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ISETC2025

2ND INTERNATIONAL SCIENCE,
ENGINEERING AND TECHNOLOGY
COLLOQUIUM



THE POWER OF SCIENTIFIC INNOVATION

INTELLIGENT SOLUTIONS FOR A
SUSTAINABLE WORLD

ORGANIZED BY:
FACULTY OF APPLIED SCIENCES
UNIVERSITI TEKNOLOGI MARA
PERAK BRANCH, TAPAH CAMPUS
MALAYSIA

CO-ORGANIZED BY:



**2nd International Science, Engineering and Technology Colloquium
(ISETC 2025)**

Faculty of Applied Sciences,
Universiti Teknologi MARA,
Perak Branch, Tapah Campus,
35400 Tapah Road, Perak, Malaysia.

Colloquium date: 9th July 2025

Publication date: 9th September 2025

Proceedings of Extended Abstracts

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e-ISBN: 978-629-97630-5-5

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Perak Branch, Tapah Campus, 35400 Tapah Road, Perak, Malaysia.

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PREFACE

Welcome to the 2nd International Science, Engineering and Technology Colloquium 2025 (ISETC 2025)!

It is with great pleasure that we present this year's colloquium, a distinguished gathering of scholars, researchers, and professionals dedicated to the advancement of applied sciences. Held virtually on 9th July 2025, ISETC 2025 serves as a platform to highlight cutting-edge research, foster meaningful networking, encourage collaborations, and explore innovative solutions to global challenges.

This year's theme, "The Power of Scientific Innovation: Intelligent Solutions for a Sustainable World" highlights our shared goal to solve global challenges through applied science. It celebrates innovation as a key to building a more sustainable and resilient future. We're proud to feature keynote speakers and presenters who bring fresh insights, bold ideas, and breakthroughs shaping tomorrow's world.

We would like to extend our heartfelt appreciation to the Faculty of Applied Sciences, Universiti Teknologi MARA, Perak Branch, Tapah Campus, for their outstanding support and assistance throughout the planning and execution of the event. Their dedication has been instrumental to the success of this colloquium. We would like to sincerely thank all participants and researchers for their valuable contributions. We also appreciate the reviewers for their careful evaluations and helpful feedback. Your hard work and support mean a lot to us.

As editors, we are proud to present this collection of proceedings. It is an honour to bring together the interesting and meaningful work of our speakers and authors. We hope the ideas shared will lead to new discoveries, encourage more research, and help solve global challenges through science and innovation.

Warm regards,

Dr. Emi Norzehan Mohamad Mahbob

Dr. Saiyidah Nafisah Hashim

Ms. Lili Widarti Zainuddin

Ms. Nurul Nazwa Mohammad

Ms. Rozaina Saleh

ISETC 2025 Proceedings Editors

EFFECT OF *Christia vespertilionis* LEAF EXTRACT ON THE METASTASIS-RELATED PROTEIN EXPRESSION OF BREAST CANCER TUMOR

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Abstract: Breast cancer is the predominant cancer among Malaysian women, representing around 19% of all diagnosed cancers. Breast cancer remains to be a significant issue, as Malaysia anticipates a two-fold rise in cancer incidence by 2040. This necessitates the implementation of proactive scientific research on natural resources in order to identify novel cancer medicines that are highly effective. The indigenous Malaysian plant, *Christia vespertilionis*, commonly referred to as butterfly wings, has garnered interest for its extensive potential therapeutic properties. The objective of the research was to determine the potential expression changes of a metastasis-related protein induced by *C. vespertilionis* in mice breast tumour. The protein sample was extracted from the breast tumour tissue of mice that treated with *C. vespertilionis* leaf extract. The VEGF protein was separated and identified by gel electrophoresis and Western blotting technique. Western blotting analysis revealed that *C. vespertilionis* leaf extract decreased the expression of VEGF protein that are crucial to inhibit the growth and enlargement of breast tumour. Moreover, the down-regulation of VEGF protein expression signifies the inhibition of the angiogenesis pathway in cancer development. This finding indicates that *C. vespertilionis* leaf extract possesses significant anti-neoplastic potential; thus, further pharmacological investigations should be conducted to explore its potential as an anticancer drug.

Keywords: *Christia vespertilionis*, breast cancer, metastasis, VEGF, Western blot

INTRODUCTION

The global cancer statistics study showed that breast cancer is the most prevalent cancer worldwide, with an estimated 2.3 million new cases and 670,000 deaths in 2022 (Kim et al., 2025). About one in five cancer patients in Malaysia had breast cancer, which accounts for 19% of all cancer cases and half of them are diagnosed with this cancer prior to reaching the age of 50 (Htay et al., 2024). Nevertheless, the majority of breast cancer cases in Malaysia are diagnosed at a late stage (stage III and IV), with an estimated 48% of cases. This is a crucial challenge, as early identification markedly enhances survival rates (Htay et al., 2021).

The *C. vespertilionis*, also known as the butterfly wing plant, is a colorful decorative herb with a unique form. It is locally known as "Rerama" in Malay (Idris et al., 2024). The *C. vespertilionis* plant has been traditionally employed to treat a variety of maladies in folk medicine, particularly in Southeast Asia. Scabies, tuberculosis, and the treatment of bone fractures, as well as antidotes for snake bites, are among the diseases that are treated (Lee et al., 2020). This plant is known to include fatty acids, alkaloids, long-chain alcohol, triterpenes, phenols and alkanes from a phytochemical perspective. Additionally, the plant has been shown to have antiproliferative, cytotoxic, antimalarial, antidiabetic, and antioxidant effects (Norazhar et al., 2021). Therefore, the present study was carried out to investigate the effect of *C. vespertilionis* leaf extract on the metastatic-related protein (VEGF) expression in the breast tumor-bearing mice.

MATERIALS AND METHODS

The plant leaf extract was extracted by boiling the dried leaf powder in the distilled water. The filtrate was then freeze-dried and kept in the -20°C. All mice were injected into the mammary fat pad with 4T1 cells (1×10^5 4T1 cells/0.1 mL of PBS). When the tumor was palpable, *C. vespertilionis* leaf extract was administered orally to the animals via gavage for 28 days. The tumor volume was measured twice weekly by using a digital vernier caliper. All mice were sacrificed and the tumor was taken out at the final day.

The tumor was manually homogenized one ice using mortar. The sample was lysed by constant agitation for an hour on ice. Tumor lysate was then centrifuged at 20,000 x g for 20 minutes at 4°C. The supernatant was collected and stored at -80°C until further use. Protein concentration of the tumor lysate was determined by using Bradford assay (BioRad, CA, USA). Equal amount of protein sample (10-20 µg) was mixed with 4X Laemmli buffer (10% β-mercaptoethanol) and heated at 95°C for 5 minutes. The sample was loaded into SDS-PAGE gel. Next, electrophoresis was run at 80V in 4% stacking gel and at 130V in 12% of resolving gel.

The protein from the gel was transferred to a PVDF membrane (Milipore, Bedford, MA, USA) using semi-dry method under 12V constant voltage. The PVDF membrane was blocked with 3% bovine serum albumin (Nacalai Tesque, Japan) in Tris buffer saline containing 0.1% Tween 20 for one hour at room temperature. Subsequently, the PVDF membrane was incubated overnight with constant agitation at 4°C with respective primary antibody as follows: anti-VEGF (1:500, Santa Cruz Biotechnology, CA, USA) and anti-β-actin (1:1000, Santa Cruz Biotechnology, CA, USA). After the washing steps, the membrane was incubated with an appropriate horseradish-conjugated secondary antibody (goat anti-rabbit IgG F(AB')₂, 1:10,000) in TBS-T for one hour at room temperature. Detection of antibody reactivity was performed with a chemiluminescence detection kit, Chemi-Lumi One (Nacalai Tesque, Japan) and ChemiDot™ MP System (Biorad, Hercules, CA, US). Densitometric analysis of Western blot bands was performed with ImageLab software (Biorad, Hercules, CA, US). Band intensity was expressed as percentage relative to untreated control after normalization to β-actin.

Data were analyzed using Graphpad prism 10.0. All the data were expressed as mean ± standard error of mean (SEM). Comparisons between groups were performed using one-way analysis of variance (ANOVA), followed by Dunnett's tests to compare with the mean of control group. Probability value less than 0.05 was considered significant.

RESULTS AND DISCUSSION

Patients with metastatic cancer are reportedly far less likely to survive five years than those with localized cancer. More than ninety percent of cancer-related deaths come from metastatic illness. The uncontrolled division of normal cells can result in the formation of cancer cells. This phenomenon becomes critical when cells fail to undergo programmed cell death or apoptosis, hence disrupting the immunological response and instigating aggressive angiogenesis. At this stage, cancer cells possess invasive capabilities, disseminating across the bloodstream to establish secondary tumors in distant organs. This dynamic and multifaceted condition known as metastasis (Castaneda et al., 2022).

Being one of the primary angiogenic factors, VEGF plays a role in the early stages of tumor growth, progression, and metastasis. VEGF possesses the capability to establish a metastatic niche and facilitate the regrowth of metastatic tumors in distant organs. Primitive vasculatures formed by VEGF offer a structural basis for cancer cell spread into the circulation. VEGF and its receptor-mediated signaling systems have thus become among the most crucial therapeutic targets for different types of malignancies (Yang & Cao, 2022).

The study demonstrated a reduced expression pattern of VEGF protein in breast tumor tissue following treatment with both low and high doses of *C. vespertilionis* (Figure 1). This plant extract is capable of inhibiting the progression of tumors to a metastatic stage. Average protein levels as comparison to β-actin control showed the decreasing expression of VEGF protein (Figure 2).

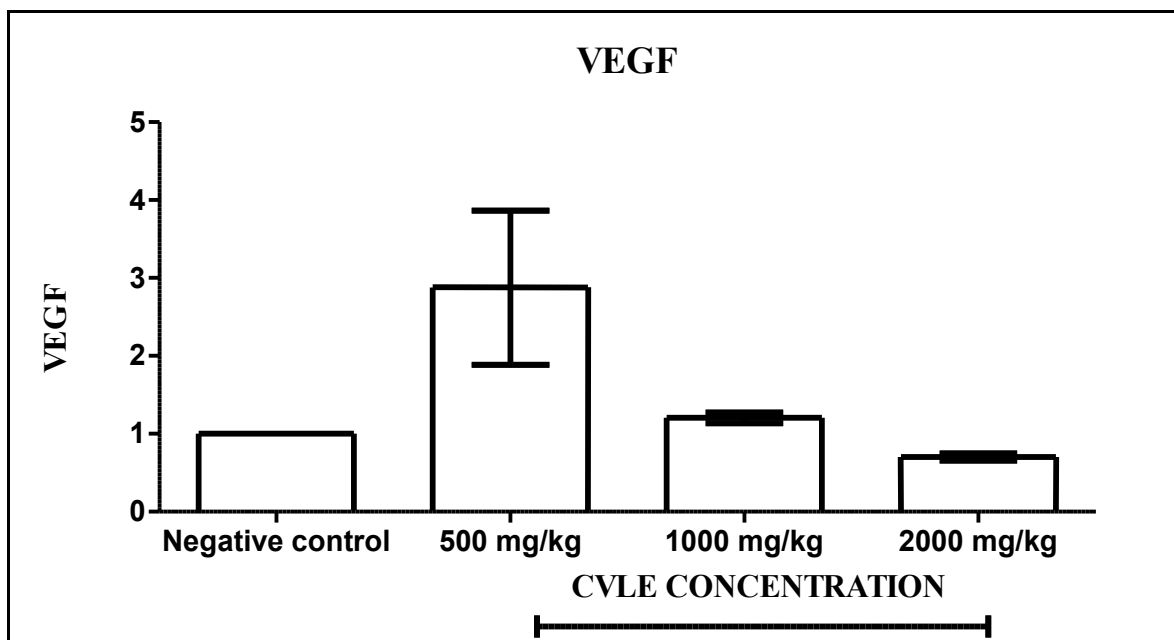


Figure 1. Protein expression pattern of VEGF in control and extract-treated groups. β -actin served as an internal control. The image represents one of three independent experiments for each sample.

	Control (normal healthy breast)	500 mg/kg CVLE	1000 mg/kg CVLE	2000 mg/kg CVLE
VEGF				
Beta actin				

Figure 2. The average protein expression level of VEGF to β -actin in control and extract-treated groups. All the data were expressed as mean $\pm$ standard error of mean (SEM).

The utilization of natural sources, including plant extracts and phytochemicals, presents a viable alternative for cancer treatment. They are more efficacious, cost-effective, readily accessible, and exhibit a minimal incidence of adverse effects, so improving compliance among patients and eventually contributing to a healthy and fulfilling life (Parveen et al., 2019). Nonetheless, the majority of investigations are conducted in vitro or on animal subjects, with few and limited human clinical trials.

CONCLUSIONS

The present study indicated that *C. vespertilionis* leaf extract has the potential to suppress the metastatic process in mice breast tumors by reducing VEGF protein expression. Preliminary evidence from expression change of this protein suggests that *C. vespertilionis* leaf extract may be capable of acting as anti-metastatic activity. However, further research is required, particularly with regard to the potentiality of active phytochemicals of *C. vespertilionis* as new therapeutic agents to combat cancer cells and its safety assessment.

ACKNOWLEDGEMENT

We want to acknowledge Universiti Teknologi MARA, Cawangan Pulau Pinang for their endless support, Universiti Putra Malaysia (UPM) for providing animal facilities and technical teams from Integrative Laboratory, Advanced Medical and Dental Institute (AMDI), Universiti Sains Malaysia for their help with the use of gel electrophoresis and Western blot apparatus.

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Surat kami : 700-KPK (PRP.UP.1/20/1)
Tarikh : 20 Januari 2023



Prof. Madya Dr. Nur Hisham Ibrahim
Rektor
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Sekian, terima kasih.

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Saya yang menjalankan amanah,

Setuju.

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