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Research Article

UNVEILING THE ANTICANCER POTENTIAL OF *ANDROGRAPHIS PANICULATA* AND *OCIMUM SANCTUM:* GC-MS, ADMET PROFILING AND MOLECULAR DOCKING

[1]P. Vanmuhil, [2]R. Karnan, [1]M. Sakthivel, [1]S. Thaila, [3]M. Suganya, [3]A.R. Balu, [*1]S. Ganesan

[1]PG & Research Department of Zoology, A.V.V.M. Sri Pushpam College (An Autonomous Institution Affiliated to Bharathidasan University), Poondi, Thanjavur-613503, Tamil Nadu, India.
[2]PG Department of Zoology, Annai Vailankanni Arts and Science College, (Affiliated to Bharathidasan University), Thanjavur 613007, Tamil Nadu, India.
[3]PG & Research Department of Physics, A.V.V.M. Sri Pushpam College (An Autonomous Institution Affiliated to Bharathidasan University), Poondi, Thanjavur-613503, Tamil Nadu, India.

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ABSTRACT

Herbal-based treatment, the backbone of the Indian traditional medicine system since ancient times, is a response to the presence of phytochemicals. Globally, phytochemicals are recognized as remarkable and eco-friendly drugs, including for cancer treatment. The aim is to explore the anticancer bioactive phytochemicals from *Andrographis paniculata* and *Ocimum sanctum* leaves' ethanolic extract using GC-MS techniques, ADMET profiles, and molecular docking approach. Flavonoids, terpenoids, steroids, coumarins, tannins, saponins, and polyphenols are held by *A. paniculata* and *O. sanctum*. Additionally, GC-MS techniques revealed 15 phytochemicals in *A. paniculata,* while *O. sanctum* held 9 phytochemicals. The ADMET profile of Lipinski's Rule was agreed on for suitability for the oral drug, and the molecular docking approach confirms the inhibition of cell proliferation and growth by 13-docosenamide (-5.00 Kcal/mol) and 9-octadecenamide (-4.90 Kcal/mol) on EGFR kinase (PDB: 3UG2). Overall, *Andrographis paniculata* leaves had rich phytochemical profiles compared to *Ocimum sanctum* leaves. Further present bioactive compounds need *in vitro* and *in vivo* studies for eco-friendly claims of cancer treatment and other pharmacological applications.

Keywords: Phytochemicals, Anticancer, *Andrographis paniculata*, *Ocimum sanctum*, *In silico*, ADMET.

INTRODUCTION

The ongoing search for safer and more potent treatment drugs is prompted by the fact that cancer continues to be a major cause of death globally (Saini *et al*., 2026). According to GLOBOCAN 2022 estimates, there are a projected 20 million new cases and 9.7 million deaths worldwide from breast cancer, making it the primary cause of cancer-related deaths among women and a major global health issue (Pasi *et al*., 2026; Situmorang *et al*., 2025). Many synthetic compounds have been observed to increase the autophagic and apoptotic pathways, which directly cause cytotoxicity to various breast cancer cell lines. Due to their high cytotoxicity, synthetic derivatives have the potential to be a useful anti-breast cancer drug, according to numerous recent and earlier research (Sharmin *et al*., 2021). Due to their high dosage, poor solubility, and low absorption, several synthetic medications alone have a variety of adverse effects (Cicerale *et al*., 2010; Grossmann *et al*., 2010). Phytoconstituents derived from plants as a new and efficient way to cure breast cancer, a common and deadly disease (Vikal *et al*., 2025).

Due to their pleiotropic biological effects and very low toxicity, plant-derived phytochemicals have emerged as attractive medicines for cancer prevention and complementary therapy in light of the increased interest in natural bioactive substances (Maffia *et al*., 2026).

*Corresponding Author: Dr. S. Ganesan, PG & Research Department of Zoology, A.V.V.M. Sri Pushpam College (An Autonomous Institution Affiliated to Bharathidasan University), Poondi, Thanjavur-613503, Tamil Nadu, India, Email: ganesanmolbio@gmail.com.

Bioactive substances with substantial anticancer potential are abundant in medicinal plants (Saini *et al*., 2026). Natural products provide more structural variety than synthesized compounds, making them essential sources for drug discovery. They have historically helped identify bioactive compounds and are still vital in the search for novel treatments (Shalaby *et al*., 2026). Polyphenols, curcumin, quercetin, genistein, and resveratrol are examples of bioactive phytochemicals that have been shown to be safe and effective against a variety of cancer types (Theofylaktou *et al*., 2021). By altering these crucial pathways, phytochemicals have shown promise for treatment by preventing the growth of cancer cells (Situmorang *et al*., 2025).

Cancer has traditionally been treated with South Asian medicinal herbs and their components. Many medicinal plants are used by the inhabitants of South Asian nations like Bangladesh, Bhutan, India, Pakistan, Sri Lanka, and Nepal to create a variety of pharmacologically powerful secondary metabolites (Prasad *et al*., 2016). The adaptable tropical plant *Andrographis paniculata* is thought to offer numerous important therapeutic qualities. This plant is used by tribal people in Tamil Nadu, India, in the Ayurvedic medical system to treat a range of illnesses (Okhuarobo *et al*., 2024). As a multifunctional medicinal agent, *Andrographis paniculata* has antibacterial, hepatoprotective, anti-cancer, anticancer, hypoglycemic, immunomodulatory, and hypotensive properties (Bhaisare *et al*., 2023; Chauhan *et al*., 2019).

India is the native home of *Ocimum sanctum*. Saponins, flavonoids, triterpenoids, and tannins are components of *O. sanctum* that may have biological activity (Jaggi *et al*., 2003). The antioxidant, anti-inflammatory, antibacterial, antidiabetic, hepatoprotective, and wound-healing properties of *Ocimum sanctum* demonstrate a therapeutic significance (Almatroodi *et al*., 2020). The aim of the present study is to screen and identify bioactive metabolites of *Andrographis paniculata* and *Ocimum sanctum* leaves' ethanolic extract using GC-MS techniques and summarize mechanisms of action for their anticancer potential.

MATERIALS AND METHODS

Collection and extraction of phytochemicals

The disease-free plants *Andrographis paniculata* and *Ocimum sanctum* leaves were collected from Poondi, Thanjavur District, Tamil Nadu, India. Each 10 grams of the powder of *Andrographis paniculata* and *Ocimum sanctum* leaves were transferred into a conical flask containing 250 ml with an added 100 ml of ethanolic solvent. The conical flask containing the sample was shaken well for 30 minutes by hand. After 24 hrs, the extracts were filtered using Whatman filter paper No. 1, and the filtrate was used for major phytochemical screening and GC-MS analysis.

Preliminary phytochemical screening

According to Sofowara (1993), Trease and Evans (1989), and Harborne (1973), phytochemical studies were performed on the *Andrographis paniculata* and *Ocimum sanctum* leaves' ethanolic extract using standard procedures to identify the major bioactive contents.

GCMS analysis

The volatile and semi-volatile components of the ethanolic extract from the leaves of *Andrographis paniculata* and *Ocimum sanctum* were identified by GC-MS analysis. By comparing the identified analytes' retention times and mass spectral fragmentation patterns with those identified in the NIST and Wiley spectral libraries integrated into the GC-MS system, phytocompound identification was performed. High-confidence identification of bioactive phytochemicals was achieved by cross-referencing the spectrum matches with well-established compound databases to verify validity (Gomathi *et al*., 2015).

In silico study

Absorption, distribution, metabolism, excretion and Toxicity (ADMET)

The ADMET profile of the *Andrographis paniculata* and *Ocimum sanctum* leaves phytochemicals was assessed using the SWISSADME tool and ProTox-III online servers (Chibuye *et al*., 2024).

Molecular docking

Molecular docking studies of 9-octadecenamide and 13-docosenamide from Andrographis paniculata and Ocimum sanctum phytochemicals were obtained from the PubChem database, and the molecular target of epidermal growth factor receptors (EGFR) tyrosine kinase (PDB: 3UG2) was retrieved from the Protein Data Bank (PDB). Molecular docking was carried out using PyRx 0.8 (AutoDock Vina). Grid dimensions (center x = 7.18, center y = 58.13, and center z = 24.69) for the docking simulations were determined using a virtual screening tool described by Trott and Olson (2010). Visualization of the resulting 2D and 3D docked complexes was performed using PyMOL, BIOVIA Discovery Studio Visualizer, and UCSF Chimera.

RESULTS AND DISCUSSION

Cancer is a major global cause of death and a serious health concern (Choudhari *et al*., 2020; Nwosu, 2024). Breast cancer is one of the most common cancer types in women worldwide, accounting for the greatest number of cancer-related deaths globally (Isbilen and Volkan, 2021). Many anticancer medications have been developed as a result of growing understanding of the molecular pathways behind cancer growth (Choudhari *et al*., 2020). In recognition of their antioxidant and anti-mutagenic properties, medicinal plants are currently recognized as a natural source of anticancer drugs (Mandour *et al*., 2023). Phytochemicals, which are naturally occurring substances derived from plants, are important sources for the purposes of cancer

treatment and novel drugs (Choudhari *et al*., 2020). The present finding is the screening of the preliminary phytochemical profile and identification of bioactive compounds of South Indian medicinal plants of *Andrographis paniculata* and *Ocimum sanctum* ethanolic leaf extract using GCMS techniques. *Andrographis paniculata* and *Ocimum sanctum* ethanolic leaf extracts contain alkaloids, coumarins, flavonoids, glycosides, polyphenols, saponins, steroids, tannins, terpenoids, and triterpenoids, while the highest phytochemical profile is held in *A. paniculata* compared to *O. sanctum*, represent in table 1.

The phytochemical components of *A. paniculata* and *O. sanctum* extract are to be identified by an additional investigation using the GC-MS method (Tables 2 and 3). *Andrographis paniculata* ethanolic leaf extract reveals 15 phytocompounds with anticancer compound of 9-octadecenamide. *Ocimum sanctum* ethanolic leaf extract illustrates the 9 phytochemicals anticancer compounds of 13-docosenamide (Table 3; Figures 1 and 2). Overall, GC-MS techniques confirmed the rich phytochemical profile of *A. paniculata* compared to *O. sanctum*. Several phytochemicals manifest anticancer functions in vitro and *in vivo* through blocking or inhibiting the growth of cancer without any side effects (Singh *et al*., 2016; Iqbal *et al*., 2017). Alkaloids, polyphenols, saponins, phytosterols, terpenoids, and flavonoids are among the phytochemicals that have shown promise in treating cancer (Luitel *et al*., 2025). It has been shown that 9-octadecenamide inhibits BL6 skin melanoma cells from spontaneously spreading (Hecht *et al*., 2015; Isbilen and Volkan, 2021). Phytochemicals, such as (Z)-9-Octadecenamide, have been shown to have potent antibacterial, antioxidant, and anticancer properties (Raletsena and Mongalo, 2023). (Z)-13-docosenamide, a bioactive compound, possessed antioxidant and antimicrobial properties and inhibited cell viability (El-Gazzar *et al*., 2025). Tannins, phenols, steroids, flavonoids, terpenoids, and saponins are examples of phytochemicals that are safe and effective for the environment (Vadivu *et al*., 2024). The presence of phytochemicals significantly contributes to cancer treatment (Jang *et al*., 2025).

Table 1. Preliminary phytochemicals screening of *Andrographis paniculata* and *Ocimum sanctum* ethanolic leave extract.

S. No	Phytochemicals	*A. paniculata*	*O. sanctum*
1	Alkaloids	+	+
2	Coumarins	+	+
3	Flavonoids	++	++
4	Glycosides	+	++
5	Polyphenols	++	++
6	Saponins	++	+
7	Steroids	++	++
8	Tannins	+	+
9	Terpenoids	++	+
10	Triterpenoids	+	+

(+: Present; -: Absent and ++: High concentration)

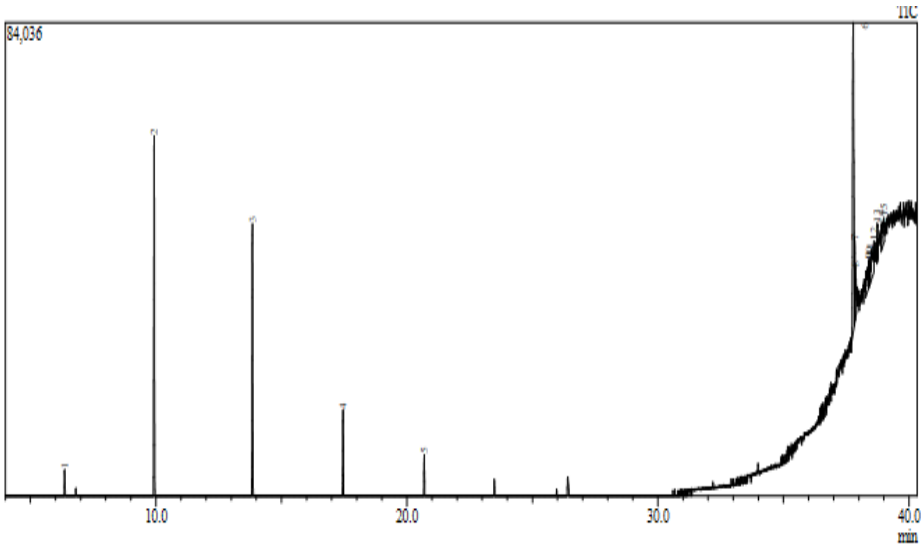

Figure 1. GCMS chromotogram of *Andrographis paniculata* ethanolic leaves extract.

Table 2. Identification of bioactive metabolites of *Andrographis paniculata* ethanolic leaves extract using GCMS techniques.

Peak #	R. Time	Area %	Phytochemicals
1	6.362	1.33	3-Phenyl-Propionic Acid [1-(3-Amino-Phenyl)-Ethylidene]-Hydrazide
2	9.928	18.8	Cyclopentasiloxane, Decamethyl-
3	13.845	15.19	Cyclohexasiloxane, Dodecamethyl-
4	17.452	4.43	1,3-Diphenyl-1-((Trimethylsilyl)Oxy)-1(Z)-Heptene
5	20.684	1.78	Tri-O-Trimethylsilyl, N-Trifluoroacetyl Derivative of Terbutaline
6	37.776	31.61	9-Octadecenamide, (Z)-
7	37.845	4.1	4-Tert-Butyl-3,4-Dihydro-2,4-Diphenylquinazoline
8	37.87	3.38	Epinephrine, (. Beta.)-, 3TMS Derivative
9	38.395	4.41	Tri-O-Trimethylsilyl, N-Heptafluorobutyryl Derivative of Terbutaline
10	38.415	0.55	N-Methyladrenaline, 3TMS Derivative
11	38.444	1.15	Heptasiloxane, 1,1,3,3,5,5,7,7,9,9,11,11,13,13-Tetradecamethyl-
12	38.597	5.66	1-((Trimethylsilyl)Ethyl)-8-(Trimethylsilyl) Naphthalene
13	38.736	2.94	Silane, Diethylbutoxy(1-Phenylpropoxy)-
14	38.891	0.85	Trisiloxane, 1,1,3,3,5,5-Hexamethyl-
15	39.001	3.81	1-((Trimethylsilyl)Ethyl)-8-(Trimethylsilyl) Naphthalene

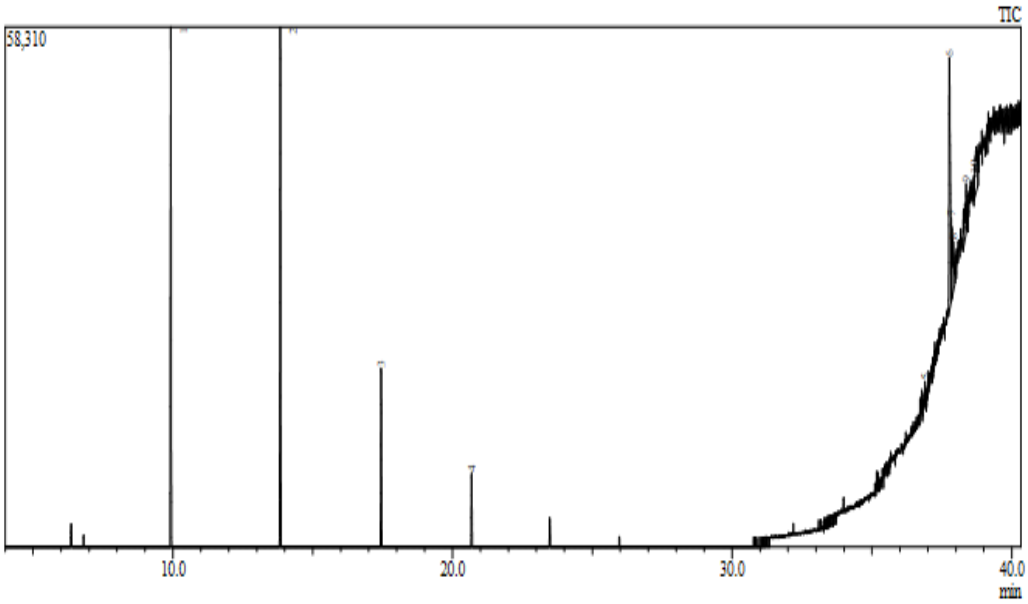

Figure 2. GCMS chromotogram of *Ocimum sanctum* ethanolic leaves extract.

Table 3. Identification of bioactive metabolites of *Ocimum sanctum* ethanolic leaves extract using GCMS techniques.

Peak	RT	Area %	Name
1	9.924	23.02	Cyclopentasiloxane, Decamethyl-
2	13.841	24.61	Cyclohexasiloxane, Dodecamethyl-
3	17.447	7.57	Cycloheptasiloxane, Tetradecamethyl-
4	20.68	3.15	Tri-O-Trimethylsilyl, N-Trifluoroacetyl Derivative of Terbutaline
5	36.895	1.35	Isoquinoline, 1,2,3,4-Tetrahydro-7-Methoxy-2-Methyl-1-[(3-Nitrophenyl) Methyl]-8-(Phenylmethoxy)-, (. +-.)-

6	37.767	20.51	(13z)-13-Docosenamide #
7	37.84	2.19	5-Deoxy-5-Iodo-2,3-O-Isopropylidene-D-Ribofuranose
8	37.91	6.03	Dimethyl Bis(3-Iodopropyl) Malonate
9	38.365	5.06	Heptasiloxane, 1,1,3,3,5,5,7,7,9,9,11,11,13,13-Tetradecamethyl-

Table 4. Biological active compounds from *A. paniculata* and *O. sanctum* with literature.

S. No.	Phytochemicals	Biological activity	References
1	9-Octadecenamide	Antibacterial, antioxidant, and anticancer	Raletsena and Mongalo, (2023)
2	13-docosenamide	Antioxidant, antimicrobial and anticancer activity	El-Gazzar *et al*., (2025)

ADMET examinations and molecular docking, a computer technique used in drug development to search for targets and lead compounds, are demonstrations of novel scientific approaches (Mathur *et al*., 2024; Shaikh *et al*., 2022). Utilizing ADMET and molecular docking, the anticancer phytochemicals of *A. paniculata* and *O. sanctum* ethanolic leaves are found to have the ability to inhibit the Epidermal Growth Factor Receptor Kinase (EGFR), which reacts to prevent cell growth and proliferation. The anticancer compounds of 9-octadecenamide and 13-docosenamide from *A. paniculata* and *O. sanctum* were screened for ADMET profiles of lipophilicity, water solubility, pharmacokinetics, drug-likeness, and toxicity. Lipinski was agreed upon by 9-octadecenamide and 13-docosenamide, which respond to suitability for the oral drug, while organ toxicity like hepatotoxicity, nephrotoxicity, respiratory toxicity, and cardiotoxicity were inactive, which responds to 9-octadecenamide and 13-docosenamide not being adverse effects on the organs (Table 4). It is advised that ADMET profiles be used in future clinical trials and *in vivo* animal studies aimed at creating new therapeutic medicines (Belitibo *et al*., 2024; Adedotun *et al*., 2022).

Table 5. ADMET profile of identified bioactive phytochemicals.

Parameters	Bioactive compounds		
	9-Octadecenamide	13-docosenamide	Doxorubicin
Physicochemical Properties			
Formula	$C_{18}H_{35}NO$	$C_{22}H_{43}NO$	$C_{27}H_{29}NO_{11}$
Molecular weight (g/mol)	281.48	337.58	543.52
Num. heavy atoms	20	24	39
Num. arom. heavy atoms	0	0	12
Fraction Csp3	0.83	0.86	0.44
Num. rotatable bonds	15	19	5
Num. H-bond acceptors	1	1	12
Num. H-bond donors	1	1	6
Molar Refractivity	91.07	110.30	132.66
TPSA	43.09 Å²	43.09 Å²	206.07 Å²
Lipophilicity			
Log $P_{o/w}$ (iLOGP)	Temporarily unavailable	Temporarily unavailable	Temporarily unavailable
Log $P_{o/w}$ (XLOGP3)	6.99	9.16	1.27
Log $P_{o/w}$ (WLOGP)	5.51	7.07	-0.32
Log $P_{o/w}$ (MLOGP)	4.16	5.06	-2.10
Log $P_{o/w}$ (SILICOS-IT)	5.71	7.47	1.17
Consensus Log $P_{o/w}$	5.59	7.19	0.01
Water Solubility			
Log S (ESOL)	-5.00	-6.45	-3.91
Solubility	2.82e-03 mg/ml	1.20e-04 mg/ml	6.72e-02 mg/ml
Class	Moderately soluble	Poorly soluble	Soluble
Log S (Ali)	-7.71	-9.96	-5.20
Solubility	5.49e-06 mg/ml	3.69e-08 mg/ml	3.46e-03 mg/ml
Class	Poorly soluble	Poorly soluble	Moderately soluble
Log S (SILICOS-IT)	-5.61	-7.20	-3.46
Solubility	6.89e-04 mg/ml	2.13e-05 mg/ml	1.87e-01 mg/ml
Class	Moderately soluble	Poorly soluble	Soluble

Pharmacokinetics			
GI absorption	High	Low	Low
BBB permeant	Yes	No	No
P-gp substrate	No	No	Yes
CYP1A2 inhibitor	Temporarily unavailable	Temporarily unavailable	Temporarily unavailable
CYP2C19 inhibitor	Temporarily unavailable	Temporarily unavailable	Temporarily unavailable
CYP2C9 inhibitor	Temporarily unavailable	Temporarily unavailable	Temporarily unavailable
CYP2D6 inhibitor	Temporarily unavailable	Temporarily unavailable	Temporarily unavailable
CYP3A4 inhibitor	Temporarily unavailable	Temporarily unavailable	Temporarily unavailable
Log K_p (skin permeation)	-3.05 cm/s	-1.86 cm/s	-8.71 cm/s
Drug likeness			
Lipinski	Yes; 1 violation: MLOGP>4.15	Yes; 1 violation: MLOGP>4.15	No; 3 violations: MW>500, NorO>10, NHorOH>5
Ghose	Yes	No; 1 violation: WLOGP>5.6	No; 2 violations: MW>480, MR>130
Veber	No; 1 violation: Rotors>10	No; 1 violation: Rotors>10	No; 1 violation: TPSA>140
Egan	Yes	No; 1 violation: WLOGP>5.88	No; 1 violation: TPSA>131.6
Muegge	No; 1 violation: XLOGP3>5	No; 2 violations: XLOGP3>5, Rotors>15	No; 3 violations: TPSA>150, H-acc>10, H-don>5
Bioavailability Score	0.55	0.55	0.17
Medicinal Chemistry			
Pains	0 alert	0 alert	1 alert: quinone_A
Brenk	1 alert: isolated_alkene	1 alert: isolated_alkene	1 alert: hydroquinone
Leadlikeness	No; 2 violations: Rotors>7, XLOGP3>3.5	No; 2 violations: Rotors>7, XLOGP3>3.5	No; 1 violation: MW>350
Synthetic accessibility	2.97	3.44	5.81
Toxicity profile (Prediction/ Probability)			
Parameters	**9-Octadecenamide**	**13-docosenamide**	**Doxorubicin**
LD_{50} (mg/kg)	750	750	205
Hepatotoxicity	Inactive/0.82	Inactive/0.82	Inactive/0.86
Neurotoxicity	Active/0.52	Active/0.52	Active/0.74
Nephrotoxicity	Inactive/0.77	Inactive/0.77	Active/0.80
Respiratory toxicity	Inactive/0.87	Inactive/0.87	Active/0.91
Cardiotoxicity	Inactive/0.57	Inactive/0.57	Active/0.64

Table 6. Molecular docking of identified bioactive phytochemicals on EGFR kinase (PDB: 3UG2**).**

Ligand	Binding affinity (Kcal/mol)	Amino acid residues (PDB ID: 3UG2)
9-Octadecenamide	-4.90	**Met 793**, **Leu 792**, Val 726, **Ala 743**, **Leu 844**, **Lys 745**, **Glu 762**, Ile 759, **Met 766**, Leu 788, **Thr 854**, **Ser 719**, **Leu 718**.
13-docosenamide	-5.00	Leu 788, **Ser 719**, **Leu 844**, Gly 796, Val 845, **Met 793**, **Leu 792**, **Leu 718**, Gln 791, Met 790, Val 726, **Lys 745**, **Thr 854**, **Glu 762**, **Ala 743**, **Met 766**, Asp 855.
Doxorubicin (Standard)	-7.60	**Ser 719**, **Ala 743**, Gly 724, Thr 725, Ser 720, **Thr 854**, Met 790, Phe 856, **Glu 762**, **Met 766**, Asp 855, **Lys 745**, **Leu 844**, **Met 793**, **Leu 792**, Gly 796, **Leu 718**, Pro 794.

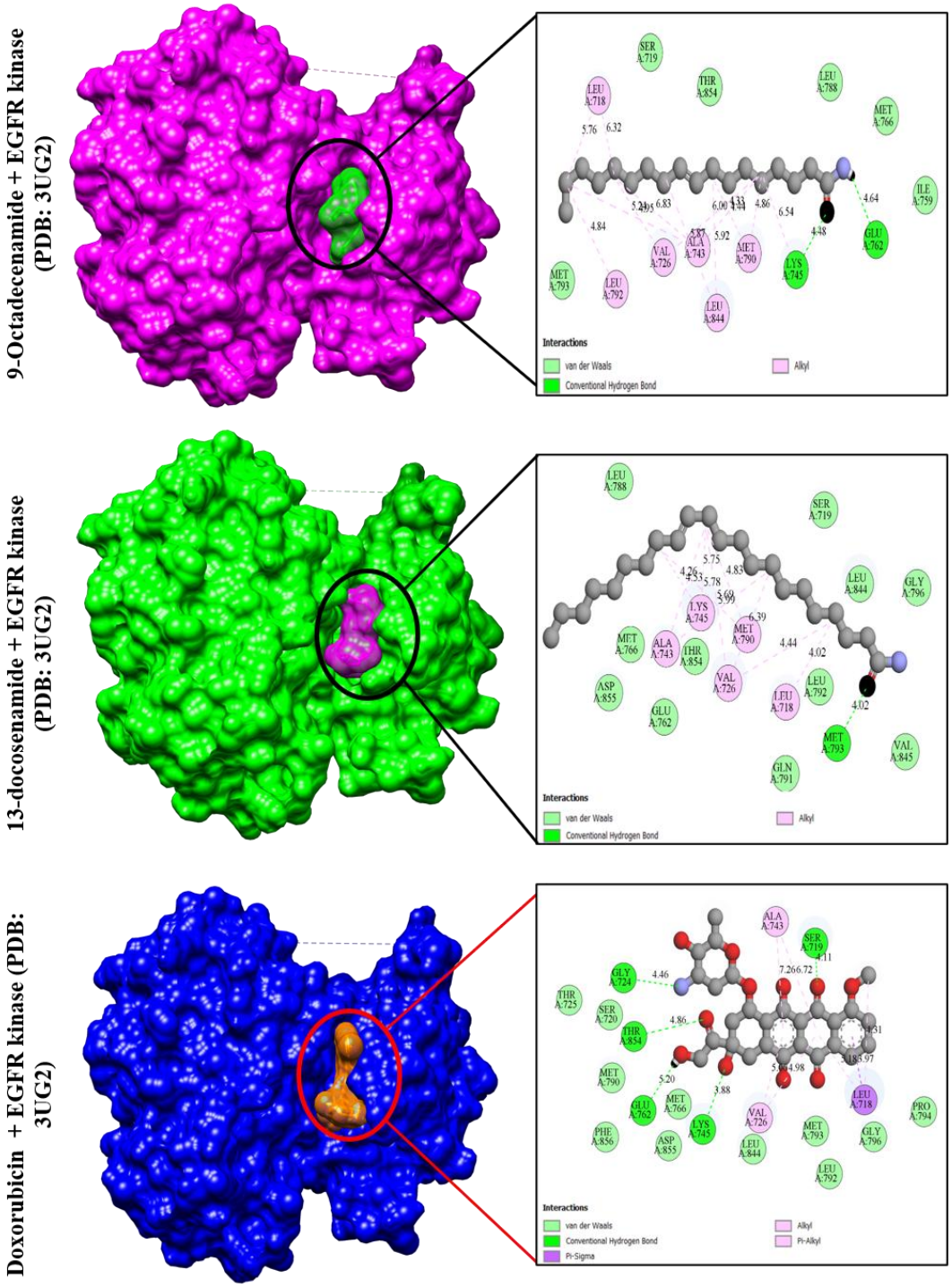

Figure 3. Molecular docking of anticancer compounds from *A. paniculata* and *O. sanctum* ethanolic leaves extract on EGFR kinase (PDB: 3UG2).

Epidermal growth factor receptors (EGFR) tyrosine kinase signaling pathway controls cell proliferation, growth, and survival. The target of EGFR tyrosine kinase activity inhibition is considered a promising therapeutic molecular target for the treatment of cancer (Zubair and Bandyopadhyay, 2023). The current in silico finding of 9-octadecenamide and 13-docosenamide was an inhibition of EGFR kinase (PDB: 3UG2), with the highest activity observed in 13-docosenamide (-5.00 Kcal/mol), compared to 9-octadecenamide (-4.90 Kcal/mol), while the standard drug Doxorubicin (-7.60 Kcal/mol) was also studied (Table 6). Doxorubicin was interacted with EGFR kinase amino acid residues of Ser 719, Ala 743, Thr 854, Glu 762, Met 766, Lys 745, Leu 844, Met 793, Leu 792, and Leu 718 (Figure 3), which were similarly identified as 9-octadecenamide and 13-docosenamide, whose response to *A. paniculata* and *O. sanctum* ethanolic leaves extract mode of inhibitory action was similar to the standard drug. EGFR signaling pathway inhibitors of *A. paniculata* and *O.*

sanctum were controlled by the cell proliferation, growth, and survival. According to Radwan *et al*. (2024) and Thomas and Weihua (2019), EGFR inhibitors are frequently utilized as first-line treatment for cancer. Raghu *et al*. (2023) state that EGFR kinase inhibitors have been licensed for use in cancer treatments due to their increased anticancer activity (Imran *et al*., 2025). Phytochemicals from *A. paniculata* and *O. sanctum*, such as 9-octadecenamide and 13-docosenamide, exhibited EGFR kinase inhibitory action in silico and were being developed as cancer treatments. Plants are significant providers of numerous secondary metabolites, including flavonoids and phenolics.

These substances are recognized to have potent antioxidant properties and to play a major role in the creation of medications and dietary supplements used to treat illnesses including cancer (Erdoğan *et al*., 2020). According to Okhuarobo *et al*. (2014), *Andrographis paniculata* is one of the most widely used medicinal plants that has historically been used to cure a variety of illnesses, including diabetes and cancer, in response to the presence of bioactive compounds. Saponins, tannins, terpenoids, and steroids are among the phytochemicals found in *A. paniculata* (Kasarkar *et al*., 2025) that have anti-cancer effects on cancer cells by preventing cell cycle progression, promoting cell apoptosis, and inhibiting cell proliferation and differentiation (Naomi *et al*., 2022). The entire plant extract of *Andrographis paniculata* was discovered to have anti-proliferative action against the A549 lung cancer cell line by raising the rate of cell death, according to Guntupalli *et al*. (2022). Luke *et al*. (2021) revealed that as O. sanctum contains active phytochemicals, it may have anticancer properties. Through its antioxidant, anti-inflammatory, antibacterial, antidiabetic, hepatoprotective, and wound-healing properties, *O. sanctum* demonstrates a therapeutic role; it has been demonstrated to slow the growth of cancer when combined with anticancer medications (Almatroodi *et al*., 2020). *Ocimum sanctum's* antioxidant, antidiabetic, antiulcer, anticancer, antibacterial, and antifungal qualities (Siva *et al*. 2016). Similarly, Vasava *et al*. (2026) agreed that *O. sanctum* leaves have anticancer properties due to the presence of alkaloids, carbohydrates, phenolic compounds, flavonoids, and saponins. Overall, phytochemicals from *Andrographis paniculata* and *Ocimum sanctum*, as well as evidence from the current in silico studies, show strong anticancer traits, making them promising choices for use in pharmaceutical and alternative medicine. However, more *in vitro* and in vivo research is required to show the medicinal significance of *A. paniculata* and *O. sanctum* as well as bioactive phytochemicals, such as 9-Octadecenamide, and 13-docosenamide, through their antiproliferative and cytotoxic traits.

CONCLUSION

The finding that *Andrographis paniculata* and *Ocimum sanctum* ethanolic leaf extracts are rich in major phytochemicals, such as flavonoids, steroids, and polyphenols, while GC-MS techniques confirm the anticancer compounds like 9-octadecenamide and 13-docosenamide significantly contribute to the epidermal growth factor receptors (EGFR) tyrosine kinase inhibitor as an antiproliferative effect. Overall, *Andrographis paniculata* and *Ocimum sanctum* were black/inhibited the cell proliferation, growth, and survival, with direct impact on anticancer drugs. However, further *in vitro* and *in vivo* studies are required to confirm the ethnomedicinal claims of *Andrographis paniculata* and *Ocimum sanctum* for pharmaceutical applications.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest

ETHICS APPROVAL

Not applicable

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AI TOOL DECLARATION

The authors declare that no AI and related tools are used to write the scientific content of this manuscript.

DATA AVAILABILITY

Data will be available on request

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