


PLANT GROWTH REGULATORS FROM THE ROOTS OF *Tylophora indica* Merr.



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ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

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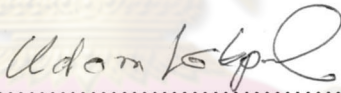
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ณัฏฐิรา สมารักษ์ : สารควบคุมการเติบโตของพืชจากรากของต้นคันทลู (Tylophora indica Merr.). (Plant Growth Regulators from Tylophora indica Merr.) อ. ที่ปรึกษา : ผศ. ดร. สันติ ทิพยางค์ , 101 หน้า. ISBN 974-17-9867-9

ผลการทดสอบฤทธิ์ในการควบคุมการเติบโตของพืชเบื้องต้น จากพืช 12 ชนิด พบว่าสิ่งสกัดจากรากของต้นคันทลู แสดงฤทธิ์ในการยับยั้งการเติบโตของผักกาดขาว (*Brassica pekinensis* Rupr.) มากที่สุด จึงเลือกรากของต้นคันทลูมาทำการศึกษาองค์ประกอบทางเคมี จากการใช้ฤทธิ์ติดตามการแยกสิ่งสกัดไดคลอโรมีเทน และเอทิลอะซิเตต สามารถแยกของผสม 2 ชนิด และ สารประกอบ 8 ชนิด ซึ่งพิสูจน์โครงสร้างโดยอาศัยสมบัติทางกายภาพ, ปฏิกริยาเคมี และข้อมูลทางสเปกโทรสโกปี ได้สารทั้งหมดดังนี้ สารใหม่ 1 ชนิด คือ 12-(6'-methoxy-2'-chromenone-7'-yl) dodecanoic acid, ของผสม hexadecanoic acid, cis-9-octadecanoic acid และ octadecanoic acid, ของผสม stigmasterol กับ β -sitosterol, stigmasteryl-3-O- β -D-glucopyranoside, oleanolic acid, ursolic acid, nonanedioic acid, decanedioic acid, 3-demethyl-14 α -hydroxyisotylocrebrine และ tylophorinidine จากการศึกษาฤทธิ์ในการควบคุมการเติบโตของผักกาดขาวในระยะต้นกล้าที่ความเข้มข้น 1000 ppm พบว่า nonanedioic acid แสดงฤทธิ์ในการยับยั้งการเติบโตส่วนรากได้ดีที่สุด คือ 100 % รองลงมาคือ decanedioic acid 90 %, 3-demethyl-14 α -hydroxyisotylocrebrine 86 % และ tylophorinidine 70 % สำหรับในส่วนลำต้น พบว่า ursolic acid และ oleanolic acid แสดงฤทธิ์ในการยับยั้งการเติบโตที่ 69 และ 65 % ตามลำดับ นอกจากนี้ยังพบว่า 3-demethyl-14 α -hydroxyisotylocrebrine, tylophorinidine, nonanedioic acid และ decanedioic acid แสดงฤทธิ์ในการยับยั้งการเติบโตของรากและลำต้นต่อต้นกล้าของหญ้าข้าวนก (*Echinochloa crus-galli* Beauv.) เกือบ 100 % ที่ความเข้มข้น 1000 ppm

ภาควิชา.....เคมี..... ลายมือชื่อนิสิต.....*ณัฏฐิรา สมารักษ์*
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The preliminary screening results on plant growth regulators of twelve plants indicated that crude extract from the roots of *Tylophora indica* Merr. showed the highest inhibitory effect against growth of lettuce seedling (*Brassica pekinensis* Rupr.). Then the roots of this plant were selected for further investigation on chemical constituents. The bioassay-guided fractionation of dichloromethane and ethyl acetate crude extracts led to the isolation of two mixtures and eight compounds. Their structures were characterized by means of physical properties, chemical reactions and spectroscopic data. They were a new compound, 12-(6'-methoxy-2'-chromenone-7'-yl) dodecanoic acid, along with nine known substances, a mixture of hexadecanoic acid, cis-9-octadecanoic acid and octadecanoic acid, a mixture of stigmasterol and β -sitosterol, stigmasteryl-3- β -D-glucopyranoside, oleanolic acid, ursolic acid, nonanedioic acid, decanedioic acid, 3-demethyl-14 α -hydroxyisotylocrebrine and tylophorinidine. The biological activity on lettuce seedling at concentration of 1000 ppm, nonanedioic acid completely inhibited on root growth, followed by decanedioic acid (90%), 3-demethyl-14 α -hydroxyisotylocrebrine (86%) and tylophorinidine (70%), respectively. On the other hand, ursolic acid and oleanolic acid showed the significant activity on the inhibition against shoot elongation (69 and 65%, respectively). In addition, 3-demethyl-14 α -hydroxyisotylocrebrine, tylophorinidine, nonanedioic acid and decanedioic acid exhibited almost complete inhibition against both root and shoot length of *Echinochloa crus-galli* Beauv. seedling at concentration 1000 ppm.

Department.....Chemistry..... Student's signature.....*Natteera Samarak*.....

Field of study.....Chemistry..... Advisor's signature.....*Santi Tip-pyang*.....

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จุฬาลงกรณ์มหาวิทยาลัย

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List of Abbreviations

°C	= degree celsius
CC, SiO ₂	= column chromatography using silica gel as absorbent
CDCl ₃	= deuterated chloroform
δ	= chemical shift
d	= doublet
dd	= doublet of doublet
DEPT	= distortionless enhancement by polarization transfer
dec.	= decompose
DMSO	= dimethyl sulfoxide
EIMS	= electron impact mass spectrometry
FT	= fourier transform
GC	= gas chromatography
Hz	= hertz
HPLC	= high performance liquid chromatography
IR	= infrared
<i>J</i>	= coupling constant
kg	= kilogram
m	= multiplet
m.p.	= melting point
m/z	= mass per charge
mg	= milligram
mL	= milliliter
MW	= molecular weight
nm	= nanometer
NMR	= nuclear magnetic resonance
PGR	= plant growth regulator
ppm	= part per million (or mg/L)
R _f	= retardation factor
s	= singlet
t	= triplet
TLC	= thin layer chromatography
UV	= ultra-violet