



Antibacterial evaluation of the methanolic extract of *Passiflora edulis*

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Article history: Received: 20 October, 2010, revised: 18December, 2010, accepted: 25 January, 2011, Available online: 14 April 2011

Abstract

In the present study methanolic from the leaves of *Passiflora edulis* for finding potential antibacterial activity. Which were compared with the standard ciprofloxacin 5µg/disc. The invitro antibacterial study efficacy of the methanolic extract was tested against Gram positive bacteria viz., *Staphylococcus aureus* (NCL 2079), *Staphylococcus faecalis* (NCL 2080), *Bacillus subtilis* (NCL 2063) and Gram negative bacteria viz., *E.coli* (NCL 2065), *Proteus vulgaris* (NCL 2027), *Salmonella typhi* (NCL 2023) by disc diffusion method. The methanolic extract showed promising activity against *Bacillus subtilis* and *E.coli*.

Key words: *Passiflora edulis*, Ciprofloxacin, Antibacterial, and Methanolic extract.

1. Introduction

The search for antibacterial agent with new mode of actions will always remain an important and challenging task.¹ To a bacterium, the human body is a collection of environmental niches that provide the warmth, moisture and food necessary for organism to grow. The bacteria have acquired genetic traits that enable them to enter the environment, remain in a niche, gain access to food sources, and escape clearance by host immune and non-immune protective responses unfortunately many of the mechanisms that bacteria use to maintain their niche and the bi-products of bacterial growth are incompatible with system of the human host. Many of these genetic traits are virulence factors, which enhance the ability of bacterium to cause disease.² *Passiflora edulis* Sims (passion fruit, purple granadilla) is wild species belonging to the family Passifloraceae.

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The plant is a shallow-rooted, woody, perennial, tendril climbers. The alternate, evergreen leaves, deeply 3-lobed when mature, are finely toothed, 3 to 8 in (7.5-20 cm) long, deep-green and glossy above, paler and dull beneath, and, like the young stems and tendrils, tinged with red or purple, especially in the yellow form. A single, fragrant flower, 2 to 3 in (5-7.5 cm) wide, is borne at each node on the new growth³.

Passiflora edulis reported to possess cytotoxic, antioxidant activity,⁴ anti-inflammatory activity,⁵ comparative biological activity,⁶ neuro pharmacological activity,⁷ healing of colonic anastomosis in rats,⁸ healing process of gastric suture,⁹ antifungal,¹⁰ antihypertensive¹¹ and it is safe herbal drug which contains the constituents like a new glycoside passiflorin, ionone-I, ionone-II, megastigma-5,8-dien-4-1, megastigma-5,8(Z)-diene-4-1, 4,4a-Epoxy-4, 4a-dihydroedulan, 3-hydroxyedulan, Edulan-I, Edulan-II, passifloric acid methyl ester.¹² The leaves are simple, 3 lobed, ovate, palmate, pinnate, length is 4 to 8 inches and colour is green.

2. Experimental

2.1. Plant Material

The fresh leaves of plant specimens were collected from Nilgri Hills in Cunoor and it was authenticated [No. BSI/SC/5/23/06-07/Tech.17] as *Passiflora edulis* Sims Family: Passifloraceae in Botanical Survey of India, Tamilnadu Agricultural University, Coimbatore. Tamilnadu, India.

2.2. Preparation of leaf extract

The dried leaf powder of *Passiflora edulis* were extracted with methanol⁷ by using Soxhlet apparatus for 48 hrs and it was concentrated *in vacuum* .

2.3. Preliminary phytochemical studies:

Preliminary phytochemical studies proved the presence of flavonoids in the methanolic extract of *P.edulis* leaves⁷.

3. Antimicrobial activity:

Antimicrobial activity for the methanolic extract of *Passiflora edulis* were tested for the antimicrobial effect against bacterial strains.¹³⁻¹⁶ The inoculums for the experiment were prepared fresh in Mueller Hinton broth from preserved frozen slants. It was incubated at 37°C for 18-24 hours and used after standardization. Mueller-Hinton agar plates were prepared marked and inoculated with Gram positive and Gram negative bacteria by Disc diffusion Technique.¹⁷ The test microorganisms are Gram positive: *Staphylococcus aureus*, *Staphylococcus faecalis* and *Bacillus subtilis*; Gram negative: *E.coli*, *Proteus vulgaris* and *Salmonella typhi*. Were obtained from National Chemical Laboratory (NCL) Pune and maintained by periodical sub culturing on Nutrient agar medium for bacteria. The effect produced by the methanolic extract 200µg/disc and isolated pure compound 20µg/disc was compared with the effect produced by the positive control (Reference standard Ciprofloxacin 5µg/disc). (Table No: 1)

Disc diffusion assay

The anti-microbial activity of *Passiflora edulis* methanolic leaf extract against microorganisms examined in the present study and their potency were assessed by the presence and absence of zone of inhibition. The percentage of zone of inhibition was calculated by using following formula.

$$(100 - \frac{CT_D - S_D}{T_D}) \times 100$$

CT_D – Calculated test dose; S_D – Standard dose; T_D – Test dose

4. Results and discussion

The results reveals that methanolic extract of *Passiflora edulis* were significantly effective against Gram positive bacteria *Bacillus subtilis* and Gram negative bacteria *E.coli*. Also methanolic extract was suggestively against *Staphylococcus aureus* and Gram negative bacteria *Salmonella typhi* when compared with standard ciprofloxacin under similar conditions.

5. Conclusion

In conclusion the methanolic extract showed promising activity when compared with the standard ciprofloxacin against both Gram positive and Gram negative bacteria

Table: 1 Antibacterial activity of methanolic extract of the leaves of *Passiflora edulis*

S.No	Microorganisms	Zone of Inhibition in Mm and %			
		A	STD	A%	STD%
01.	<i>Staphylococcus aureus</i> (NCL 2079)	10±1.03	30±0.78	0.83%	100%
02.	<i>Staphylococcus faecalis</i> (NCL 2080)	15±1.24	32±0.88	1.17%	100%
03.	<i>Bacillus subtilis</i> (NCL 2063)	18±0.88	35±1.12	1.28%	100%
04.	<i>E.coli</i> (NCL 2065)	25±1.54*	38±0.76**	1.64%	100%
05.	<i>Proteus vulgaris</i> (NCL 2027)	8±1.36	30±0.64	0.66%	100%
06.	<i>Salmonella typhi</i> (NCL 2023)	15±1.12	32±1.62	1.17%	100%

n=3 A - Methanolic extract; STD - Standard Drug Ciprofloxacin. student t test , * p value<0.05, ** p value<0.01

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