Anticancer Activity of Selected *Colocasia gigantia* Fractions

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The objective of this study is to investigate the anticancer potential of the extract of Colocasia gigantea C. gigantea), a plant member of the Araceae family. In the present study, we investigated the cytotoxic activity of C. gigantea extract on cervical cancer (Hela) and human white blood cells (WBC) in vitro. The authors then identified the bioactive ingredients that demonstrated cytotoxicity on tested cells and evaluated those bioactive ingredients using the bioassay-guided fractionation method. The results showed that not all parts of C. gigantea promote cytotoxic activity. The dichloromethane leaf fraction showed significant cell proliferation effect on Hela cells, but not on WBCs. Only the n-hexane tuber fraction (Fr. 1T) exhibited significant cytotoxicity on Hela cells (IC_{50} = 585 μg/ml) and encouraged WBC cell proliferation. From GC-Mass spectrometry, 4,22-Stigmastadiene-3-one, Diazoprogesterone, 9-Octadecenoic acid (Z)-, hexyl ester, and Oleic Acid were the components of Fr. 1T that demonstrated cytotoxic potential. In conclusion, C. gigantea's Fr. 1T shows potential for cervical cancer treatment.

Keywords: *Colocasia gigantea (Araceae), Cervical cancer, Cytotoxicity, Bioactive ingredients*

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Cancer is a disease of uncontrollable cell fission in malignant tumors that invade normal human body systems[1,2]. Many factors are known to increase the risk of contracting cancer, such as environmental pollutants, radiation, stress, obesity, and diet[2]. Cancer is a primary health crisis problem for people in many parts of the world[1,3]. Thailand is one of the many countries that has been affected by cancer. National Cancer Institute Thailand, a cancer research and care center under the Thailand Ministry of Public Health reported 3,314 new cancer patients in Thailand in 2009[4]. Among all cancers, cervical cancer is the most common carcinoma found in Thailand[4].

Many studies and articles from all over the world have reported the anticancer activity of phytochemical ingredients[5,6]. Plants are a source of natural bioactive compounds. Various compounds are cytotoxic and therefore have the potential for anticancer activity[7-11]. When contained in nutrients and foodstuffs, the cytotoxicity of phytochemicals must target specific cells, such as cancer cells, and must not be harmful to consumers[1].

Colocasia gigantea Hook. f. was selected for this study. *C. gigantea* belongs to the Araceae family, similar to *Colocasia esculenta (L.) Schott* (Taro). *C. gigantea* grows commonly in Thailand and other Southeast Asian countries[12]. In the Pacific islands, the tubers are cooked and eaten as a starch[12]. In India and Bangladesh, the tubers are used as a main ingredient in curries and stews[13]. In Thailand, *C. gigantea* is considered as a minor food crop and is mainly utilized as a stem vegetable. *C. gigantea*'s stem is often used for making homemade Thai food called "Bon curry". In Thai traditional medicine, *C. gigantea* tuber is heated over a fire. It is used to reduce "internal heat" (fever) and also for the treatment of drowsiness. Fresh tuber has been shown to ameliorate stomach problems, combat infection, and accelerate the healing

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of wounds. In the northern region of Thailand, fresh or dried tuber is used for the treatment of phlegm by mixing it with honey[14].

The objective of the present study was to explore *C. gigantea* as an anticancer agent against cervical cancer cells. Our method of investigation centered on the use of Hela *in vitro* and bioassay-guided fractionation techniques to identify bioactive ingredients in the active fractions of *C. gigantea.*

Material and Method

Extraction

Tuber and leaf components of *C. gigantea* were obtained from the Department of Anatomy, Faculty of Medicine, Chulalongkorn University. The tuber and leaf samples were washed with water, cut, and dried by dehydrator at 40°C for 5 days. They were then ground into small pieces with a grinder. *C. gigantea* extract samples were obtained by macerating the *C. gigantea* in n-hexane (n-C_6H_{14}) for 3 days at room temperature; this step was performed 3 times. The mixture was then filtered using a vacuum filter. The filtrate was concentrated to remove n-C_6H_{14} under reduced pressure by rotary vacuum evaporator to obtain a crude n-C_6H_{14} fraction. Marc was then extracted using dichloromethane (CH_2Cl_2) and then again using methanol (CH_3OH), with increasing polarity. For both dichloromethane and methanol, the same extraction process used for n-hexane (n-C_6H_{14}) was used. These fractions were evaluated for cytotoxic activity, with the most active fractions identified for further fractionation. The *C. gigantea* extraction process is illustrated in Fig. 1.

Fractionation

Column chromatography was used for isolating compounds which stationary phase was silica gel 60 (230-400 mesh ASTM). Thin layer chromatography (TLC, aluminum sheet silica gel 60 F_{254}) was used for the detection of compound fractions. UV light at wavelengths of 254 and 365 nm and 5% anisaldehyde in sulfuric acid heated to 110°C were used for the detection of compound fractions on TLC sheets.

Identification of fractions

Modification of Mitova et al 2003[15], GC-Mass spectroscopy (Leco Corporation, St. Joseph, MI, USA) was used for fraction identification. The column HP5-MS (30 m x 0.25 mm, 0.25 µm film thickness) was used. The injector port was set at 300°C. The injection volume was 0.2 µl and injections were carried out under split/splitless: split/split ratio: 1:20. Helium was used as a carrier gas with a constant flow of 1 ml/min. The temperature was programmed from 40°C (2 min) to 300°C at a rate of 6°C min^{-1} with a 10 min hold. The fractions in the test solution were identified by comparing the spectra with known compounds stored in the internal library.

Cell lines and culture

Cervical cancer cells (Hela) were obtained from the Department of Anatomy, Faculty of Medicine, Chulalongkorn University. Human white blood cells (WBC) were collected from the blood of one of the research authors and this sample was used as the primary cell line in the experiment. Hela cells were maintained in Dulbecco's Modified Eagle's Medium (DMEM). WBCs were maintained in Roswell Park Memorial Institute Medium (RPMI) at 37°C in an incubator containing 5% CO_2. Both DMEM and RPMI were supplemented with 10% (v/v) fetal bovine serum (FBS), 1% penicillin/streptomycin, and 3.7 g/L sodium bicarbonate (Na_2CO_3).

In vitro assay for cytotoxicity

Hela cells were washed two times with phosphate buffered saline (PBS) and were then

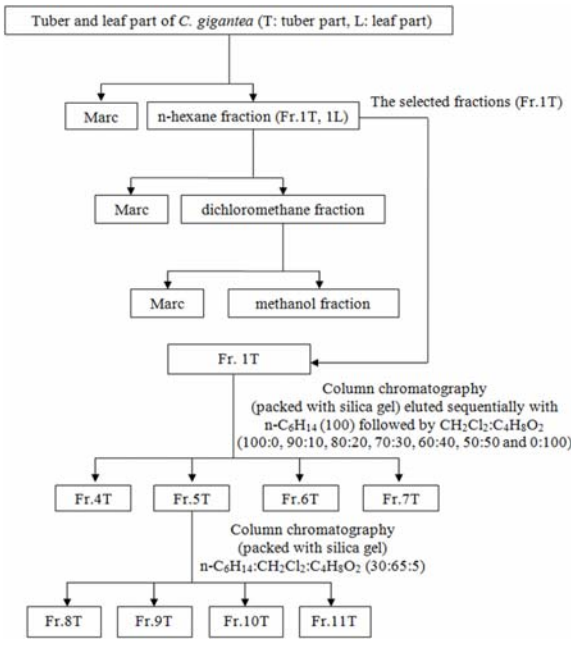

Fig. 1 Bioactive compound extraction and fractionation process for the evaluation of cytotoxic activity in *C. gigantea.*

collected by trypsinization. Hela cells and WBC cells were stained with trypan blue. Cell counts were adjusted to 1 x 10^3 cell/well and seeded in 96-well plates containing DMEM medium for Hela and RPMI medium for WBC cells and then incubated for 24 hours in an incubator. After 24 hours of incubation, the Hela and WBC cells were treated with various concentrations *of C. gigantea* fractions and then incubated for an additional 48 hours. *C. gigantea* fraction-free plates containing DMEM for Hela and RPMI for WBC were used as a negative control. Doxorubicin (Adriamycin), an effective anticancer drug, was used as a positive control. PrestoBlue™ Cell Viability Reagent was used as a cell viability indicator after treatment (48-hour incubation). 10 µl of PrestoBlue™ Cell Viability Reagent was added to each well and then incubated for 30 minutes. Cytotoxicity was determined by measurement of the fluorescence of the converted PrestoBlue™ Cell Viability Reagent at a wavelength of 590 nm in a microplate reader (BioTeK Synergy HT, Winooski, VT, USA). Percent (%) of cell viability was calculated from:

$$\text{Cell viability (\%)} = \frac{\text{Treated cells}}{\text{Negative control}} \times 100$$

Statistical analysis

All experiments were conducted as three independent replicates. The experimental data are shown in terms of both mean and standard deviation. The data were analyzed using Microsoft Excel software (Microsoft Software Inc., Redmond WA, USA) and GraphPad Prism 5 (GraphPad Software Inc., San Diego, CA, USA).

Results

Screening of crude n-hexane, dichloromethane, and methanol fractions for cytotoxicity

The objective of the initial experiment was to screen the crude n-C_6H_{14}, CH_2Cl_2, and CH_3OH fractions of tuber and leaf parts of *C.gigantea* for cytotoxicity. The concentrations of each fraction were 62.5, 125, 250, 500, and 1,000 µg/ml. As shown in Table 1, only fraction 1T from the tuber part of *C. gigantea* exhibited cytotoxicity on Hela cells. The half maximal inhibitory concentration value (IC_{50}) was 585 µg/ml for Hela cells. Fig. 2 describes how increasing concentrations of fraction 1T resulted in a dramatic decrease in Hela cell viability. The IC_{50} value of doxorubicin on Hela cells was 7.03 µM, which is equivalent to 3.82 µg/ml. Fraction 1T from the tuber part not only expressed cytotoxicity on Hela cells, but also significantly stimulated WBC

Table 1. Cytotoxicity of the crude fractions on Hela and WBC cells *in vitro*

Fractions	IC_{50} (µg/ml)	
	Hela	WBC
1T	585	-[a]
2T	-	-
3T	-	-
1L	-	-
2L	-	-
3L	-	-
Doxorubicin	3.82	-

Fraction cytotoxicity is considered statistically significant if >1,000 µg/ml and doxorubin cytotoxicity is considered sta tistically significant if >5.43 µg/ml.

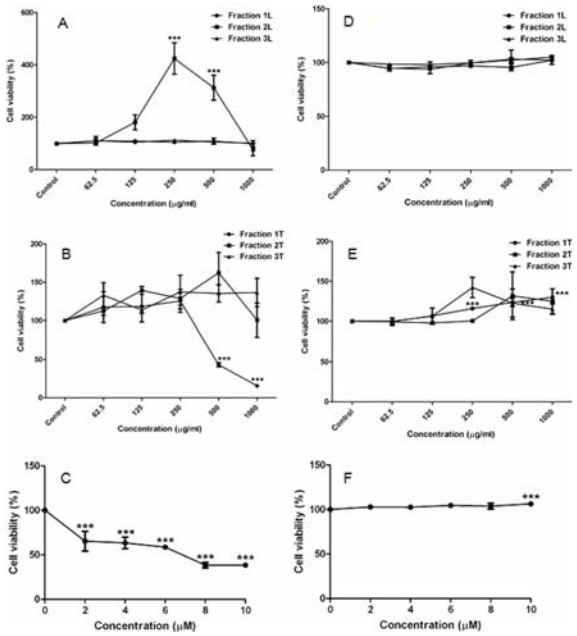

Fig. 2 Screening of crude n-C_6H_{14}, CH_2Cl_2, and CH_3OH fractions for cytotoxicity *in vitro*: (A) Growth inhibition of leaf part fractions on Hela cells, (B) growth inhibition of tuber part fractions on Hela cells, (C) growth inhibition of doxorubicin on Hela cells, (D) growth inhibition of leaf part fractions on WBC cells, (E) growth inhibition of tuber part fractions on WBC cells, (F) growth inhibition of doxorubicin on WBC cells (the triple asterisk (***) indicates a significant difference from the control $p<0.001$, one-way ANOVA, Dunett's test) Results are mean values ±SD of independent experiments performed in triplicate.

cell proliferation. Inexplicably, fraction 2L from the leaf part stimulated Hela cell proliferation very significantly (Fig. 2). Hela cell proliferation varied according to fraction 2L concentration, with the highest level of cell proliferation occurring at 250 µg/ml. The IC_{50} values of all fractions and doxorubicin on WBC cells were more than 1,000 µg/ml and 10 µM (equivalent to 5.43 µg/ml), respectively. From the experimental results, fraction 1T was selected for further investigation.

Bioassay-guided fractionation of the fraction 1T

Fraction 1T was loaded into column chromatography, which was packed with silica gel and eluted sequentially with n-C_6H_{14} (100), followed by CH_2Cl_2: $C_4H_8O_2$ (100:0, 90:10, 80:20, 70:30, 60:40, 50:50, and 0:100), to yield four fractions (4T, 5T, 6T and 7T). Each fraction was once again subjected to cytotoxicity testing to observe the most active fraction. As described in Table 2, fraction 5T (CH_2Cl_2: $C_4H_8O_2$; 80:20) was associated with the lowest IC_{50} value (IC_{50} = 93.0 µg/ml). Fig. 3 further illustrates that IC_{50} values for all fractions exceeded 500 µg/ml with regard to WBC cells. Moreover, fraction 5T not only delivered the lowest IC_{50} value with regard to Hela cells, but also stimulated significant WBC cell proliferation. Increasing concentrations of fraction 5T dramatically decreased Hela cell viability. Therefore, fraction 5T was chosen for further fractionation. Fraction 5T was then subjected to column chromatography on silica gel eluted with n-C_6H_{14}: CH_2Cl_2: $C_4H_8O_2$ (30:65:5) to yield four fractions (8T, 9T, 10T and 11T). Once again, a descriptive outline of the fractionation process is illustrated in Fig. 1. Additionally, Fig. 4 pictorially describes Hela cell morphology resulting from treatment with fraction 5T.

The bioactive ingredients in fractions 8T, 9T, 10T and 11T, which were fractionated from fraction 5T, were analyzed by GC-Mass spectroscopy and the analyzed results are shown in Table 3. Analysis of the chromatograms showed that the most commonly occurring and the highest peak height of expected bioactive compounds found in fractions 8T, 9T, 10T and 11T belonged to 4,22-Stigmastadiene-3-one,

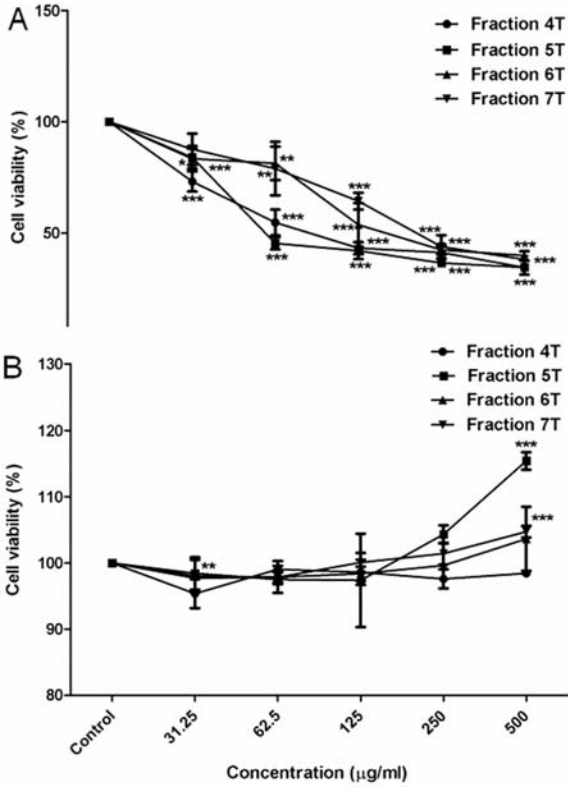

Fig. 3 Cytotoxicity of 4T, 5T, 6T and 7T fractions *in vitro*: (A) The cytotoxicity of each fraction on Hela cells; (B) The cytotoxicity of each fraction on WBC cells (the triple asterisk (***) indicates a significant difference from the control $p<0.001$, one-way ANOVA, Dunett's test). Results are mean values ±SD of independent experiments performed in triplicate.

Table 2. Cytotoxicity of 4 fractions fractionated from fraction 1T on Hela and WBC cells *in vitro*

Cell	IC_{50} (µg/ml) Fraction 1T				
	4T	5T	6T	7T	Doxorubicin
Hela	104	93.0	166	210	3.82
WBC	-[a]	-	-	-	-

Fraction cytotoxicity is considered statistically significant if > 500 µg/ml and Doxorubin cytotoxicity is considered statistically significant if > 5.43 µg/ml

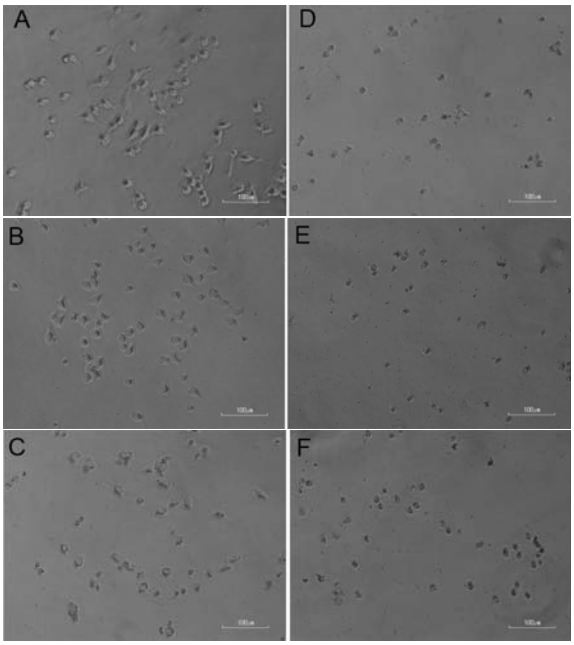

Fig. 4 Hela cell morphology after being treated fraction 5T: (A) control; (B-F) Hela cells treated with fraction 5T concentrations of 32.25, 61.5, 125, 250, and 500 μg/ml, respectively.

Diazoprogesterone, 9-Octadecenoic acid (Z)-, hexyl ester, and Oleic Acid, respectively.

Discussion

C. esculenta has been reported to contain several biologically active ingredients and has been used as a food and a traditional medicinal plant[14]. Although, there are many reports that highlight the biological activities of the phytochemicals in *C. esculenta*, there are few reports on *C. gigantea*'s biological activities and its bioactive ingredients. This study is the first to report the cytotoxic activity and the suspected bioactive ingredients of some *C. gigantea* fractions on Hela cells. The results showed that not all parts of *C. gigantea* demonstrated cytotoxicity on Hela cells. In fact and paradoxically, some *C. gigantea* leaf part fractions promoted significant Hela cell proliferation. Similarly, Wei et al (2011)[16] reported that extract from the leaf part of *C. esculenta* encouraged human breast adenocarcinoma (MCF-7) proliferation. Accordingly, cancer patients should perhaps avoid reasonable precautions against the consumption of *C. gigantea* leaf parts as a food ingredient. *C. gigantea* fraction 1T, which comes from the tuber portion of the plant, demonstrates two different pathways for Hela cell inhibition. First, it directly restrains Hela cell proliferation by the effects of its bioactive ingredients. Second, fraction 1T encourages the immune system by acting as a mitogen. Ohno et al (1994)[17] reported that mitogen activated lymphocytes can kill numerous types of colon cancer cells in humans and in rodents. To demonstrate that the cytotoxicity of the bioactive ingredients in this case is specific to Hela cells, but is safe for human white blood cells, fraction 1T from the tuber part of *C. gigantea* stimulated WBC cell proliferation significantly. The experimental results on WBC cells in the present study were similar to the results reported by Brown et al (2005)[5], in which normal mouse splenocyte cells were treated with *C. esculenta* extract. Brown et al suggested that *C. esculenta* contains an endogenous mitogen and a mannose-binding lectin, similar to *Phasleus vulgaris*, that activates lymphocytes[18,19]. Some lectins can induce lymphocyte proliferation through interleukin-2 production. Lymphocytes incubated 1-2 days with a high dose of interleukin-2 induced normal lymphocytes to become lymphokine-activated killer cells (LAK). LAK cells have a non-specific tumoricidal activity that kills various types of cancer cells[17].

The main idea of bioactive ingredients in anti-cancer property *in vitro* is that it acts on non-nutritive plant compounds[5]. Bioassay-guided fractionation was the method used for the identification of active ingredients. Column chromatography was used for the fractionation of bioactive ingredients. TLC and GC-Mass spectroscopy were used to observe various components contained within each fraction.

4,22-Stigmastadiene-3-one and Diazoprogesterone can be classified as a phytosterol. There have been many reports regarding the anticancer activities of phytosterol[20,21]. Phytosterol can act against carcinogenesis by various mechanisms. The authors expected that phytosterol in *C. gigantea* might be a bioactive ingredient that plays an important role as an anticancer compound. In 2004, Awad et al[22] reported on mechanisms of phytosterol acting on cancer cells. Phytosterol suppressed cancer development by reducing the production of carcinogens. In 2005, Vivancos and Moreno[23] reported that phytosterol increased the activities of antioxidant enzymes, superoxide dismutase, and glutathione peroxidase in cultured macrophages. They suggested that phytosterol prevented cells from damage by reactive oxygen species. Phytosterol also induces apoptosis in cancer cells, an important mechanism in the inhibition of carcinogenesis[20]. Park et al (2007)[24], Moon et al (2007)[25], and Rubis et al (2008)[26] published the

Table 3. The chemical ingredients of fractions 8T and 9T that were isolated from fraction 5T and analyzed by GC-Mass spectroscopy

No.	Rate (sec)	Molecular Formula	%	Name
Fraction 8T				
1	150.9	$C_6H_{12}O$	1.34	Furan, tetrahydro-2,5-dimethyl-
2	183.75	$C_3H_8O_2$	39.08	(S)-(+)-1,2-Propanediol
3	226.95	$C_5H_8O_2$	1.23	1-Propen-2-ol, acetate
4	240.75	$C_6H_{12}O$	3.49	Hexanal
5	1160.75	$C_{10}H_{18}O_3$	1.46	Nonanoic acid, 9-oxo-, methyl ester
6	1627.7	$C_6H_{12}O$	1.31	Pentanal, 2-methyl-
7	1868.8	$C_7H_{17}NO$	0.74	Dimethylamine, N-(neopentyloxy)-
8	2022.7	$C_{18}H_{34}O_2$	3.90	Oleic Acid
9	2037.1	$C_{19}H_{37}MoNO_3P_2$	0.95	Molybdenum,tricarbonyl-[N-butyl-bis [2-(butylphosphino)ethyl] amine]
10	2099.8	$C_{11}H19ClO$	4.74	10-Undecenoyl chloride
11	2240.1	$C_{28}H_{46}O_4$	0.98	Phthalic acid, dodecyl 2-ethylhexyl ester
12	2276.3	$C_{12}H_{22}N_2O_4$	6.63	N,N'-Bis(2-methyl-2-nitrosopentan-4-one)
13	2464.75	$C_{10}H_{16}O_2$	3.04	4,8-Dioxatricyclo[5.1.0.0(3,5)]octane, 1-methyl-5-(1-methylethyl)-, (1a,3a,5a,7a)-
14	2804.05	$C_{26}H_{36}O_8$	2.41	1H-Cyclopropa[3,4]benz[1,2-e]azulene-5,7b,9,9a-tetrol, 1a,1b,4,4a,5,7a,8,9-octahydro-3-(hydroxymethyl)-1,1,6,8-9a-triacetate, [1aR-(1aa,1ba,4aa,5a,7aa,7ba,8a,9a,9aa)]-tetramethyl-, 5,9
15	2824.4	$C_{29}H_{46}O$	10.66	4,22-Stigmastadiene-3-one
16	2874.1	$C_{21}H_{30}N_4$	5.15	Diazoprogesterone
Fraction 9T				
1	239.55	C_7H_{16}	4.18	Hexane, 3-methyl-
2	241.05	$C_4H_{10}N_2$	4.12	(2-Aziridinylethyl)amine
3	2022.45	$C_{18}H_{34}O_2$	13.65	Oleic Acid
4	2718.2	$C_{27}H_{38}O_4S_2$	18.17	2a,4a-Epoxymethylphenanthrene-7-methanol, 1,1-dimethyl-2-methoxy-8-(1,3-dithiin-2-ylidene)methyl-acetate1,2,3,4,4a,4b,5,6,7,8,8a,9-dodecahydro-
5	2736.7	$C_{21}H_{30}N_4$	48.42	Diazoprogesterone

apoptosis mechanism of β-sitosterol and showed that it increased the activity of caspase-3 and, at the same time, deactivated the Bcl-2 pathway. Furthermore, Moon et al (2007)[25] explained the activation of caspase-3 showing that phytosterol could be mediated by extracellular signals that were complemented by mitochondrial pathways. Moreover, phytosterol also inhibited angiogenesis and metastasis in cancer cell proliferation[27]. Choi et al (2007)[28] found basic fibroblast growth factor (bFGF)-induced angiogenesis in endothelial cells isolated from human umbilical veins and successfully reduced proliferation of the cells with campesterol treatment. The anticancer property of Oleic Acid was proposed by Menendez et al (2005)[29]. They observed that Oleic Acid supported trastuzumab (Herceptin, an anticancer drug) when used in cancer cell cultures. They suggested that Oleic Acid up-regulates polyomavirus enhancer activator 3 (PEA3), which suppressed the expression of human epidermal growth factor receptor 2 (HER2/neu), a cause of breast cancers. Therefore, high levels of PEA3 would result in lower levels of HER2/neu, thereby lowering the risk of cancer onset as a result of HER2/neu over-expression. Valko et al (2007)[30] and Sakthivel et al (2010)[31] reported that Diazoprogesterone, 9-Octadecenoic acid (Z)-, hexyl ester, and Oleic Acid not only displayed anticancer activity, but also had antimicrobial, hypercholesterolaemic, and anti-ulcerogenic effects.

Conclusion

The potential anticancer properties of *C. gigantea* tuber parts had the combined effect of

Table 4. The chemical ingredients of fractions 10T and 11T that were isolated from fraction 5T and analyzed by GC-Mass spectroscopy

No.	Rate (sec)	Molecular Formula	%	Name
Fraction 10T				
1	150.7	$C_6H_{12}O$	2.66	Furan, tetrahydro-2,5-dimethyl-
2	226.45	$C_5H_8O_2$	4.44	1-Propen-2-ol, acetate
3	239.55	$C_{32}H_{45}NO_3$	10.36	3'H-Cycloprop(1,2) cholesta-1,4,6-trien-3- one, 1'-carboethoxy-1' -cyano-1a,2a-dihydro-
4	240.45	$C_6H_{12}O$	16.27	Hexanal
5	573.45	$C_6H_{12}O_2$	0.65	Pentanoic acid, 2-methyl-
6	700.65	$C_{12}H_{20}O_4$	0.76	Oxalic acid, allyl heptyl ester
7	728.75	$C_9H_{18}O_2$	1.69	Octanoic acid, methyl ester
8	932.95	$C_7H_{12}O$	0.94	4-Pentenal, 2-ethyl-
9	1026	$C_9H_{16}O_3$	1.42	Methyl 8-oxooctanoate
10	1040.35	$C_{11}H_{20}O$	1.01	2-n-Hexylcyclopentanone
11	1116	$C_9H_{16}O_2$	4.78	4-Octenoic acid, methyl ester, (Z)-
12	1160.9	$C_{10}H_{18}O_3$	9.82	Nonanoic acid, 9-oxo-, methyl ester
13	1627.7	$C_8H_{16}O$	1.71	2-Heptanone, 5-methyl-
14	1712.2	$C_8H_{16}O_2$	0.96	2-Methylheptanoic acid
15	1869.95	$C_{13}H_{26}O_2$	2.69	Decanoic acid, propyl ester
16	2023.7	$C_{24}H_{46}O_2$	18.08	9-Octadecenoic acid (Z)-, hexyl ester
17	2047	$C_7H_{17}NO$	0.77	Dimethylamine, N-(neopentyloxy)-
18	2051.7	$C_9H_{17}ClO$	2.92	Nonanoyl chloride
19	2095.35	$C_{10}H_{16}O_2$	1.44	Tetrahydrofuran-2-one, 3-[2-pentenyl]-4-methyl-
Fraction 11T				
1	151.15	$C_6H_{12}O$	1.40	Furan, tetrahydro-2,5-dimethyl-
2	536.55	$C_5H_{10}O_2$	13.02	Pentanoic acid
3	1115.75	$C_7H_{14}O_2$	2.69	Hexanoic acid, methyl ester
4	2022.7	$C_{18}H_{34}O_2$	23.58	Oleic Acid
5	2050.4	$C_{11}H_{20}O_3$	2.43	Decanoic acid, 2-oxo-, methyl ester
6	2240.15	$C_{27}H_{38}O_4S_2$	17.86	2a,4a-Epoxymethylphenanthrene-7-methanol, 1,1-dimethyl-2-methoxy-8-(1,3-dithiin-2-ylidene) methyl-1,2,3,4,4a,4b,5,6,7,8,8a,9-dodecahydro-, acetate

inhibiting cervical cancer Hela cell proliferation and stimulating human white blood cell growth. These experimental results may stimulate future research and *in vivo* mechanism studies on cell death. The results demonstrate that a fraction extracted from *C. gigantea* tuber parts (using n-hexane (n-C_6H_{14}) as a solvent) contains powerful bioactive ingredients with anticancer properties. With further study, these findings may contribute to the development of new-targeted cancer chemotherapy agents.

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Potential conflicts of interest

None.

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ฤทธิ์ต้านมะเร็งของส่วนสกัดที่ถูกัดเลือกจาก COLOCASIA GIGANTEA

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งานวิจัยนี้มีวัตถุประสงค์ที่จะตรวจสอบศักยภาพในการต่อต้านมะเร็งของสารสกัดจากต้นบอนคูน (Colocasia gigantea) ซึ่งอยู่ในวงศ์ Araceae ในการศึกษาได้มีการตรวจสอบฤทธิ์ความเป็นพิษต่อเซลล์ของสารสกัดจากต้นบอนคูนโดยใช้เซลล์มะเร็งปากมดลูก (Hela) และเซลล์เม็ดเลือดขาวในหลอดทดลอง อีกทั้งตรวจสอบสารออกฤทธิ์ทางชีวภาพในสารสกัดจากต้นบอนคูนซึ่งมีความเป็นพิษต่อเซลล์ด้วยวิธี bioassay-guided fractionation ผลการทดลองแสดงให้เห็นว่าไม่ใช่สารสกัดจากต้นบอนคูนทุกส่วนที่ก่อให้เกิดความเป็นพิษต่อเซลล์มะเร็งปากมดลูก โดยสารสกัดที่ได้จากส่วนของใบซึ่งใช้ไดคลอโรมีเทนเป็นตัวทำละลายสามารถเร่งการเจริญเติบโตของเซลล์มะเร็งปากมดลูกแต่ไม่เร่งการเจริญเติบโตของเซลล์เม็ดเลือดขาว ในขณะที่สารสกัดซึ่งได้จากส่วนของลำต้นใต้ดินโดยใช้เฮกเซนเป็นตัวทำละลาย (Fr.1T) มีความเป็นพิษต่อเซลล์มะเร็งปากมดลูก (IC_{50} = 585 ไมโครกรัมต่อมิลลิลิตร) แต่เร่งการเจริญเติบโตของเซลล์เม็ดเลือดขาว ผลการวิเคราะห์ด้วยเทคนิค GC-MS พบว่าสารสกัด Fr.1T ประกอบไปด้วย 4,22-Stigmastadiene-3-one, Diazoprogesterone, 9-Octadecenoic acid (Z)-, hexyl ester และ Oleic acid ซึ่งคาดว่าจะมีฤทธิ์ความเป็นพิษต่อเซลล์ดังนั้นจึงสรุปว่าสารสกัด Fr.1T จากต้นบอนคูนมีศักยภาพที่จะใช้รักษามะเร็งปากมดลูกได้