

ฤทธิ์ต้านมะเร็งและต้านวัณโรคของส่วนสกัดหยาบจากชิงจี

ANTI-CANCER AND ANTI-TUBERCULOSIS ACTIVITY OF THE CRUDE EXTRACTS FROM *Capparis micracantha* DC.

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บทคัดย่อ: สกัดใบและดอกของชิงจีด้วยเฮกเซน ไดคลอโรมีเทน และเมทานอล ผลการทดสอบฤทธิ์ทางชีวภาพพบว่า ส่วนสกัดหยาบเฮกเซนของใบแสดงฤทธิ์ต้านเซลล์มะเร็งปอด มีค่า IC₅₀ 6.99 µg/ml และแสดงฤทธิ์ต้านเชื้อก่อวัณโรค มีค่า MIC 200.00 µg/ml ส่วนสกัดหยาบเฮกเซนและไดคลอโรมีเทนของดอกแสดงฤทธิ์ต้านเชื้อก่อวัณโรค มีค่า MIC 100.00 และ 200.00 µg/ml ตามลำดับ ผลการทดสอบความเป็นพิษต่อเซลล์พบว่า ส่วนสกัดหยาบทั้งหมดไม่เป็นพิษต่อเซลล์

Abstract: The leaves and the flowers of *Capparis micracantha* DC. were successively extracted with hexane, dichloromethane, and methanol. The six crude extracts were tested bioactivities. The hexane extract of the leaves showed inhibiting lung cancer with IC₅₀ 6.99 µg/ml. It also showed anti-tuberculosis with MIC 200.00 µg/ml. The hexane and dichloromethane extracts of the flowers showed anti-tuberculosis with MIC 100.00 and 200.00 µg/ml, respectively. All crude extracts showed non-cytotoxicity against Vero cells.

Introduction: *Capparis micracantha* DC. is a shrub tree found in Thailand [1]. It is known as “Ching-chee” (ชิงจี) in Thai. It has different local names such as “Za-thu” (ซาทุ, Khon Kaen (authors)). A book of Thai Herbs mentioned that the flowers of *C. micracantha* can inhibit cancer [1]. Beside cancer, one of importance diseases in a public health problem is tuberculosis (TB). At present, tuberculosis returns to rapidly spread worldwide [2]. The main causes of the rising TB trend in developing countries and Thailand are HIV infection and *Mycobacterial tuberculosis*'s drug resistance. Our work mainly aimed to evaluate bioactivities of the crude extracts of the leaves and the flowers of *C. micracantha* against tuberculosis and cancer. **Figure 1** showed flowers and leaves of this plant.

Methodology: The leaf and the flower of *Capparis micracantha* DC. were collected from Khon Kaen Province, North East of Thailand. The air-dried leaves were successively extracted three times with hexane, dichloromethane, and methanol at room temperature. The filtrates were evaporated under vacuum to give three crude extracts. The extraction of the air-dried flowers was operated as same as the extraction of the air-dried leaves. The six crude extracts from the leaves and the flowers were tested bioactivities. Antimycobacterial activity was evaluated against *M. tuberculosis* H37Ra using the Microplate Alamar Blue Assay (MABA) [3]. Anti-cancer activity was assessed against human small cell lung cancer (NCI-H187) cell lines using colorimetric method according to Skehan *et al* [4]. Cytotoxicity against Vero cells (African green monkey kidney fibroblast) was determined by colorimetric method as described by Skehan *et al* [4].

Results, Discussion and Conclusion: The hexane, dichloromethane, and methanol extracts of the leaves and the flowers of *C. micracantha* were evaluated bioactivities. The hexane extract of the leaves showed moderate inhibition against human small cell lung cancer (NCI-H187) cell lines with IC_{50} 6.99 $\mu\text{g/ml}$. It also was active against *M. tuberculosis* with MIC 200.00 $\mu\text{g/ml}$. The dichloromethane and methanol extract of the leaves were inactive on anti-cancer and anti-tuberculosis assays. The three extracts of the leaf were tested cytotoxicity against Vero cells. The result showed that the three extracts were non-cytotoxic. The hexane and dichloromethane extracts of the flowers were active against *M. tuberculosis* H37Ra with MIC 100.00 and 200.00 $\mu\text{g/ml}$, respectively. The hexane, dichloromethane, and methanol extracts of the flowers were inactive against human small cell lung cancer (NCI-H187) cell lines. The methanol extract was also inactive against *M. tuberculosis*. The cytotoxicity assays of the three extracts of the flowers showed that the extracts were non-cytotoxic against Vero cells. A Thai traditional medicine and a book of Thai herbs mentioned that the flowers of *C. micracantha* can inhibit cancer [1]. But our work found that the crude extract from the leaves exhibited inhibiting lung cancer while the one from the flowers was inactive. **Table 1** showed biological activity of the crude extracts of *C. micracantha*.



Figure 1: The flowers and leaves of *C. micracantha*.

Table 1: Biological activity of the crude extracts from *C. micracantha*.

Plant Materials	Crude Extracts	Biological activity		
		Cytotoxicity	Anti-cancer (IC_{50} , $\mu\text{g/ml}$)	Anti-TB (MIC ₅₀ , g/ml)
Leaves	Hexane	Non-cytotoxic	6.99	200.00
	Dichloromethane	Non-cytotoxic	Inactive	Inactive
	Methanol	Non-cytotoxic	Inactive	Inactive
Flowers	Hexane	Non-cytotoxic	Inactive	100.00
	Dichloromethane	Non-cytotoxic	Inactive	200.00
	Methanol	Non-cytotoxic	Inactive	Inactive

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References:

1. ชงชัย เปาอินทร์ และ นิวัตร เปาอินทร์, *ต้นไม้ยาน่ารู้*, ออฟเซ็ท เพรส, พิมพ์ครั้งที่ 1, 138-140, 2544.
(In Thai)
2. World Health Organization. Global Tuberculosis Control: Surveillance, Planning, Financing. WHO Report 2006. Geneva: World Health Organization; 2006.
3. Collins, L. A.; Franzblau, S. G. *Antimicrobial Agents and Chemotherapy*, 1997, **41**(5), 1004-1009.
4. Skehan, P.; Storeng, R.; Scudiero, D.; Monks, A.; McMahon, J.; Vistica, D.; Warren, J. T.; Bokesch, H.; Kenney, S.; Boyd, M. R. *J. Natl. Cancer Inst.* 1990, **82**, 1107-1112.

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