol respectively and were evaluated for anti-microbial efficacy against 2 types of bacteria (gram positive & gram negative) & 2 types of fungi.

All bacteria (except E.coli) are sensitive to higher extract concentration (500mg/ml) & showed resistant at decreased concentration levels. *Anogeissus latifolia* & *Glycerrhiza glabra* showed protection against microbial infections.

In conclusion the results suggested that *Anogeissus latifolia* and *Glycerrhiza glabra* has protective action against microbial infections but no synergistic effect observed & the potency of antimicrobial effect was equal to that of *Glycerrhiza glabra*.

Keywords: Anti-bacterial activity, Anti-microbial activity, Anti-fungal activity, *Anogeissus latifolia* barks, *Glycerrhiza glabra* roots and rhizomes, Minimum Inhibitory Concentration method.

INTRODUCTION

Anogeissus latifolia Wall is an anti-oxidant plant belonging to family: combretaceae. The plant is reported to contains leucocyanidins & tannoid principles like ellagic acid, flavellagic acid & its derivatives. The tannoid principles of this plant are known to possess antioxidant activity, this antioxidant property was proven to reduce microbial infection in recent years. The bark was used for the treatment of ulcers ¹, microbial infections & wounds ². It is also found useful in the treatment of various disorders like snake bite, colic, cough, diarrhoea ³.

In the traditional system of medicine, the roots and rhizomes of *Glycerrhiza glabra* (family: Leguminosae), also known as liquorice possess antipyretic, antimicrobial ^{4,5}, anxiolytic, antiherpes activity ⁶. It's also have anti-inflammatory, anti-oxidant⁷ and memory strengthening activity ⁸. Both the extracts *A.latifolia* as well as *G.glabra* possesses anti-microbial activity ^{2,6}. With the view of antimicrobial action & is not much known by invitro (MIC) method, so we have decided to evaluate the synergistic effect of the extract on microbial infections by MIC method.

MATERIALS AND METHODS

Preparation of *Anogeissus latifolia* extract ³

The plant bark of *Anogeissus latifolia* Wall were collected from the Karnataka University Dharwad, in the month of July-August and authenticated by Dr. Harsha Hegade, R.M.R.C (Regional Medical Research Centre), Belgaum (The voucher specimen number: RMRC - 461). After the identification, the bark was dried at room temperature and grounded into powder followed by maceration with petroleum ether for 24 hours with occasional shaking; the dried powdered bark then extracted with hydro-alcohol (50% alcohol and 50% water). The lyophilized hydro-alcoholic extract of *Anogeissus latifolia* was kept at room temperature prior to the experiment. The yield obtained is 23g.

Preparations of *Glycerrhiza glabra* extract ⁶

The roots and rhizomes of *Glycerrhiza glabra* were crushed to coarse powder and extracted with ethanol (70% v/v) using soxhlet

extractor for 24 h. The extract was concentrated under reduced pressure and air dried. The semisolid mass obtained and stored in an air tight container in refrigerator for further use.

Anti-microbial activity ⁹

Anti-microbial screening of the *A.latifolia* & *G.glabra* extract was carried out by Minimum Inhibitory Concentration (MIC) method.

The organisms selected for anti-bacterial activity are Staphylococcus aureus, Escherichia fecalis (gram positive bacteria), Escherichia coli, klebsiella (gram negative bacteria) & for fungal activity Aspergillus niger, Candida albicans were selected. The different concentrations of extract (1, 2, 4,8,16,125, 31.250, 62.5, 125, 250,500 mg / ml) were used. Ciprofloxacin was the standard drug used for anti-bacterial activity, fluconazole & aspergillus were used as standard drug for the antifungal activity.

250mg of *Anogeissus latifolia* & 250mg of *Glycerrhiza glabra* were combined to assess the synergistic effect on microbial infection.

RESULTS AND DISCUSSION

Extracts were evaluated for anti-microbial activity by MIC method. As shown in table I, *Anogeissus latifolia* & *Glycerrhiza glabra* extracts showed promising activity against few tested micro-organisms. The tested extracts were shown both inhibitory as well as bactericidal activity against gram +ve bacteria tested compared to gram -ve bacteria, where extract shown only inhibitory activity but not cidal activity.

Both the extracts were also evaluated for anti-fungal activity by MIC method as shown in table II. Both the extracts has got fairly good inhibitory as well as cidal activity against both the fungus tested.

In the previous studies both the extracts, *Anogeissus latifolia* & *Glycerrhiza glabra* proven to possess antimicrobial action individually. Thus we have evaluated the synergistic effect of equal quantity of *Anogeissus latifolia* & *Glycerrhiza glabra* extract. The results of combined extracts shown equal anti-microbial activity as that of *G.glabra*, but no synergistic effect observed.

Table 1: Anti-bacterial activity protocol for *Anogeissus latifolia* barks & *Glycerrhiza glabra* roots & rhizomes

Extracts	Conc. (mg/ ml)	Test organism			
		Gram + ve bacteria		Gram -ve bacteria	
1) <i>A.latifolia</i>	500	S. aureus	E.fecalis	E.coli	Klebsiella
	250	S	S	R	S
	125	S	S	R	S
	62.5	S	S	R	R
	31.250	S	S	R	R
	16.125	S	R	R	R
	8	R	R	R	R
	4	R	R	R	R
	2	R	R	R	R
	1	R	R	R	R
2) <i>G.glabra</i>	500	S	S	R	S
	250	S	S	R	S
	125	S	S	R	S
	62.5	S	S	R	S
	31.250	S	S	R	R
	16.125	S	S	R	R
	8	S	S	R	R
	4	S	S	R	R
	2	S	S	R	R
	1	S	R	R	R

Table 2: Anti-fungal activity protocol for *Anogeissus latifolia* barks & *Glycerrhiza glabra* roots & rhizomes

Extracts	Conc. (mg/ ml)	Test organism	
		Candida	Aspergillus
1) <i>A.latifolia</i>	500	S	S
	250	S	S
	125	S	S
	62.5	S	R
	31.250	S	R
	16.125	R	R
	8	R	R
	4	R	R
	2	R	R
	1	R	R
2) <i>G.glabra</i>	500	S	S
	250	S	S
	125	S	S
	62.5	S	S
	31.250	S	S
	16.125	S	R
	8	R	R
	4	R	R
	2	R	R
	1	R	R

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