Pharmacogn J. 2017; 9(3): 410-416
A multifaceted peer reviewed journal in the field of Pharmacy
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Original Article

Antimicrobial, Analgesic and Anti - Inflammatory Activity Reported on *Tamarindus indica* Linn Root Extract

Sangeeta Gupta[1], Amit Singh[2]

ABSTRACT

Objective: *Tamarindus indica* (Family- Fabaceae) show various folkloric uses in treatment of various ailments such as rheumatisum, dysentery, jaundice etc. **Aim:** The research was conducted to investigate its phytoconstituients and various activity such as antimicrobial, analgesic & anti-inflammatary of AETIRE. **Method:** The antimicrobial activity was performed on 4 bacterial stains containing (*B.subtilis, S.aureus, P. aeruginosa & E.coli*) on AETIRE using Disc diffusion method. The Analgesic activity was tested by thermal and chemical induced pain through Hot plate and AAIWT. And carrageenan induced rat paw oedema model is used to evaluate anti-inflammatory activity. **Result:** Phytoconstituients such as tannins, alkaloids, saponins, flavonoids and carbohydrates present in both the extract. The maximum zone of inhibition of about 21mm & 22mm was shown on *B.subtilis* strain by both the extract when compared with standard drug (Tetracycline & Gentamycin). In AAIWT and hot plate test the AETIRE of concentration (100, 200 mg/kg) produce significant dose-dependent inhibition of pain response with maximum 54.33% protection against acetic acid induced pain and about 74.83% inhibition against thermally induced pain by the aqueous extract 200mg. & the anti- inflammatory activity shown by AETIRE (100 & 200mg/kg) caused significant dose dependent inhibition of oedema with maximum 45.94% inhibition in the Carrageenan induced rat paw oedema by the AE. **Conclusion:** Therefore the AE of *Tamarindus indica* root was more effective in showing analgesic and anti-inflammatory activity when compared to the standard drug in each model while ethanol extract show effective antimicrobial activity.

Key words: Antimicrobial, Fabaceae, Analgesic, Anti- inflammatory activity, *Tamarindus indica*.

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History
- Submission Date: 06-12-16;
- Review completed: 18-12-16;
- Accepted Date: 02-02-17.

DOI : 10.5530/pj.2017.3.70

Article Available online
http://www.phcogj.com/v9/i3

INTRODUCTION

The plant *Tamarindus indica* locally known as imli all over India belongs to family *Fabaceae*. The plant is extensively grown in all over the Bangladesh, is widely used all over Tropical Africa, Sudan, India, Pakistan for different purposes. Different parts of this plant are used in the indigenous system of medicine (Ayurveda, Unani, Siddha, Homeopathic) for the treatment of variety of human ailments.[1,2] According to ethnobotanical survey the various parts of *Tamarindus indica* is used in treatment of many diseases such as fever, malaria, stomach ache, wound,[3] diabetes,[4] rheumatism, ulcer, sore throat, eye infection and in jaundice[5] Further the pharmacological investigation on *Tamarindus indica* the leaf extracts show antimicrobial,[6] antidiabetic,[7] Hypolipidemic,[8] anti-asthmatic[9] and wound healing property.[10] While the fruit pulp and seed shows antioxidant,[11] antimicrobial,[12] hepatoprotective,[13] immunomodulatory[14] and laxative property.[15] and the bark and roots are used as analgesic,[16] anthelmintic[17] and in menorrhagia in woman.[18]

The clinical efficiency of many existing antibiotics is being threatened by the emergence of multi- drug resistant pathogens. Many infectious diseases have been known to be treated with herbal remedies throughout the history of mankind.[19] The increasing failure of the chemotherapeutics and antibiotic resistance exhibited by pathogenic microbial infectious agents have led to the screening of several medicinal plants for their potential antimicrobial activity.[20]

Pain is an unpleasant sensory and emotional experience which we primarily associate with tissue damage or describe in terms of such damage or both[21] While Inflammation is a pathophysiological response of living tissue to injuries that lead to local accumulation of fluids and blood cells the complex events and mediators involved in inflammatory reaction can induce or aggravate many diseases.[22] However studies have been continuing on analgesic and anti-inflammatory diseases and the side effects of the non -steroidal anti-inflammatory drugs (NASAIDs) and opioids drugs pose major problem during their clinical use. Hence the search for the new drugs with more powerful analgesic and anti-inflammatory activity and having minimal side effects is necessary.[23]

However it has been seen from various literature reviews that no scientific report has been seen on the root of *Tamarindus indica*. Hence, the aim of the present study on the basis of various evidence is to investigate the antimicrobial, analgesic and anti- inflammatory activity on the root of *Tamarindus indica*.

Cite this Article: Gupta S, Singh A. Antimicrobial, Analgesic and Anti - Inflammatory Activity Reported on *Tamarindus indica* Linn Root Extract. Pharmacogn J. 2017;9(3):410-6.

MATERIALS AND METHODS

Plant Materials

The fresh root of *Tamarindus indica* plant was collected from Bhopal district (M.P), India during the month of November 2011. The specimen herbarium (564/boi/safia/12) was identified by the Taxonomist, Department of Botany, Safia College of Science, Bhopal (MP), India.

Chemicals

Various chemicals such as Aspirin, Pentazocin, Acetic acid, Carrageenan, Agar, Tetracycline and gentamycin were procured from S. K Scientific chemicals, Moradabad, India. And food pellets for feeding experimental rats were supplied by Pranav Agro Industries, Vadodara, Gujrat.

Preparation of Extract

The root of the plant is shade dried and powdered. The extraction of powdered root was performed by hot extraction method by soxhlet apparatus. The powdered root was then extracted with solvents of increasing polarity, such as petroleum ether, ethanol and water. The individual extract was then filtered respectively through Whatman filter paper to remove impurities and volume is reduced by vacuum evaporator and further evaporated on water bath till dryness and collected. All extracts were stored in well closed container at room temperature.

Test micro-organism

The test organisms were clinical isolates from the stock culture of Institute of Microbial Technology (MTCC), Chandigarh, India. They include *Staphylococcus aureus* (MTCC 3160), *Escherichia coli* (MTCC 1698), *Bacillus subtilis* (MTCC 2757), and *Pseudomonas aeruginosa* (MTCC 6458). Each of these microorganisms was subculture unto nutrient broth to test for viability and subsequently on nutrient agar slants and kept at 4°C prior to susceptibility testing.

Animals

Male and Female Albino wistar rats (100-200g) were used in the studies of analgesic and anti- inflammatory activity. The animals were maintained in clean polypropylene cages with 12 h light and dark cycle at a temperature of 26-28°C and supplied with pellet diet and water *ad libitum*. The animals were acclimatized to laboratory condition for one week before starting the experiment. The experimental protocol approved by Institutional animal ethical committee allotted registration. No. (TIT/IAEC/831/p'cog/2012/16).

Phytochemical screening

The phytochemical examination of ethanol and aqueous extracts of *Tamarindus indica* root was performed by various standard procedure for the detection of secondary metabolite such as alkaloids, flavonoids, saponins, glycosides, tannins etc. [24, 25]

Toxicity study

Male Albino wistar rat were used for acute toxicity study according to OECD guidelines. Distilled water was used as vehicle to suspend the extracts and administered orally. The plant extract was forced through gavage to the rats at doses of - 50, 100, 200, 300, 500 and 1000 and 2000 mg/kg. Immediately after dosing, the animals were observed for 2h continuously after treatment for behavioural changes such as convulsion, hyperactivity, sedation, ataxia and increased diuresis and for mortality at the end of 24 h, 48 h and 72 h respectively. Further if the animals are survived they were kept and further observed for the sign of death or toxicity for the next 7 days.[26]

Determination of Antimicrobial Activity

In-vitro antimicrobial screening was generally performed by paper disc diffusion method for the primary selection of the compound as therapeutic agent.[27] The antimicrobial activity was performed on the extract of the root of *Tamarindus indica* against four pathogenic bacteria like *Bacillus subtilis, Staphylococcus aureus, Escherichia coli and Pseudomonas aeruginosa* (Two Gram positive and two Gram negative). The direct colony suspension method was used for inoculums preparation.[28] Tetracycline and Gentamycin were used as the standard drug for comparative purposes with the extract. Stock solution of the standard drug were prepared in sterile distilled water to give a concentration of 100mg/ml and the test extracts were also prepared at the same concentration. Sterile discs (0.5 mm diameter) made of Whatman filter paper were dipped into the test extract and were put onto the agar surface after complete drying. Plates were then incubated at 35°C for 24 h. After incubation plates were observed for zones of inhibition, and their diameter were measured including the diameter of the disc.[29]

Determination of Analgesic activity

Hot plate method

The animals of either sex were weighed and divided into six groups of six animals in each. Group I (distilled water, 10ml/kg p.o) served as control group. Group II (pentazocine 30 mg/kg p.o) served as standard and Group III and IV were treated with aqueous and ethanol extracts at a dose of 100 and 200 mg/kg body weight. The reaction time of animal was noted down on hot plate at 30, 45, 60 and 90 minutes after the above treatment. The basal reaction was the time taken by observing hind paw licking and jump response in animals while placed on hot plate which was maintained at constant temperature 55°C. A cut off period of 15 sec was taken for complete analgesia and to avoid further tissue damage.[30] The percent inhibition of activity at each interval can be calculated by the formula :-

$$\text{Percent Inhibition} = (P_T - P_0) / (X - P_T) \times 100$$

Where P_T is post treatment latency, P_0 is the pre-treatment latency and X is the cut –off time of 15 sec

Acetic acid induced writhing test

Animals were divided into six groups of six animals each and the drug treatments were given as per the hot plate method for control, standard Aspirin (100mg/kg p.o) and test. Thirty minutes prior to the administration of Acetic acid (0.6% or 1ml/kg body weight i.p). The writhing effect is seen which is indicated by stretching of abdomen with simultaneous stretching of at least one hind limb. This was observed for 15minutes and change in number of writhing in test group was compared with standard. And the percentage inhibition was calculated by the formula:-

$$\text{Percent inhibition} = (1 - Nt / Nc) \times 100$$

Where, Nt is the average number of writhing in treated group and Nc is the average number of writhing in control group [30, 31]

Determination of Anti - inflammatory activity

Male Albino rats were used for anti- inflammatory study. They were divided into five groups. (n = 5 animals in each group). Group I served as control (distilled water, 10ml/kg p.o) Group II served as standard group (Aspirin, 200mg/kg p.o) and Group III and IV received 100 and 200 mg/kg of both the test extract. One hour after the administration of the

various agents, oedema was induced by injection of carrageenan (0.1 ml, 1%, w/v in saline) into the sub plantar tissue of the right hind paw of all the animals. The relative increase in paw volume was measured using plethysmometer at an interval of 1, 2, 3, 4 and 5 h after carrageenan injection.[32] The increase in paw volume of Group II, III and IV were compared with the Group I. The percentage inhibition of oedema volume was calculated by using formula.

$$\text{Percent inhibition} = (1 - Vt / Vc) \times 100$$

Where, Vt is increase in paw volume in treated group and Vc is increase in paw volume in control group.[33]

Statistical Analysis

All observation is expressed as mean ± SEM and calculation of the statistical significance (P value) was done by using ANOVA followed by Dunnett's test. A value of $P<0.01$, $P<0.05$ indicated as significant difference when compared with the control.

RESULT

The Phytochemical screening of ethanol and aqueous extract of *Tamarindus indica* root revealed the presence of various active constituents in both the extract (Table 1). It confirms the presence of tannins, alkaloids, saponins, flavonoids, phenol, steroids and carbohydrate.

In the acute toxicity study, no behavioural changes was observed during the first 24 hour period at the tested doses of 50, 100, 200, 300, 500 and 1000 and 2000 mg/kg and the animal showed no mortality rate due to toxicity within 72 h and further within 7 days of observation.

The antimicrobial result as given in (Table 2) reveal that, the activity of crude extract of the root of *Tamarindus indica* plant is encouraging. The antimicrobial activity is shown by each microorganisms used in the study (*Bacillus subtilis, Staphylococcus aureus, Escherichia coli and Pseudomonas aeruginosa*) The maximum zone of inhibition is shown on *Bacillus subtilis* strain by ethanol extract with 22 mm diameter while with aqueous extract it is about 21 mm diameter so the ethanol extract of *Tamarindus indica* root is more significant when compared with standard drug Tetracycline and Gentamycin.

The analgesic activity was performed by Hot plate method and Acetic acid induced writhing test which show dose dependent inhibition in both aqueous and ethanol extract as mentioned in (Table 3 and 4). The percent pain inhibition seen by the extract resulted to be 25.80%, 74.83% in aqueous extract of concentration (100mg and 200mg) and about 29.98%, 66.60% in ethanol extract (100mg and 200mg) within 90 min of pain latency by hot plate test. While in acetic acid induced writhing test the percent protection from pain caused by acetic acid was found to be 39.82%, 54.33%, 23.75% and 33.71% in aqueous and ethanol extract at a concentration of 100mg and 200mg. Therefore analgesic activity is seen to be quite significant in aqueous extract (200mg) when compared with the standard drug in both the model

While the anti - inflammatory activity performed by carrageenan induced rat paw oedema (Table 5) revealed percent inhibition against carrageenan caused oedema to be 29.72%, 45.74% by the aqueous extract at both the concentration 100mg & 200mg and 32.43%, 37.83% in ethanol extract at time interval of 5 h. So the aqueous extract at 200 mg show significant anti-inflammatory activity when compared with the standard drug (Aspirin).

DISCUSSION

Exploring the healing power of plants is an ancient concept and for centuries people have been trying to develop various drugs from plants which has effective activity and less side effects.[34] In literature it has been indicated that medicinal plants are the backbone of traditional medicine and the activity of plant extract is due to different chemical agent in the extract which were classified as active compounds.[35] In plants various phytochemical constituents such as tannins, flavonoids, alkaloids and several other aromatic compounds are secondary metabolites of plants that serve as defence mechanisms against predation by many microorganisms, insects and herbivores and act as a phytoprotectants and respond to envoirmental stress condition.[36, 37] This may therefore explain the demonstration of antimicrobial activity by the root extracts of *Tamarindus indica.* It has been also reported that *Tamarindus indica* leaf extract show antimicrobial property due to the presence of secondary metabolites such as phenols and flavonoids.[6] The demonstration of antibacterial activity against both gram positive and gram negative bacteria may be indicative of the presence of broad spectrum antibiotic compounds.[38]

In the recent study ethanol & aqueous extract of *Tamarindus indica* root has been taken in which the ethanol extract show effective antimicrobial property (Table 2) against various microorganisms such as *B.subtilis,*

Table 1: Phytochemical screening of *Tamarindus indica* extract

S.no	Active constituents	Ethanol extract	Aqueous extract
1	Alkaloids	+	--
2	Amino acids	-	-
3	Steroids and Triterpenoids	-	+
4	Tannins	++	++
5	Saponins	+	+
6	Carbohydrates	+	+
7	Flavonoids & polyphenols	++	+++
8	Cardiac glycosides	-	-
9	Anthraquinone glycosides	-	-

Symbol (+) and (-) shows presence and absence of the active constituents in the extract

Table 2: Antimicrobial activity of *Tamarindus indica* root extract

Test sample	Zone of Inhibition (mm)			
	S. aureus	*B. subtilis*	*P. aeruginosa*	*E. coli*
Aqueous extract	18	21	15	11
Ethanol extract	20	22	17	-
Tetracycline	25	28	26	27
Gentamycin	26	27	28	29

Table 3: Analgesic effect shown by root of *Tamarindus indica* root extract by Acetic acid induced writhing method

Treatment	Dose (p.o)	Number of writhing in 15 min	% Protection
Control	10 ml/kg	70.3 ± 2.27	-
Aspirin	100 mg/kg	22.1 ± 1.32**	68.50
Test I	100 mg/kg	42.30 ± 2.89*	39.82
	200 mg/kg	32.10 ± 2.48**	54.33
Test II	100 mg/kg	53.60 ± 2.60*	23.75
	200 mg/kg	46.60 ± 3.41*	33.71

Table 4: Analgesic effect of the *Tamarindus indica* root extract by Hot plate method

Group	Dose	Pain latency before administration of drug (in sec)	Pain latency after administration of drug (in sec) & percent inhibition			
			30 min	45 min	60 min	90 min
Control	10ml/kg	2.00 ± 0.30	2.16 ± 0.30 (1.23)	2.33± 0.30 (2.53)	2.50 ± 0.42 (3.84)	2.83 ± 0.22 (6.38)
Pentazocine	30mg/kg	3.50 ± 0.50	6.16 ± 0.47* * (23.13)	8.00 ± 0.93* * (39.13)	11.16±0.74 ** (66.60)	13.83 ± 1.13 ** (89.82)
Aqueous extract	100mg/kg	2.33 ± 0.55	3.50 ± 0.76 (9.23)	4.30 ± 0.66 (15.54)	5.00 ± 0.44 (21.07)	5.60 ± 0.91 (25.80)
	200mg/kg	3.16 ± 0.30	6.00 ± 0.51* (23.98)	7.50 ± 0.76 ** (36.65)	10.00 ± 0.68** (57.77)	12.02 ± 0.57 ** (74.83)
Ethanol extract	100mg/kg	2.16 ± 0.30	3.83 ± 0.65 (13.00)	4.00 ± 0.57 (14.33)	5.66 ± 0.55 (27.25)	6.01 ± 0.12 (29.98)
	200mg/kg	3.00 ± 0.44	6.16 ± 0.47* (26.33)	6.33 ± 0.49* (27.75)	9.33 ± 0.61 * (52.75)	11.00 ± 0.63* (66.60)

Table 5: Anti - inflammatory effect of *Tamarindus indica* root extract on the carrageenan induced rat paw oedema in rats.

Group	Dose	Change in paw volume after drug administration (ml) and % Inhibition				
		1 h	2 h	3 h	4h	5 h
Control	10 ml/kg	0.64 ± 0.06	0.76 ± 0.06	0.80 ± 0.87	0.78 ± 0.08	0.74 ± 0.08
Aspirin	200 mg/kg	0.32 ± 0.03** (50.00)	0.36 ± 0.06** (52.63)	0.42 ±0.05** (47.50)	0.36±.03** (53.84)	0.30 ± 0.07** (59.45)
Aqueous extract	100 mg/kg	0.50 ± 0.07 (21.80)	0.54 ± 0.07* (28.94)	0.58 ±0.05* (27.50)	0.56 ± 0.04* (28.20)	0.52 ± 0.05* (29.72)
	200 mg/kg	0.42 ± 0.03* (34.37)	0.44 ± 0.05** (42.10)	0.48 ± 0.05** (40.00)	0.46 ± 0.09** (41.02)	0.40 ± 0.08** (45.94)
Ethanol extract	100 mg/kg	0.52 ± 0.03 (18.75)	0.56 ± 0.06* (26.31)	0.60 ± 0.08* (25.00)	0.54 ± 0.07* (30.67)	0.50±0.07* (32.43)
	200 mg/kg	0.48 ± 0.05* (25.01)	0.52 ± 0.05* (31.57)	0.56 ± 0.04** (30.00)	0.52 ±0.03* (33.35)	0.46± 0.08** (37.83)

Values are in mean ± SEM, n= 5 for all groups (One way ANOVA followed by Dunnett's multiple compression test). ** P<0.01, * P< 0.05 when compared with the control group.

P.aeruginosa, St.aureus and E.coli as compared to aqueous extracts. Different solvents have been reported to have the capacity to extract different phytoconstituents depending on their solubility or polarity in the solvent.[37] Ethanol extracts in this study might have had higher solubility for more phytoconstituents, consequently the highest antibacterial activity

Peoples are getting inclined towards natural sources of drugs because the various analgesic and anti-inflammatory drugs such as non - steroidal anti-inflammatory drugs and opioids present in the market induce various side effects like gastric ulcer and hepatotoxicity.[39] In the present study, the analgesic and anti-inflammatory effects of aqueous and ethanol extract of *Tamarindus indica* root were evaluated to verify the claims regarding its medicinal properties made by practitioners of traditional medicine.

The phytochemical screening of the root of *Tamarindus indica* (Table 1) revealed the presence of certain active constituents such as tannins, alkaloids, saponins, flavonoids, phenol and carbohydrates. Bioactive compounds such as tannins and flavonoids as found in the extract possess analgesic and anti-inflammatory activities. Flavonoids have been reported to play a role in analgesic activity primarily by targeting prostaglandins. [40, 41] These flavonoids may interact directly with the prostaglandin system and inhibit the substitute cofactor for the prostaglandin generation and also inhibit arachidonic acid lipoxygenation as well as enzymes involved with inactivation or biotransformation of prostaglandins. [42, 43]

Tannins have astringent properties which are important in wound healing.[44] There are also reports on the role of tannins in anti-nociceptive activity.[45]

The analgesic properties of root of *Tamarindus indica* were studied using two laboratory models, which allowed assessment of responses to two different types of noxious stimulus, thermal stimulus and chemically-induced pain stimulus. The hot-plate test is a reliable test for analgesic. Thermal stimulus-induced hyper analgesia is specific for centrally-mediated nociception while chemically induced analgesia act by causing peripherally mediated nociception.[46]

The analgesic activity of aqueous extract of *Tamarindus indica* root produced significant graded dose effects in both the models employed viz; acetic acid-induced writhing and hot plate method as compared to the ethanol extract. Writhing induced by chemical substances (e.g. acetic acid, phenyl benzoquinone) injected i.p. are due to sensitization of noci-

ceptors by prostaglandins. [47, 48] and this test is useful for the evaluation of mild analgesic non-steroidal anti-inflammatory compounds. [49, 50]

The data presented in Table 3 indicate that the plant aqueous extract showed effective analgesic activity against chemical pain induced stimulus by acetic acid in a dose-dependent manner, when compared to the standard (Aspirin) and show maximum percent inhibition than the ethanol extract.

The acetic acid induced writhing test is usually selected to study the peripheral analgesic effects of drugs and act by stimulating chemically induced pain stimulus.[51] It has been suggested that intra peritoneal injection of acetic acid causes the release of endogenous mediators such as prostaglandins, especially prostaglandin E2, in peritoneal fluids. Prostaglandins activate and sensitize peripheral chemo sensitive nociceptive receptors, leading to the induction of abdominal constrictions that are accompanied by extension of the forelimbs and elongation of the body.[52]

The inhibition of writhing in mice by the aqueous extract suggests a peripheral mechanism of action possibly via inhibition of prostaglandins among several possibilities. Pain sensation in acetic acid-induced writhing method is elicited by triggering localized inflammatory response resulting from the release of free arachidonic acid from tissue phospholipid,[38] via cyclooxygenase (COX), and prostaglandin biosynthesis in peritoneal fluids.[53] The increase in prostaglandin levels within the peritoneal cavity then enhances inflammatory pain by increasing capillary permeability.[54] The agent reducing the number of writhing will render analgesic effect preferably by inhibition of prostaglandin synthesis, a peripheral mechanism of pain inhibition.[53, 55] The significant pain reduction of the plant extract might be due to the presence of analgesic principles acting within the prostaglandin pathways.[56] The effect of the extract was however; lower than that of the standard drug, Asprin and pentazocine in both the test. Peak analgesic effect was observed at a dose of 200 mg/kg in both the tests. In order to further confirm the analgesic effect of the extract, the hot plate tests were carried out. Thermal nociceptive tests are more sensitive to opioid μ receptors and non-thermal tests are to opioid κ receptors. [57, 58] It measures the complex response to a non-inflammatory, acute nociceptive input and is one of the models normally used for studying central nociceptive activity. [59]

In the hot plate experiments, (Table 4) shows that aqueous extract of higher concentration of the *Tamarindus indica* had significant effect on pain latency with increased in time period when compared to the standard. While the ethanolic extract show lesser analgesic property. Since there were significant activities recorded in hot plate method the extract could be said to act both peripherally and centrally in producing analgesia. Peripherally acting analgesics such as non-steroidal anti-inflammatory drugs (NSAIDs) act by inhibiting release of prostaglandins.[60] The centrally acting analgesics such as pentazocine act through their receptors in the central nervous system (CNS) by increasing the threshold response to pain stimuli.[61] Opioid analgesics inhibit both peripheral and central mechanisms of pain, while NSAIDs inhibit only peripheral pain. [62, 63]

Carrageenan induced hind paw oedema is the standard experimental model for acute inflammation. Carrageenan is the phlogistic agent of choice for testing anti- inflammatory drug.[64] Carrageenan-induced oedema involves the synthesis or release of mediators at the injured site. These mediators include prostaglandins, especially the E series, histamine, bradykinins, leukotrienes and serotonin, all of which also cause pain and fever.[65] Inhibitions of these mediators from reaching the injured site or from bringing out their pharmacological effects normally ameliorate the inflammation and other symptoms.

This study has shown (Table 5) that the aqueous extract of the root of *Tamarindus indica* possessed significant anti-inflammatory effect on paw oedema induced by carrageenan at certain interval and the percent inhibition is increasing with increase in time. Certain report on analgesic and anti-inflammatory activity on *Tamarindus indica* seed also show decrease in levels of ESR, total WBC count, lymphocytes, neutrophils and total RBC count which was estimated after giving methanol extract of *Tamarindus indica* and this activity may be due to presence of various active constituents in it.[66]

CONCLUSION

From the present study we revealed that the *Tamarindus indica* root extract show effective antimicrobial activity it can be a promising plant in traditional medicine for treatment of various infections. While it's aqueous extract show significant analgesic and anti – inflammatory activity providing a scientific basis for its ethnobotanical uses for alleviating pain and treating various inflammatory disorder. This investigation has opened up the possibility of the use of this plant in future for drug development and various herbal formulation having less side effects.

ACKNOWLEDGEMENT

I would like to express my thanks of gratitude to Dr Zia-Ul-Hasan, Head of Department, Botany, Safia Science College, Bhopal for his valuable support in authentification of drug. I am highly indebted to the institutional committee of Technocrates College of Pharmacy for providing laboratory and animal facility.

CONFLICT OF INTEREST

None

ABBREVIATION USED

AETIRE: Aqueous and Ethanol *Tamarindus indica* root extract; AAIWT : Acetic acid induced writhing test.

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SUMMARY

- The Phytochemical and Pharmacological research conducted on the root of *Tamarindus indica* shows presence of certain chemical constituents such as tannins, flavonoids and alkaloids & pharmacologically it shows antibacterial property on certain microorganism and analgesic (Hot plate & AAWT) and anti-inflammatory (Carrageenan induced paw oedema) activity in rats. The Ethanol extract act as a potent antimicrobial agent while aqueous extract is effective as analgesic and anti-inflammatory agent.

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Cite this Article: Gupta S, Singh A. Antimicrobial, Analgesic and Anti - Inflammatory Activity Reported on *Tamarindus indica* Linn Root Extract. Pharmacogn J. 2017;9(3):410-6.