

ฤทธิ์ต้านจุลชีพของสารสกัดหยาบจากมะเดื่อปล้อง

Antimicrobial Activity of *Ficus hispida* Linn. Extract

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บทคัดย่อ

ศึกษาฤทธิ์การต้านจุลชีพ (*E. coli* TISTR 780 *B. cereus* TISTR 687 *S. aureus* TISTR 1466 และ *Samonella typhimurium* TISTR 292) จากส่วนสกัดหยาบส่วนใบ เปลือกและลำต้นของมะเดื่อปล้อง (*Ficus hispida* Linn.) โดยใช้ตัวทำละลายเฮกเซน เอทิลอะซิเตตและเมทานอล ตามลำดับ ด้วยวิธี disc diffusion พบว่าส่วนสกัดหยาบเฮกเซนและเอทิลอะซิเตต มีฤทธิ์ในการต้านจุลชีพมากกว่าในส่วนสกัดหยาบ เมทานอล พร้อมทั้งฤทธิ์การยับยั้งของพืชชนิดนี้พบน้อยในส่วนเปลือกเมื่อเทียบกับส่วนใบและส่วนลำต้น

คำสำคัญ: ฤทธิ์ต้านจุลชีพ, ส่วนสกัดหยาบ, มะเดื่อปล้อง

ABSTRACT

Investigated antimicrobial activity (*E. coli* TISTR 780 *B. cereus* TISTR 687 *S. aureus* TISTR 1466 and *Samonella typhimurium* TISTR 292) of leaves, bark and stem crude extracts from *Ficus hispida* Linn with hexane ethyl acetate and methanol, respectively, by disc diffusion method showed strong inhibition from hexane and ethyl acetate crude extracts more than methanol extract. Moreover, antimicrobial inhibition of this plant came from bark part less than leaves and stem parts.

Key words: antimicrobial activities, crude extract, *Ficus hispida* Linn

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INTRODUCTION

Thailand has several kinds of medicinal plants which have been used to treat many diseases for a long time. Among these potential Thai plants, *Ficus hispida* L. is one of the most widely Thai traditional medicine for cancer therapy (Wang and Coviello, 1975; Pratumvinit *et al.*, 2009).

F. hispida L. (Locally known as *Ma Dau Plong*), is a traditional Thai plant from family Moraceae (Chantarasuwan and Kumtong, 2005; Jain *et al.*, 2005; Tanming and Chantaranothai, 2009). It is a shrub or moderate sized tree and grows well in damp and in shady places. It is widely distributed throughout India, Sri Lanka, Myanmar, southern regions of the China, New Guinea and Queensland in Australia. Almost parts of this plant can be used in traditional medicine for treatment of various ailments, for example, anti-diarrheal (Ghosh *et al.*, 2004; Gutiérrez *et al.*, 2007), hepatoprotective activity (Krishna *et al.*, 2007), antineoplastic (Pratumvinit *et al.*, 2009), cardioprotective effect (Shanmugarajan *et al.*, 2008) antimalarial and cytotoxic activity (Nguyen-Pouplin *et al.*, 2007). However, there is rare scientific data about antimicrobial activity of all parts of *F. hispida* L. Therefore, we have investigated the antimicrobial activity of *F. hispida* L. from leaf bark and stem against *E. coli* TISTR 780 *B. cereus* TISTR 687 *S. aureus* TISTR 1466 and *Samonella typhimurium* TISTR 292.

MATERIALS AND METHODS

Plant identification

F. hispida L. was collected from Nakonsrithummarat province in the southern part of Thailand in June, 2010.

Plant material and extraction procedures

All dried parts of *F. hispida* L. were collected and were successively extracted in solvents by sequential polarity organic solvents such as hexane ethyl acetate and methanol, respectively, over a period of seven days each at room temperature. Crude extract was acquired by concentrating the extract under reduced pressure.

Microorganisms and media

The microorganisms used in this study were pathogenic bacteria, *Escherichia coli* (*E. coli*) TISTR 780, *Bacillus cereus* (*B. cereus*) TISTR 687, *Staphylococcus aureus* (*S. aureus*) TISTR 1466 and *Samonella typhimurium* (*Samonella typhi.*) TISTR 292. Bacteria wer (grown on Tryptic soy agar (TSA, Difco,USA) at 37 °C for 24 h.

Antimicrobial screening

The disc diffusion method was used to screen the antimicrobial activity of leaves, bark and stem of *F. hispida* L. Sterile 6-mm diameter paper disks were placed on the inoculated TSA agar. Each petri dish using 10 μ L of DMSO were used as negative controls. Plates were incubated at 37 °C for 24-48 h and the inhibition zone diameter was measured. The tests were performed in duplicate and the results were averaged.

RESULTS AND DISCUSSION

The antimicrobial activities of the leaves, bark and stem crude extract from *F. hispida* L. were shown in Table 1. All crude extracts showed antibacterial activity against all microorganisms except for the crude methanol extract of bark showed no inhibition zone with all microorganisms as well as the crude extract of stem and leaves from methanol showed no inhibition zone with *B. cereus* and *S. aureus*, respectively. Their inhibition zones ranged from 2.9-14.3 mm (Figure 1).

From the result concluded that the chemical constituents of the leave, bark and stem from the hexane and ethyl acetate crude extracts were more effective than that of each part from

the crude methanolic extract.

CONCLUSION

The results obtained from this study showed that the leaves bark and stem crude extracts of *F. hispida* L. inhibitory effect against all organisms (*E. coli* TISTR 780 *B. cereus* TISTR 687 *S. aureus* TISTR 1466 and *Samonella typhi*. TISTR 292), especially, their crude extracts from hexane and ethyl acetate. However, their crude extracts from methanol showed less inhibitory effect against than that of hexane and ethyl acetate.

Therefore, the determination of chemical constituents and antimicrobial effect from leaves, bark and stem of *F. hispida* L. in hexane and ethyl

Table 1 The antimicrobial activities of crude extracts of *F. hispida* L.

Test microorganisms	Code	Zone of inhibition diameter (mm)		
		Hexane	Ethyl acetate	Methanol
<i>E. coli</i> (TISTR 780)	L	14.1±1.2	14.3±2.1	10.2±1.0
	B	13.2±1.4	12.2±1.2	NZ
	S	11.4±0.6	12.9±0.7	5.3±4.6
<i>B. cereus</i> (TISTR 687)	L	11.3±1.5	7.0±6.1	2.9±5.0
	B	11.3±0.3	10.2±0.8	NZ
	S	9.1±2.2	11.0±0.5	NZ
<i>S. aureus</i> (TISTR 1466)	L	10.5±0.4	11.0±1.7	NZ
	B	10.9±0.3	10.0±1.2	NZ
	S	11.0±0.7	9.4±1.6	6.6±1.3
<i>Samonella typhi</i> . (TISTR 292)	L	12.1±2.1	12.7±2.4	6.3±5.5
	B	11.8±0.6	11.0±2.1	NZ
	S	10.4±1.6	7.7±6.8	8.0±1.7

Values are mean±S.D; n = 3

L = leaves, B = bark, S = stem

NZ = no inhibition zone

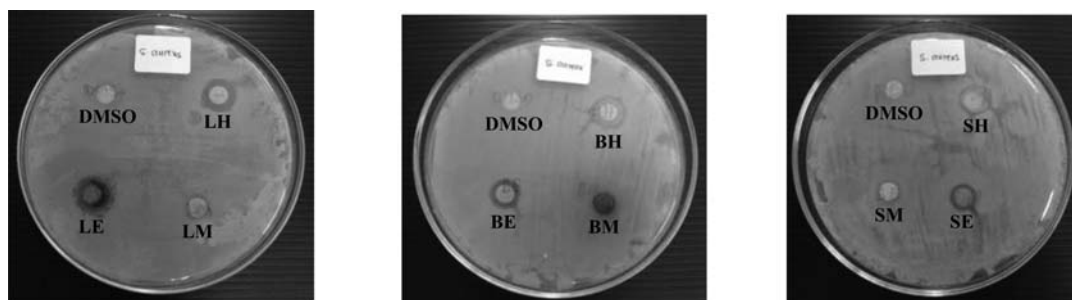


Figure 1 Antimicrobial activity of the crude extract (1) leaves, (2) bark and (3) stem of *F. hispida* L. in hexane ethyl acetate and methanol against *S. aureus* by disk diffusion method.

acetate solvent are to interesting explored and to further study.

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REFERENCES

- Tanming, W. and Chantaranonthai, P. 2009. Diversity of the genus *Ficus* (*Ficus* L.) in the northeast of Thailand. **KKU Science Journal** 37(1): 112-120. (in Thai)
- Ghosh, R., Sharatchandra, Kh., Rita, S. and Thokchom, I.S. 2004. Hypoglycemic activity of *Ficus hispida* (bark) in normal and diabetic albino rats. **Indian Journal Pharmacology** 36: 222-225.
- Gutiérrez, S.P., Sánchez, M.A.Z., González, C. P. and García, L.A. 2007. Antidiarrhoeal activity of different plants used in traditional medicine. **African Journal of Biotechnology** 6: 2988-2994.
- Jain, A., Katewa, S.S., Galav, P.K. and Sharma, P. 2005. Medicinal plant diversity of Sitamata wildlife sanctuary, Rajasthan, India. **Journal Ethnopharmacology** 102: 143-157.
- Chantarasuwan, B. and Kumtong, P. 2005. On two varieties of *Ficus hispida* L.f. (Moraceae) in Thailand. **The Thailand Natural History Museum Journal** 1: 79-85.
- Krishna, M.G., Pallavi, E., Ravi, K.B., Ramesh, M. and Venkatesh, S. 2007. Hepatoprotective activity of *Ficus carica* Linn. leaf extract against carbon tetrachloride-induced hepatotoxicity in rats. **DARU Journal of Pharmaceutical Sciences** 15(3): 162-166.
- Nguyen-Pouplin, J., Tran, H., Tran, H., Phan, T. A., Dolecek, C., Farrar, J., Tran, T.H., Caron, P., Bodo, B. and Grellier, P. 2007. Antimalarial and cytotoxic activities of ethnopharmacologically selected medicinal plants from South Vietnam. **Journal of Ethnopharmacology** 109: 417-427.

- Pratumvinit, B., Srisapoomi, T., Worawattananon, P., Opartkiattikul, N., Jiratchariyakul, W. and Kummalue, T. 2009. In vitro antineoplastic effect of *Ficus hispida* L. plant against breast cancer cell lines. **Journal of Medicinal Plants Research**. 3(4): 255-261.
- Shanmugarajan, T.S., Arunsundar, M. and Somasundaram, I. 2008. Cardioprotective effect of *Ficus hispida* Linn. on cyclophosphamide provoked oxidative myocardial injury in a rat model. **Internation Journal of Pharmacology** 4(2): 78-87.
- Wang, S. and Coviello, D.A. 1975. The isolation, characterization and synthesis of 10-ketotetracosyl arachidate from *Ficus hispida*. **Tetrahedron** 31: 929-932.