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A study of antimicrobial activity of the flavonoid- Kaempferol-3-rutinoside- from *Gliricidia sepium* (Jacq.) kunth.ex.Walp.

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ABSTRACT

This study was performed to evaluate the antimicrobial activity of flavonoid extracted from the flowers of *Gliricidia sepium* (Jacq.) Kunth. ex. Walp. of Fabaceae. The different concentrations of the extracted flavonoid and solution of standard containing streptomycin were prepared. The efficacy of isolated Kaempferol-3- rutinoside, against five microorganisms of Gram-positive and Gram-negative were investigated by Turbidimetric Assay1 and reported. The antimicrobial activity of Kaempferol-3- rutinoside was comparable with the standard drug streptomycin.

Keywords : Antimicrobial activity, Kaempferol-3- rutinoside, *Gliricidia sepium* (Jacq.) Kunth. ex. Walp, streptomycin, Gram-positive and Gram-negative microorganisms

Introduction:

Flavonoids are a group of polyphenolic compounds, which have the diphenylpropane (C6–C3–C6) skeleton, ubiquitously found in various parts of plants. The flavonoid family includes flavones, flavonols, flavanones, flavanonols, flavans, flavanols, leucoanthocyanidins, anthocyanidins, aurones, chalcones, and isoflavones². Flavonoids possess physiological effects in animals as well as in humans. It has been reported that many flavonoids have antibiotic effect on *E.coli*, *L.casie*, *S. typhosa* and *S.aureus*³. The antiviral effects of many types of flavonoids have been demonstrated⁴. Flavonoids show anti-allergic, anti-inflammatory, anti-microbial and anti-cancer activities⁵. Hence Chemists and drug manufacturers have become interested in flavonoids.

Gliricidia sepium (Jacq.) Kunth.ex.Walp. belonging to Fabaceae family, a native of South America is a small or medium sized tree, fairly free from pests and diseases. Its leaves and bark are reported to possess insecticidal activity⁶. In the present investigation, the antimicrobial activity of the isolated flavonoid, Kaempferol-3- rutinoside from the above said plant against various potent Gram positive and Gram negative microorganisms has been studied using turbidimetric method¹. The turbidimetric method is based on the inhibition of growth of a microbial culture in a fluid medium containing a solution of an antibiotic².

Materials & Methods:

Sample Preparation:

The flavonoid was extracted from fresh flowers of *Gliricidia sepium* (Jacq.) Kunth. ex. Walp. and characterized as Kaempferol-3- rutinoside² by Chromatographic, IR, UV, H1 NMR and C13 NMR Spectroscopic studies. The solutions of 50, 100 and 200 µg / ml in sterile water of Kaempferol-3- rutinoside were prepared. Standards containing Streptomycin at concentration of 50, 100, 200 µg / ml and control containing no drug were also prepared.

A nutrient broth medium of neutral pH containing peptone 1% (w/v), yeast extracted 5.5% (w/v) and sodium chloride 0.5% (w/v) was prepared in distilled water and sterilized by autoclaving for about 30 min. at 15 lb/cm² steam pressure. A

standard volume (8 ml) of nutrient broths medium that would support the growth of the test organisms was added to several labeled, sterile, stoppered and identical assay tubes. One loopful of inoculums at defined dilution of an overnight broth culture of *E.coli*, *B.subtilis*, *S.pyrogens*, *S.typhi* and *S.aureus* were added. All these manipulations were carried out at under aseptic conditions.

The assay tubes were incubated at 37°± 1°C for 48 hours and the resultant turbidity were measured with Nephelo-turbidity meter. The percentage of bacterial growth inhibition produced by a specific concentration of the test compound, Kaempferol-3-rutinoside was calculated from the measure of the turbidity of the control and the turbidity of the specific treatment by using the following relationship.

$$\text{Percentage inhibition} = \frac{T_c - T_t}{T_c} \times 100$$

T_c – Turbidity of the control

T_t – Turbidity after treatment.

Sub culturing from the treatment showing no visible growth into broths, without the kaempferol-3-rutinoside was also carried out to make sure that all the bacterial cells has been destroyed by the given concentration of kaempferol-3-rutinoside.

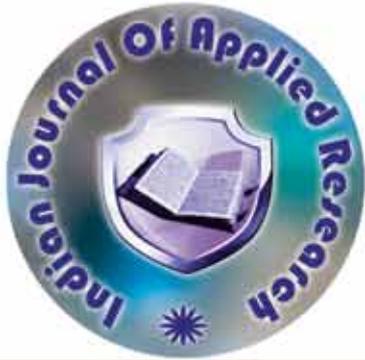
Results and Discussion:

The results obtained from our methods are tabulated.

Drug	Concentration (µg/ml)	Percentage Inhibition				
		E. coli	B. subtilis	S. aureus	S. pyrogens	S. typhi
Kaempferol-3-rutinoside	50	70	82	80	78	70
	100	81	89	90	88	79
	200	90	93	95	95	91
Streptomycin	50	73	85	83	81	72
	100	80	87	88	87	79
	200	85	90	92	91	84

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