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Short Communication

Thrombolytic Activity and Antimicrobial Properties of *Ficus hispida*

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Abstract

In this present study, the various plant parts of *Ficus hispida* were subjected to thrombolytic and antimicrobial activities. The thrombolytic activities were assessed by using human blood samples and the results were compared with standard streptokinase (SK). In this study, the methanol soluble fraction (MSF) exhibited highest thrombolytic activity (50.12±1.91). However, significant thrombolytic activity was demonstrated by the crude ethanol extract (CEE) and n-hexane soluble fraction (HSF) of *F. hispida* (21.74±0.69) and (42.22±1.42) respectively. On the other hand, the n- hexane soluble fraction (HSF) and methanol soluble fraction (MSF) of ethanol extract revealed moderate antibacterial activity against some microorganisms used in the screening.

Keywords: Ficus hispida, thrombolytic activity, antimicrobial activity.

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1. Introduction

Ficus hispida (Bangla name- Dumoor) is a hairy shrub or medium sized tree belonging to the family Moraceae. Traditionally, different parts of the plant have been used in the treatment of ulcers, psoriasis, anemia, piles jaundice, vitiligo, hemorrhage, diabetes, convulsion, hepatitis, dysentery, biliousness and as lactagogue and purgative. Phytochemical screening with different reagents showed the presence of fluorescence compounds, steroids, triterpenoids, phenols, tannins and flavonoids [1]. Various scientific works have been published to establish the scientific basis of traditional medicinal values attributed to *F. hispida*. Furthermore, newer pharmacological activities like antineoplastic, cardioprotective, neuroprotective and anti-inflammatory effects were also reported

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recently. Till now, no work has been published to elaborate the pharmacognostic features of *F. hispida* Linn. [2].

As a part of our continuing studies on medicinal plants of Bangladesh [3-8], the organic soluble materials of the plant parts of *F. hispida* were evaluated for thrombolysis and antimicrobial activities for the first time.

2. Materials and Methods

***Plant materials*:** Various plant parts of *F. hispida* were collected from Mirpur Botanical Garden, Dhaka, Bangladesh, in September 2011. A voucher specimen for this plant has been maintained in Bangladesh National Herbarium, Dhaka, Bangladesh (Accession no.35334).

The sun dried and powdered parts (500 gm) of *F. hispida* was macerated in 2.5 L of ethanol for 7 days and then filtered through a cotton plug followed by Whatman filter paper number 1. The extract was concentrated with a rotary evaporator at low temperature (40-45ºC) and reduced pressure. The concentrated ethanolic extract (EE) was partitioned by modified Kupchan method [9] and the resultant partitionates i.e., n-hexane (HSF), and methanol (MSF) soluble materials were used for the experimental processes.

***Streptokinase (SK)*:** Commercially available lyophilized Altepase (Streptokinase) vial (Beacon pharmaceutical Ltd.) of 15, 00,000 I.U., was collected and 5 ml sterile distilled water was added and mixed properly. This suspension was used as a stock from which 100µl (30,000 I.U) was used for *in vitro* thrombolysis.

***Blood sample*:** Blood (n=6) was drawn from healthy human volunteers without a history of oral contraceptive or anticoagulant therapy and 1ml of blood was transferred to the previously weighed micro centrifuge tubes and was allowed to form clots.

***Thrombolytic activity*:** The thrombolytic activity of all extracts was evaluated by the method developed by [10] and slightly modified by [11] using streptokinase (SK) as the standard.

***Antimicrobial activity*:** The antimicrobial screening, which is the first stage of antimicrobial drug discovery, was performed by the disc diffusion method [12] against some gram positive and gram negative bacteria and also against fungi (Table 2) collected as pure cultures from the department of microbiology, University of Dhaka, Bangladesh. Standard disc of Kanamycin (30 µg/disc) and blank discs (impregnated with solvents followed by evaporation) were used as positive and negative control, respectively. The

antimicrobial activity of the test agents was determined by measuring the diameter of zone of inhibition expressed in mm [13].

3. Results and Discussion

As a part of discovery of cardio-protective drugs from natural sources the extractives of *F. hispida* were assessed for thrombolytic activity and the results are presented in Table 1. Addition of 100µl SK, a positive control (30,000 I.U.), to the clots and subsequent incubation for 90 minutes at 37°C, showed 80.64% lysis of clot. At the same time, distilled water was treated as negative control which exhibited negligible lysis of clot (18.64%). In this study, the methanol soluble fraction (MSF) exhibited highest thrombolytic activity (50.12%). However, significant thrombolytic activity was demonstrated by the crude ethanol extract (CEE) of *F. hispida* (21.74%).

Table 1. Thrombolytic activity of different fractions of *F. hispida.*

Sample	Thrombolytic activity (% of lysis)
SK	80.64±1.59
Water	18.64±0.13
CEE	21.74±0.69
MSF	50.12±1.91
HSF	42.22±1.42

SK = Streptokinase, CEE= crude ethanol extract, MSF= methanol soluble fraction and HSF= n-hexane soluble fractions of *F. hispida.*

The crude extract and its different partitionates when subjected to antimicrobial screening at 400 µg/disc, the crude ethanol extract (CEE) and its methanol soluble fraction (MSF) revealed antimicrobial activity against the tested microorganisms having the zone of inhibition ranging from 9 to 12 mm (Table 2).

Table 2. Antimicrobial activity of *F. hispid.*

Test microorganisms	Diameter of zone of inhibition (mm)			
	HSF	MSF	CEE	Kanamycin
Gram positive bacteria				
Bacillus cereus	10	--	--	42
Bacillus megaterium	--	10	09	42

Table 2 *(contd.)*

Bacillus subtilis	--	12	11	42
Staphylococcus aureus	09	--	--	42
Sarcina lutea	--	--	--	42
Gram negative bacteria				
Escherichia coli	10	--	--	42
Pseudomonas aeruginosa	10	--	--	43
Salmonella paratyphi	--	10	09	41
Salmonella typhi	--	09	09	41
Shigella boydii		--	--	42
Shigella dysenteriae	--	--	--	43
Vibrio mimicus	11	--	--	42
Vibrio parahemolyticus	--	--	--	42
Fungi				
Candida albicans	09	--	--	43
Aspergillus niger	10	11	11	43
Sacharomyces cerevacae		09	09	43

CEE= crude ethanol extract, MSF= methanol soluble fraction and HSF= n-hexane soluble fraction of *F. hispida*.

4. Conclusion

It can be concluded that the extracts of the *F. hispida* can be used to design different antimicrobial agents as well as an anti thrombolytic agent due to its moderate antimicrobial activity. Further work is needed to isolate the secondary metabolites and study of metabolic interchanges in bacterial metabolic pathways when applying this extract. This *in vitro* study demonstrated that folk medicine can be as effective as modern medicine to combat pathogenic microorganisms. The use of these plants in folk medicine suggests that they represent an economic and safe alternative to treat infectious diseases.

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