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PHYTOCHEMICAL SCREENING AND CYTOTOXIC EVALUATION FROM LEAF EXTRACTS OF *COMBRETUM QUADRANGULARE* AND *CLERODENDRUM INERME* ON MCF-7 AND HEPG2 CANCER CELL LINES

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Abstract: Cancer is the second most common disease causing human deaths worldwide. Recent studies have disclosed that medicinal plants exhibit anticancer activity through various mechanisms. The present study is aimed at determining cytotoxicities from the leaf extracts of *C. quadrangulare* and *C. inerme*, and investigating their extracted secondary metabolites. Phytochemical screening confirmed the presence of phyto-constituents such as phenols, flavonoids, tannins, triterpenoids, saponins, and steroids in *C. quadrangulare* leaves whereas alkaloids, phenols, flavonoids, tannins, coumarins, triterpenoids, saponins, and steroids were found in *C. inerme* leaves. The results indicated a different level of cytotoxic activity against MCF-7 and HepG2 cancer cell lines using *C. quadrangulare* and *C. inerme* crude or fractionated extracts. Ethyl acetate extraction in both medicinal materials demonstrated higher cytotoxicity.

Key words: *Combretum quadrangulare*; *Clerodendrum inerme*; phytochemical screening; cytotoxicity; MCF-7; HepG2.

1. Introduction

Cancer is considered as a burning health problem and is one of the most life - threatening diseases in both developed and developing countries [1]. Blood cancer, liver cancer, lung cancer, breast cancer, prostate cancer, cervix cancer, bone cancer, and ascites cancer are the most occurring cancers around the globe. These cancers can cause death through the loss of cell cycles leading to abnormal cell development [2, 3].

Cancer imposes a serious burden on public health and its treatment and curing processes are still scientifically challenging [4]. Current treatment therapies include chemotherapy, radiotherapy, hormone therapy, and chemically derived drugs. However, the problems of poor selectivity and severe side effects of the available anticancer drugs, have demanded the need for the development of higher safety and stronger effective chemotherapeutic agents [5]. Natural plant products may offer a solution. According to the World Health Organization, over 60% of the global population and around 80% in developing countries have used traditional and medicinal plants for their treatment purposes [6]. Herbal products are worldwide accepted as a source of complementary and alternative medicine in various diseases, especially in cancer. They have been known as alternative therapy, which are relatively safe, effective, and economical [6]. Previous studies have also shown that herbs play an important role in cancer treatment, helping to control cancer and induce apoptosis in cancer cells [5, 7].

Combretum quadrangulare Kurz. (Combretaceae) and *Clerodendrum inerme* (L.) Gaertn. (Verbenaceae) have been used as a traditional herb on the treatment of various ailments. Pharmacological studies have demonstrated that the compounds and extracts from *C. quadrangulare* and

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C. inerme leaves have extensive activities, such as anticancer, antibacterial, antifungal, antioxidant, antitumor, anti-inflammatory, antinociceptive, antilipidemic, hypoglycaemic, hepatoprotective, neuroprotective and other activities [8, 9, 10, 11]. The cytotoxic activity of *C. quadrangulare* leaf extract on HepG2 cells, a liver cancer cell line was proven in the study of Thi – Phuong Nguyen *et al.* (2018), but it needs to be deeply investigated [12]. However, there has been no report regarding the evaluation of cytotoxic activity of *C. inerme* leaves on MCF-7 and HepG2 cancer cell lines in Vietnam. This study aims to evaluate preliminary phytochemical of *C. quadrangulare* and *C. inerme* leaves and *in vitro* cytotoxicity potential activities of the crude ethanol extract and differentiation fractional extracts against MCF-7 human breast cancer cell line and HepG2 human liver cancer cell line.

2. Materials and Methods

2.1. Sample preparation

The plant *Combretum quadrangulare* and *Clerodendrum inerme* were collected on November 2016 from Tan Thanh District, Long An Province and Phu Quoc Island, Kien Giang Province, respectively. The plant samples were identified and authenticated by MSc. Le Duc Thanh (Research Center of Ginseng and Medicinal Materials, Ho Chi Minh City) and voucher specimens (TNDL-CQ-1116 and TNDL-CI-1116) were deposited for *Combretum quadrangulare* Kurz. and *Clerodendrum inerme* Gaertn. (L.), respectively. The leaves were rinsed with tap water followed by distilled water to remove the dirt on the surface. They were then air-dried to the standard of losing weight due to drying in accordance with the Vietnam Pharmacopoeia 5th Edition [13]. The dried samples were ground to a fine powder and stored individually in airtight PVE bags at the Research Center Ginseng and Medicinal Materials in Ho Chi Minh City (Sample codes: TTS-CQ-1116 and TTS-CI-1116).

2.2. Chemicals and Reagents

Ethanol 96% (OPC Pharmaceutical Company, Vietnam), *n*-hexane, chloroform, ethyl acetate, *n*-butanol (VN-Chemsol, Co. Ltd, Vietnam), Camptothecin, MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide), dimethyl sulfoxide (DMSO) were purchased from Sigma-Aldrich® Co. Ltd (USA).

2.3. Extraction and Fractionation

Dried powdered material was successively extracted (The material-solvent ratio of 1/15 (g/mL)) with 96%, 70%, and 45% ethanol at room temperature for 24 hours in an percolator apparatus. The extracts of each solvent were collected at a rate of 2 mL/min, combined and concentrated using a rotary evaporator at 60°C under reduced pressure to obtain a crude ethanol extract. To get fractionated extracts, the crude ethanol extract was solubilized in distilled water and sequentially extracted with solvents of increasing polarity (*n*-hexane, chloroform, ethyl acetate, and *n*-butanol).

Six dried extracts including CE (crude extract), *n*-hexane (F1), chloroform (F2), ethyl acetate (F3), *n*-butanol (F4), and aqueous (F5) extracts were obtained as fractional extracts. The crude and fractionated extracts were preserved in sterilized vials and stored in a refrigerator at 2-8 °C. They were dissolved in a suitable solvent to yield a stock solution.

2.4. Preliminary qualitative phytochemical analysis of secondary metabolites

Preliminary qualitative phytochemical analysis was carried out to identify the secondary metabolites in the leaf of *C. quadrangulare* and *C. inerme*. The screening was performed according to the method of Cuilei with minor modifications by University of Pharmacy and Medicine Ho Chi Minh City for alkaloids, phenols, flavonoids, tannins, triterpenoids, saponins, steroids, coumarins [14]. The qualitative results were expressed as (+) for the presence and (−) for the absence of phytochemicals.

2.5. Cell lines and cell culture

MCF-7 (HTB-22) and HepG2 cells (HB-8065) were purchased from the American Type Culture Collection (Manassas, Rockville). Cells were cultured in Eagle's Minimal Essential Medium (EMEM) supplemented with 10% (v/v) FBS, 2 mM L-glutamine, 20 mM HEPES, 0.025 µg/mL amphotericin B, 100 IU/mL penicillin G, and 100 µg/mL streptomycin at 37°C and 5% CO_2. These chemicals were purchased from Sigma-Aldrich® Co. Ltd (USA). Cells used in this study were between passages 4 and 20.

Cytotoxicity assay

Cell viability was examined via the ability of the cells to cleave the tetrazolium salt MTT by means of the mitochondrial enzyme succinate dehydrogenase following the procedure as described earlier [15]. Cells were loaded at a density of 10^4 cells/well in 96-well plates and cultured for 24 hours before being incubated with crude and fractionated extracts at different concentrations for 48 hours in triplicate. Moreover, Camptothecin as a conventional chemotherapy medication and non-treated cells (without extract) were used as positive and negative controls, respectively. After 48 hours of incubation time, 10 µL of MTT solution was added to each well to reach a final concentration of 0.45 mg/mL, including controls. After 3 hours of incubation at 37°C, the supernatant was removed and 100 µL of DMSO was added to dissolve the formazan crystals. Finally, the absorbance at 570 nm and 630 nm was measured by means of a microplate plate reader (Biotek, USA). The percentage of the growth inhibition (I%) was estimated using the following expression:

$$I\% = \frac{OD_c - OD_t}{OD_c} \times 100$$

In which OD_t and OD_c are the optical density values of the test sample and the control sample respectively.

2.6. Statistical analysis

The results were expressed in terms of mean ± SEM (Standard error of the mean), data were analyzed by means of the Graphpad Prism software (Inc., La Jolla, CA, USA) using the t-test and One-way ANOVA. *P*-values less than 0.05 were considered to demonstrate statistically significant differences.

2. Results

3.1. Phytochemical analysis

The extracts were subjected to qualitative chemical tests for the identification of various secondary metabolites present in the leaves of *C. quadrangulare* and *C. inerme*. The results showed that the *C. inerme* leaves had the presence of all secondary metabolites tested. While *C. quadrangulare* leaves contained phenols, flavonoids, tannins, triterpenoids, saponins, steroids; however, alkaloids and coumarins were not detected (Table 1).

Table 1. *Phytochemical analysis results of C. quadrangulare and C. inerme leaves via chemical reactions*

Metabolites	Test	*C. quadrangulare*	*C. inerme*
Alkaloids	Dragendorff's	-	+
	Bouchardat's	-	+
	Mayer's	-	+
Phenols	Ferric chloride	+	+
	Hot water	+	+
Flavonoids	Shinoda's	+	+
	Ferric chloride	+	+
	Alkaline reagent	+	+
	Lead acetate	+	+
Tannins	Ferric chloride	+	+
	Gelatin salt	+	+
Coumarins	Luminesce in alkaline solution	-	+
Triterpenoids	Liebermann - Burchard's test	+	+
Steroids	Liebermann - Burchard's test	+	+
Saponins	Foam test	+	+

(+): the presence; (−): the absence

3.2. Extraction yield of crude and fractionated extracts

The percentage yield of crude and fractionated extracts of *C. quadrangulare* and *C. inerme* leaves are

shown in **Table 2**. The result showed that the LOD of dried powder and the crude extract of *C. quadrangulare* leaves were 7.60 ± 0.04% and 15.20 ± 0.13% respectively, and the LOD of dried powder and the crude extract of *C. inerme* leaves were 7.92 ± 0.05% and 18.02 ± 0.15% respectively, which reached the standard concerning the raw material (≤ 13%) and condensed extract (≤ 20%).

Table 2. *Extraction yield (%) of crude and fractionated extracts*

Medicinal materials	Solvent solution					
	CE	F1	F2	F3	F4	F5
C. quadrangulare	41.07	13.61	22.04	9.79	12.08	20.67
C. inerme	33.41	3.77	5.10	27.73	24.91	44.12

(CE) crude ethanol extract, (F1) n-hexane, (F2) chloroform, (F3) ethyl acetate, (F4) n-butanol, and (F5) aqueous fractions.

3.3. Cytotoxic activity of *C. quadrangulare* and *C. inerme* leaves on MCF-7 cancer cells

1.The result of MTT assays as shown in **Fig. 1** revealed that the crude and fractionated extracts of *C. quadrangulare* and *C. inerme* leaves decreased the percent viability of MCF-7 cancer cells. At a concentration of 100 µg/mL, the *n*-hexane and ethyl acetate fractions of *C. quadrangulare* leaves, and ethyl acetate fraction of *C. inerme* leaves had cytotoxic activity against MCF-7 cancer cells with toxic percentage of 54.12 ± 3.53%, 73.09 ± 1.56%, and 63.84 ± 9.78%, respectively, which were significantly higher than other extracts. Furthermore, increasing concentration to 300 µg/mL resulted in an increase in the toxic activity of crude and fractionated extracts of *C. inerme* leaves. The highest activity were found in the ethyl acetate fraction with percentage cytotoxicity of 68.44 ± 0.65%. In contrast, the extracts of *C. quadrangulare* leaves at the concentration of 300 µg/mL led to decrease cytotoxic activity. The aqueous fraction had the highest toxic activity with a percent inhibition of 42.92 ± 0.93%. Meanwhile, the effect induced by the standard chemotherapeutic drugs (camptothecin) at a concentration of 0.01 µg/mL reached 24.50 ± 1.25% for MCF-7 cancer cells.

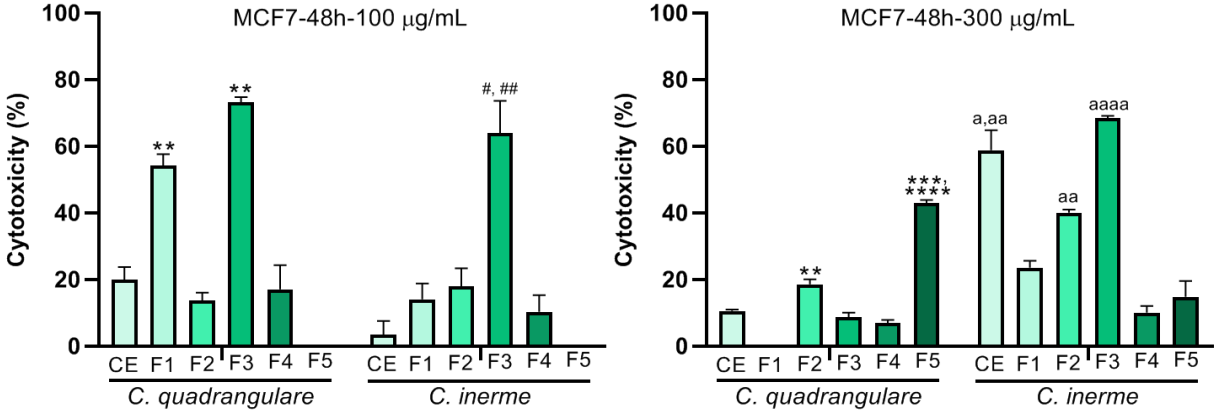


Figure 1. *Cytotoxicity of crude extract and different fractions of C. quadrangulare and C. inerme leaves on MCF-7 cancer cell line*

All values are expressed as mean ± SEM (n = 3), $^{**}p < 0.01$ compared with other extracts, $^{***}p < 0.001$ compared with F2 fraction, $^{****}p < 0.0001$ compared with CE extract, F3 and F4 fractions, $^{\#}p < 0.05$ compared with F1, F2, and F4 fractions, $^{\#\#}p < 0.01$ compared with CE extract, $^{a}p < 0.05$ compared with F2 fraction, $^{aa}p < 0.01$ compared with F1, F4, and F5 fractions, $^{aa}p < 0.01$ compared with F1, F4, and F5 fractions, $^{aaaa}p < 0.0001$ compared with other extracts, *(CE) crude ethanol extract, (F1) n-hexane, (F2) chloroform, (F3) ethyl acetate, (F4) n-butanol, and (F5) aqueous fractions.*

3.4. Cytotoxic activity of *C. quadrangulare* and *C. inerme* leaves on HepG2 cancer cells

2.As the results via MTT assays (**Fig. 2),** the crude extract and fractionated extract of *C. quadrangulare* and

C. inerme leaves were not toxic on HepG2 cancer cells under treatment at a concentrations of 100 μg/mL. When the concentration to 300 μg/mL was increased, the toxic activity of the extracts dramatically increased. The certain effect was observed under treatment using crude extract, *n*-hexane chloroform, ethyl acetate, *n*-butanol fractioned extract by *C. quadrangulare* leaves. Except for aqueous fraction, the other extracts exhibited more than 50% cytotoxic. In particular, *n*-hexane (91.36 ± 0.77%) fraction had the strongest cytotoxicity against HepG2 cancer cells, whereas only ethyl acetate fraction of *C. inerme* leaves had cytotoxic activity against HepG2 at this concentration with a toxic percentage of 53.23 ± 2.76%. Camptothecin was used as a positive control with a percent inhibition of 27.70 ± 1.26% at a concentration of 0.01 μg/mL for HepG2 cancer cells.

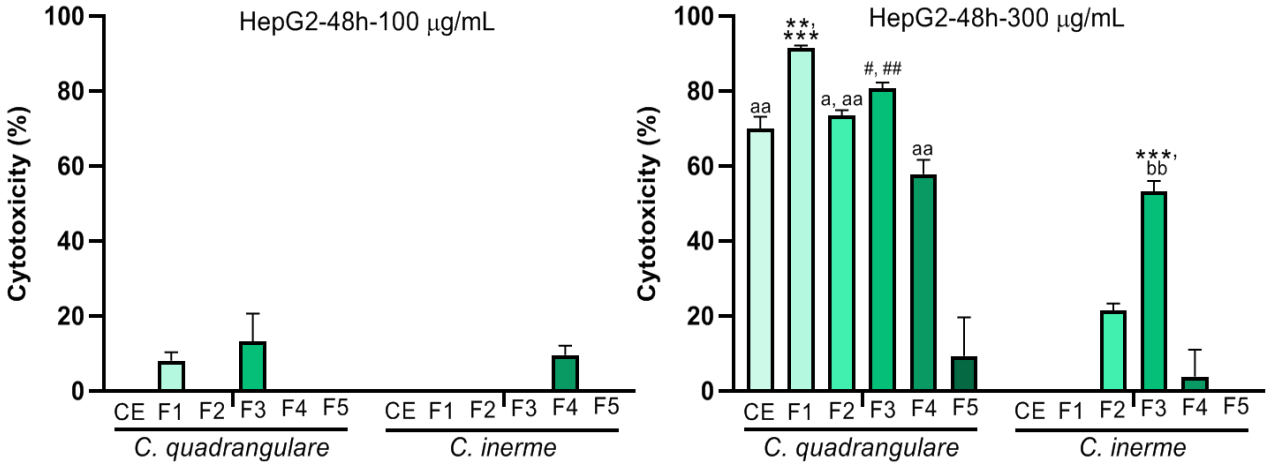


Figure 2. *Cytotoxicity of crude extract and different fractions of C. quadrangulare and C. inerme leaves on HepG2 cancer cell line*

All values are expressed as mean ± SEM (n = 3), $^{**}p < 0.01$ compared with CE extract, F3, F4, and F5 fractions, $^{***}p < 0.001$ compared with F2 fraction, $^{\#}p < 0.05$ compared with CE extract and F2 fraction, $^{\#\#}p < 0.01$ compared with F4 and F5 fractions, $^{a}p < 0.05$ compared with F4 fraction, $^{aa}p < 0.01$ compared with F5 fraction, $^{bb}p < 0.01$ compared with F4 fraction *(CE) crude ethanol extract, (F1) n-hexane, (F2) chloroform, (F3) ethyl acetate, (F4) n-butanol, and (F5) aqueous fractions.*

3. Discussion

In recent years, the use of herbal medicines in cancer treatment has received increasing attention due to their varied phyto-metabolic contents with multiple biological activities. Phytochemical analysis revealed the presence of secondary metabolites in the selected extracts of the plant. These secondary metabolites are reported to have many biological and therapeutic properties [16]. Some major secondary metabolites identified in the leaf extract of *C. quadrangulare* and *C. inerme* leaves were polyphenols such as flavonoids and tannins, saponins. These phytochemical groups are known for their anticancer, antioxidant, anti-inflammatory, antidiabetic, and other activities [17, 18].

In this study, the MTT assay was used to screen the crude and fractionated extracts of *C. quadrangulare* and *C. inerme* leaves to assess the toxicity. The assay also provided an indication of possible cytotoxic properties of the tested plant extracts. The MTT assay is based on the reduction of MTT via mitochondrial dehydrogenase with the purple formazan product. It is frequently used as an *in vitro* model system to measure cytotoxic effects of a variety of toxic substances and plant extracts against cancer cell lines [19]. *In vitro* cytotoxicity test using MCF-7 and HepG2 human cancer cell lines were performed to screen cytotoxic activity of leaf extracts of *C. quadrangulare* and *C. inerme*. The crude extract and different fractions of two medicinal plants showed *in*

vitro growth inhibition effects on the two cancer cell lines (MCF-7 and HepG2).

This study determined various phyto-compounds in *C. quadrangulare* and *C. inerme* leaves, including phenols, flavonoids, alkaloids, tannins, triterpenoids, and saponins. Many natural compounds such as terpenoids, saponins, phenols, tannins, flavonoids, coumarins, and alkaloids were discovered from plant sources that contain significant antioxidant activities and play an important role in cancer treatment [20]. The previous study had shown that methanol extract of *C. quadrangulare* leaves had activity to inhibit human cancer cell lines such as KB (oral cavity) and NCI-H187 (lung cancer) [12]. Recent studies have shown that the ethanol extract of *C. inerme* leaves has the effect of inhibiting proliferation of human cell lines such as lung cancer A549, liver cancer HepG2, and cervical cancer HeLa [21, 22]. Other studies also demonstrated anticancer effects of hispidulin – the main flavonoid compound of the *C. inerme* leaves, according to different molecular pathways [23, 24]. This study has demonstrated the anticancer activity of *C. inerme* and *C. quadrangulare* leaves in Vietnam on MCF-7 and HepG2 cancer cell lines. More scientific evidence is needed to comprehensively evaluate the anticancer effects of these two medicinal plants.

4. Conclusion

In conclusion, the results of this study demonstrate that the *C. quadrangulare* and *C. inerme* leaves contain a wide variety of secondary metabolites holding anticancer capacity which add scientific evidence to conduct further studies, investigate the compounds present in the plant, as well as further evaluate its anticancer potential.

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References

[1] Tagne R. S., Telefo B. P., Nyemb J. N., Yemele D. M., Njina S. N., Goka S. M., Lienou L. L., Nwabo Kamdje A. H., Moundipa P. F., Farooq A. D. (2014). Anticancer and antioxidant activities of methanol extracts and fractions of some Cameroonian medicinal plants. *Asian Pacific Journal of Tropical Medicine*, 7(1), 442-447.

[2] Aruoma O. I. (1998). Free radicals, oxidative stress, and antioxidants in human health and disease. *Journal of the American Oil Chemists' Society*, 75(2), 199-212.

[3] Sumitra C., Nagani K. (2013). In vitro and in vivo methods for anticancer activity evaluation and some Indian medicinal plants possessing anticancer properties: an overview. *Journal of Pharmacognosy and Phytochemistry*, 2(2), 140-152.

[4] Rajesh R., Chitra K., Paarakh P. M., Chidambaranathan N. (2011). Anticancer activity of aerial parts of Aerva lanata Linn Juss ex Schult against Dalton's Ascitic Lymphoma. *European Journal of Integrative Medicine*, 3(3), 245-250.

[5] Greenwell M., Rahman P. K. (2015). Medicinal Plants: Their Use in Anticancer Treatment. *International journal of pharmaceutical sciences and research*, 6(10), 4103-4112.

[6] Shrestha P. M., Dhillion S. S. (2003). Medicinal plant diversity and use in the highlands of Dolakha district, Nepal. *Journal of Ethnopharmacology*, 86(1), 81-96.

[7] Ochwang'I D. O., Kimwele C. N., Oduma J. A., Gathumbi P. K., Mbaria J. M., Kiama S. G. (2014). Medicinal plants used in treatment and management of cancer in Kakamega County Kenya. *Journal of Ethnopharmacology*, 151, 1040-1055.

[8] Esmail A. A. (2016). Chemical Constituents and Pharmacological Effects of Clerodendrum inerme-A Review. *SMU Medical Journal*, 3(1), 129-153.

[9] Roy, R., Singh R. K., Shyamal K. J., Sarkar A., Gorai D. (2014). Combretum quadrangulare (Combretaceae): Phytochemical Constituents and Biological activity. *Indo American Journal of Pharmaceutical Research*, 4(8),: 3416-3427.

[10] Nopsiri W., Chansakaow S., Putiyanan S., Natakankitkul S. S., Santiarworn D. (2014). Antioxidant and anticancer activities from leaf extracts of four Combretum species from Northern Thailand. *Chiang Mai University Journal of Natural Sciences*, 13(2), 195-205.

[11] Khan S. A., Kanwal,S., Rizwan K., Shahid S. (2018). Enhanced antimicrobial, antioxidant, in vivo antitumor and in vitro anticancer effects against breast caner cell line by green synthesized un-doped SnO2 and Co-doped SnO2 nanoparticles from Clerodendrum inerme. *Microbial Pathogenesis*, 125,

366-384.
[12] Thi-Phuong Nguyen, Thuc-Huy Duong, Huu-Hung Nguyen. (2018). Cytotoxic activity of Combretum quadrangulare leaf extracts on HepG2 cancer cell line. *Tạp chí Khoa học & Công nghệ ĐH Nguyễn Tất Thành*, 31-33.
[13] Ministry of Health (2017). *Vietnam Pharmacopoeia 5th Edition*. Medical Publishing House, Hanoi.
[14] Ciulei I. (1982). *Methodology for Analysis of Vegetables Drugs.* Ministry of Chemical Industry; Bucarest, Roumania, 67.
[15] Ogbole O. O., Segun P. A., Adeniji A. J. (2017). In vitro cytotoxic activity of medicinal plants from Nigeria ethnomedicine on Rhabdomyosarcoma cancer cell line and HPLC analysis of active extracts. *BMC complementary and alternative medicine*, 17(1), 494.
[16] Aye M. M., Aung H. T., Sein M. M., Armijos C. (2019). A Review on the Phytochemistry, Medicinal Properties and Pharmacological Activities of 15 Selected Myanmar Medicinal Plants. *Molecules* (Basel, Switzerland), 24(2), 293.
[17] Tungmunnithum D., Thongboonyou A., Pholboon A., Yangsabai A. (2018). Flavonoids and Other Phenolic Compounds from Medicinal Plants for Pharmaceutical and Medical Aspects: An Overview. *Medicines (Basel, Switzerland)*, 5(3), 93.
[18] Yuan C. S., Wang C. Z., Wicks S. M., Qi L. W. (2010). Chemical and pharmacological studies of saponins with a focus on American ginseng. *Journal of ginseng research*, 34(3), 160-167.
[19] Morshed, M. A., Uddin, A., Rahman, A., Hasan, T., Roy, S., Amin, A. A. (2011). In vitro antimicrobial and cytotoxicity screening of Terminalia arjuna ethanol extract. *Int J Biosci*, 1, 31-38.
[20] Rajandeep K., Kapoor K., Harpreet K. (2011). Plants as a source of anticancer agents. *Journal of Natural Products Plant Resource*, 1(1), 119-124.
[21] Kalavathi R., Sagayagiri R. (2016). Anticancer Activity Of Ethanolic Leaf Extract Of Clerodendrum Inerme Against Lung Adenocarcinoma Epithelial Cell Line. *European Journal of Molecular Biology and Biochemistry*, 3(2), 69-72.
[22] Kalavathi R., Sagayagiri R. (2016). Anticancer and Cytotoxicity Activities of Clerodendrum Inerme Against Human Cervical Carcinoma and Liver Cancer Cell Lines. *American Journal of Biological and Pharmaceutical Research*, 3(2), 46-49.
[23] Liu K., Gao H., Wang Q., Wang L., Zhang B., Han Z. Gao M. (2018). Hispidulin suppresses cell growth and metastasis by targeting PIM1 through JAK2/STAT3 signaling in colorectal cancer. *Cancer Science*, 109(5), 1369-1381.
[24] Yang J. M, Hung C. M., Fu C. N., Lee J. C., Huang C. H., Yang M. H., Lin C. H., Kao J. Y., Way T. D. (2010). Hispidulin Sensitizes Human Ovarian Cancer Cells to TRAIL-Induced Apoptosis by AMPK Activation Leading to Mcl-1 Block in Translation. *J. Agric. Food Chem*., 58(18), 10020-10026.

SƠ BỘ THÀNH PHẦN HOÁ THỰC VẬT VÀ ĐÁNH GIÁ HOẠT TÍNH GÂY ĐỘC TẾ BÀO CỦA CÁC CAO CHIẾT TỪ LÁ TRÂM BẦU (*COMBRETUM QUADRANGULARE*) VÀ LÁ NGỌC NỮ BIỂN (*CLERODENDRUM INERME*) TRÊN DÒNG TẾ BÀO UNG THƯ MCF-7 VÀ HEPG2

Tóm tắt: Ung thư là nguyên nhân phổ biến thứ hai gây tử vong trên toàn thế giới. Các nghiên cứu gần đây cho thấy thảo dược có hoạt tính kháng ung thư thông qua nhiều cơ chế khác nhau. Mục đích của nghiên cứu này là xác định độc tính tế bào ung thư của cao chiết từ lá Trâm bầu (*Combretum quadrangular*) và lá Ngọc nữ biển (*Clerodendrum inerme*) và khảo sát một số hợp chất chuyển hóa thứ cấp của chúng. Kết quả sơ bộ hóa thực vật đã xác định được sự hiện diện của các thành phần như phenol, flavonoid, tannin, triterpenoid, saponin và steroid trong lá Trâm bầu và alkaloid, phenol, flavonoid, tannin, coumarin, triterpenoid, saponin và steroid trong lá Ngọc nữ biển. Nghiên cứu cũng chỉ ra rằng có sự khác biệt về độc tính tế bào của cao chiết tổng và các cao chiết phân đoạn từ lá Trâm bầu và lá Ngọc nữ biển đối với hai dòng tế bào ung thư là MCF-7 và HepG2. Trong đó, cao phân đoạn ethyl acetat ở cả hai dược liệu này đều thể hiện hoạt tính tốt hơn.

Từ khóa: *Combretum quadrangulare*; *Clerodendrum inerme;* khảo sát hóa thực vật; độc tính tế bào; MCF-7; HepG2.