DISSERTATION

SECONDARY METABOLITES FROM MYANMAR MEDICINAL PLANT (*Clausena excavata*) AND THEIR ANTIOXIDANT, ANTIDIABETIC, AND ANTICANCER ACTIVITITES

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LIST OF ABBREVIATIONS

WHO	=	World Health Organization
^{1}H NMR	=	Proton Nuclear Magnetic Resonance
^{13}C NMR	=	Carbon Nuclear Magnetic Resonance
HSQC	=	Heteronuclear Single Quantum Coherence
HMBC	=	Heteronuclear Multiple Bond Coherence
DQF-COSY	=	Double Quantum Filtered Correlation Spectroscopy
NOESY	=	Nuclear Over Hauser Effect Spectroscopy
Hz	=	Hertz
MHz	=	Mega Hertz
δ	=	Chemical shift value
ppm	=	Parts per million
s	=	Singlet
d	=	Doublet
dd	=	Double doublet
t	=	Triplet
m	=	Multiplet
J	=	Coupling constant
$CDCl_3$	=	Deuterated chloroform
methanol-d_4	=	Deuterated methanol
DMSO-d_6	=	Deuterated dimethylsulfoxide
FT-IR	=	Fourier Transform Infrared
UV	=	Ultraviolet
Vis	=	Visible
cm^{-1}	=	Reciprocal centimeter
NaCl	=	Sodium Chloride
DART-MS	=	Direct analysis in real time Mass Spectroscopy
m/z	=	mass by charge
HPLC	=	High Performance Liquid chromatography
DCM	=	Dichloromethane

EtOAc	=	Ethyl Acetate
MeOH	=	Methanol
H_2O	=	Water
R_f	=	Retardation factor
v/v	=	volume by volume
°C	=	degree Celsius
%	=	Percentage
g	=	gram
mg	=	milligram
kg	=	kilogram
mp	=	Melting point
$[\alpha]_D^{20}$	=	Specific rotation in degrees
TLC	=	Thin-Layer Chromatography
VLC	=	Vacuum liquid chromatography
GCC	=	Gravitational column chromatography
CC	=	column chromatography
Fig.	=	Figure

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ABSTRACT

SECONDARY METABOLITES FROM MYANMAR MEDICINAL PLANT (*Clausena excavata*) AND THEIR ANTIOXIDANT, ANTIDIABETIC, AND ANTICANCER ACTIVITITES

Tin Myo T., Nanik Siti A., Alfinda Novi K. and Yoshiaki Takaya

In the course of searching bioactive constituents from Myanmar medicinal plant (*Clausena excavata*), a total of 17 isolated and modified compounds were reported from this species. Among them one new compound, TMT-**4**, (excavatin-A) was isolated together with six known compounds; TMT-**1** (nordentatin), TMT-**2** (dentatin), TMT-**3** (heptaphylline), TMT-**5** (mukonine), TMT-**6** (xanthoxyletin), and TMT-**7** (7-hydroxyheptaphylline) were naturally isolated from *C. excavata*. Moreover, 10 new pyranocoumarin benzoate derivatives (TMT-**1a** to **TMT-1j**), were semi-synthesized from TMT-**1** (nordentatin). All structures were elucidated by using spectroscopy methods. All the isolated and modified compounds were tested on their antioxidant activity by DPPH assay, antidiabetic activity by using α-glucosidase inhibition assay and cytotoxicity by MTT assay. Among isolated compounds, TMT-**1** showed the highest antioxidant activity with IC_{50} values 0.02 mM. Moreover, TMT-**1** exhibited strong inhibition activity against maltase (IC_{50} 5.45 µM) and sucrase (IC_{50} 43.57 µM), whereas TMT-**2** showed high inhibition against maltase and yeast enzymes. Moreover, inhibition activity modified compounds against on yeast α-glucosidase were performed and compared with the parent compound (TMT-**1**). Of modified compounds, TMT-**1b** exhibited highest inhibition against yeast α-glucosidase with IC_{50} values 1.54 mM (where, acarbose IC_{50} values 7.57 mM was used as standard) more inhibit than parent compound TMT-**1** (nordentatin, 37.62 mM) on yeast α-glucosidase enzymes. In addition, the evaluation of cell viability of *Hela* (cervical cancer) and T47D (breast cancer) of isolates and semi-synthesized compounds were performed. Among tested compounds, new compound TMT-**4** (excavatin-A) showed the highest cell cytotoxic activity on hela (IC_{50}, 44.5 µM) and on the other hand, TMT-**1** (nordentatin) showed the highest values on T47D (IC_{50} 41.3 µM).

Keywords: Clausena excavata, excavatin-A, nordentatin, dentatin, heptaphylline, 7-hydroxyheptaphylline, xanthoxyletin, mukonine, pyranocoumarin benzoates, antioxidant, α-glucosidase inhibitor, Hela, T47D