ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26apr1561

A Comprehensive Review on Herbal Medicine in Breast Cancer Therapy

Tania; Samiksha Sharma*; Sanjiv Duggal

Global College of Pharmacy, Kahnpur Khui, Anandpur Sahib, Punjab, India, 140117

Corresponding Author: Samiksha Sharma*

Publication Date: 2026/05/01

Abstract: The search for innovative treatments derived from natural sources is prompted by the fact that breast cancer continues to be a major cause of death globally. Promising anticancer potential has been demonstrated by herbal plants like *Mangifera indica, Vitex negundo, Achyranthes bidentata, and Sophora flavescens*. Solvent extraction, chromatography, and spectroscopic methods have been used to isolate a variety of phytochemicals, such as triterpenoids (ursolic acid), flavonoids (quercetin, catechin), alkaloids (matrine), phytosterols (*β-sitosterol*), and quinones (emodin). In breast cancer models, these substances have cytotoxic, anti-proliferative, and apoptotic actions. Anticancer chemicals obtained from animals and marine sources also aid in the search for new drugs. Herbal fractions and extracts are important resources for creating safer and more potent anticancer treatments.

Keywords: *Herbal Plants, Phytochemicals, Triterpenoids, Flavonoids, Alkaloids, Natural Plants Marine Medication and Breast Cancer.*

How to Cite: Tania; Samiksha Sharma; Sanjiv Duggal (2026) A Comprehensive Review on Herbal Medicine in Breast Cancer Therapy. *International Journal of Innovative Science and Research Technology*, 11(4), 2766-2774. https://doi.org/10.38124/ijisrt/26apr1561

I. INTRODUCTION

Herbal drugs have emerged as promising complementary and alternative options for breast cancer management due to their multi target actions, relatively low toxicity, and wide availability[2,4,7,12,13]. Conventional therapies like surgery, radiotherapy, chemotherapy, hormone therapy, and targeted agents are frequently limited by side effects, drug resistance, and incomplete control of aggressive subtypes.

These difficulties have prompted extensive research into herbal formulations and bioactive compounds derived from plants as novel or supplemental therapeutic approaches[3,10,12,7].Numerous phytochemicals that have been isolated from medicinal plants and, occasionally, microbes, such as flavonoids, terpenoids, polyphenols, phenolic acids, and alkaloids, exhibit cytotoxic and anti-proliferative effects against breast cancer cells both in vitro and in vivo [4,7,8,10,13].Inhibition of angiogenesis and metastasis, cell cycle arrest, induction of apoptosis and autophagy, modulation of oxidative stress and immune responses, and targeting of important signaling pathways (e.g., EGFR, HER2, PI3K/AKT/mTOR, NF κB, JAK/STAT3, MAPK, Wnt, Notch, Hedgehog, TGF β, VEGF, and estrogen receptor)[7,4,12,3,6].Additionally, when used in combination regimens, herbal medicines are being investigated for their potential to improve chemosensitivity, overcome multidrug resistance, and lessen the toxicity of conventional treatments[2,6,10,12,11].The routine integration of herbal medicines into evidence-based breast cancer care is still limited by problems with bioavailability, standardization of extracts, variability in formulations and dosing, and the scarcity of large, high-quality randomized clinical trials confirming their efficacy and safety[1,2,5,10,12,13]. When used with conventional medications, many of these medicines seem less toxic than regular chemotherapy and may improve their effects or lessen their negative effects [7,13,9,1,3]. Ongoing research focuses on improving delivery (e.g., nanoparticles), understanding precise molecular actions, and rigorously testing safety and efficacy in patients. However, the majority of evidence to date is preclinical (cell and animal studies), and major obstacles—low bioavailability, lack of standardization, and limited large clinical trials—still prevent routine clinical use[4,3,15,11].

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26apr1561

Table : 1 Medicinal Plants Used for Breast Cancer

S. No.	Scientific Name	Common Name	Uses	Reference
1	*Panax ginseng*	Ginseng	Chemo-protective and chemotherapeutic properties in breast cancer	19
2	*Allium sativum*	Garlic	Documented anti-breast -cancer activities; interferes with proliferation and malignant progression	19
3	*Actaea (Cimicifuga) racemosa*	Black cohosh	Modulate estrogen-related pathways in breast cancer	19
4	*Curcuma longa*	Turmeric	Anti-proliferative and chemo preventive effects	18,19,20
5	*Camellia sinensis*	Green tea	Anti-breast-cancer actions and chemo preventive effects	17,18,19,20
6	*Echinacea* spp.	Echinacea	Antiproliferative/anti-tumor effects in breast cancer context	19
7	*Arctium* spp.	Burdock	Traditional medicinal plant; listed with anti-cancer properties in breast cancer management	19
8	*Linum usitatissimum*	Flaxseed	Dietary source rich in omega-3 and lignans; associated with reduced breast cancer risk	19
9	*Nigella sativa*	Black cumin	Exhibits anti-breast-cancer activities in vitro and in vivo models	19
10	*Zingiber officinale*	Ginger	Dietary/medicinal plant; bioactive constituents active against breast cancer cell lines	20
11	*Catharanthus roseus*	-	Source of vinca alkaloids; active compounds tested on MCF-7, MDA-MB-231 cells	20
12	*Peganum normata*	-	Identified as promising anti-breast-cancer medicinal plant	17
13	*Ammi visnaga*	-	Reported potential anti-breast-cancer activity	17
14	*Peganum harmala* (likely “Peganum normata” group)	-	Included among plants with potential activity	17
15	*Annona muricata*	Soursop/ graviola	Listed among herbs with immune-stimulating and anti-tumor properties in breast cancer	15
16	Cruciferous vegetables (e.g., *Brassica* spp.)	Brocilli, cabbage etc	Dietary source of phytochemicals (e.g., DIM, sulforaphane) with anti-breast-cancer effects	16
17	Various fruits & cereals	Pomegranate, mangosteen, citrus, apple, grape, mango, cereals	Dietary natural products with demonstrated anti-breast-cancer effects in experimental studies	16

- *Phytochemical Isolated from Herbal Drugs for Breast Cancer:*

Isolating particular bioactive chemicals from plants and testing them against breast cancer cell lines is the main focus of research on herbal medicines for breast cancer.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26apr1561

Main chemical class isolation are:

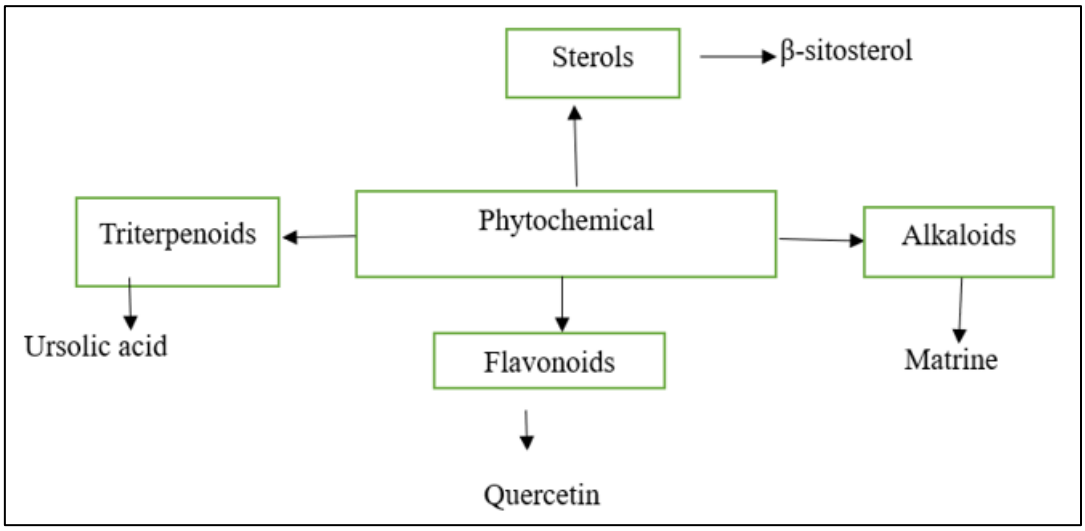
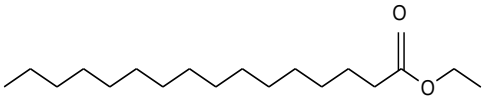
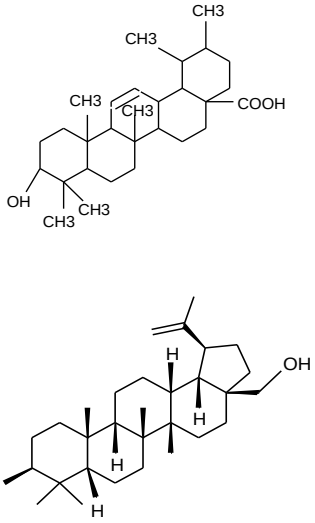
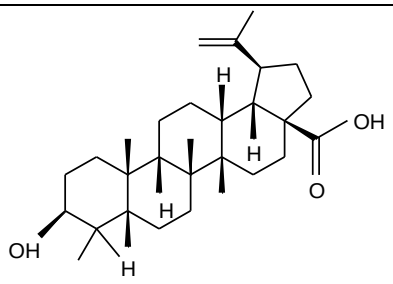
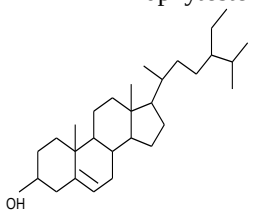
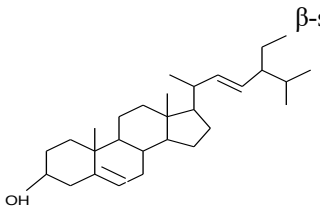
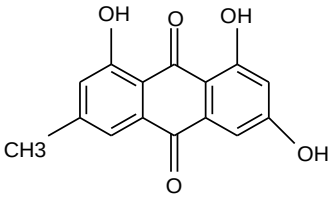
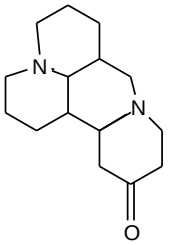


Fig 1: Phytochemical Isolated from Herbal Drugs for Breast Cancer

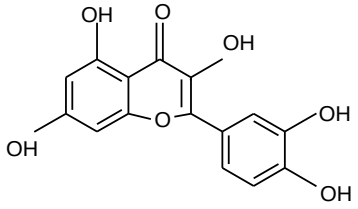
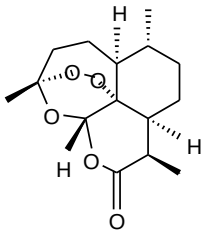
Table 2 Phytochemical Isolation from Herbal Breast Cancer.

Sr no.	Chemical class	Botanical name	Isolated compounds	Reference
1	Fatty acid ester	*Arisaema flavum*	Hexadecenoic acid ethyl ester; 5-oxo-19-propyl-docosanoic acid methyl ester.  Hexadecenoic acid ethyl ester	26
2	Triterpenoids	*Alstonia scholaris, Psorospermum guineense, Uncaria nervosa, Achyranthes bidentata*	Botulin, botulinic acid, ursolic acid  Ursolic acid Botulin	27,28

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26apr1561

			 Betulinic acid	
3	Phytosterols phytosterones	*Achyranthes bidentata*	β-sitosterol, stigmasterol, β-sitosterol glucoside: 10phytosterones.  β-sitosterol  Stigmasterol	27
4	Quinones & xanthones	*Mangifera indica*	Emodin, 3-geranyloxyemodin, 3-geranyloxyemodin anthrone, 2-geranylemodin, acetylismione D.  Emodin	24
5	Alkaloids (Sophora, others)	*Sophora flavescenes*	Matrine, and related alkaloids.  Matrine	21

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26apr1561

6	Flavonoids/ polyphenols	*Mangifera indica* *Vitex negundo*	Artemetin and catechin from mangiferin, norathyriol, gallotannins, gallic acid, methyl gallate, quercetin.  Quercetin  Artemetin	30

➢ *Herbal Extract from Plant Studied for Breast Cancer:*

Numerous therapeutic plants have been studied against breast cancer in cell and animal models as extracts rather than just pure components. These extracts are typically regarded as complementary therapies rather than stand-alone treatments, and the majority of the data are preclinical[41,42]

Table 3: Herbal Extracts and Their Anti-Breast Cancer Activity.

Sr no.	Plant & part used (extract type)	Main effect	Reference
1	*Mangifera indica (*mango; bark, kernal, leaves, peel, pulp; various extracts)	In vitro and in vivo extracts inhibits breast cancer cell growth, proliferation, migration, invasion; induce apoptosis and cell cycle arrest; reduce xenograft tumor growth.	45
2	*Cassia occidentalis* (methanol extract)	Methanolic extract cytotoxic to MCF-7 cells also anti-oxidant and anti-angiogenic.	34
3	*Callistemon viminalis* leaves &roots (methanol extract)	Strong cytotoxicity against MCF-7 and marked anti-angiogenic and anti-oxidant activity	34
4	*Cleome viscora* leaves &roots (methanol extract)	Cytotoxic against MCF-7 show anti-angiogenic and anti-oxidant effects.	34
5	*Mimosa hamata* (methanol extract)	Cytotoxic to MCF-7 with anti-angiogenic and anti-oxidant activity.	34
6	*Prmella vulgaris* (crude extract; ethanol fractions, esp.50% ethanol)	PV50 fraction inhibit proliferation of MDA-MB-231, MCF-7,4TI cells: in mice reduces tumor growth and lung metastasis: induce apoptosis: contain flavonoids and triterpenes.	38
7	*Andrographis paniculata, Momordica charantia, Peperomia pellucida (95% ethanol extracts)*	All three ethanolic extracts show dose- dependent cytotoxicity, apoptosis, ROS generation, and anti-migratory activity in MCF-7 cells*; A. paniculata* most potent.	33
8	*Christia vespertiloinis (*root, leaf; successive solvent extracts; EtOAc root most active)	Ethyl acetate root extract selectively cytotoxic to MDA-MB-231, with high phenolic content and antioxidant activity; fractions (F3) rich in flavonoids, coumarins, quinones show strong cytotoxicity.	37
9	Sri lanka plants (e.g. *Erigeron sp., Gardenia crameri, Camarium zeylanicum,* Elaeocarpus	Leaf/ bark solvent extract shows anti-proliferative effect on MCF-7 and MDA-MB-231 with limited toxicity to normal cells; several extracts have strong antioxidant and polyphenol content.	44

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26apr1561

Table no. 3: herbal drugs for their anti-breast cancer activity.

➢ *Herbal Anti-Cancer Agents from Marine and Animal Origin:*

Bioactive substances from marine and animal sources are being used in natural anticancer "herbal-type" medications. Important marine anti-cancer drug:

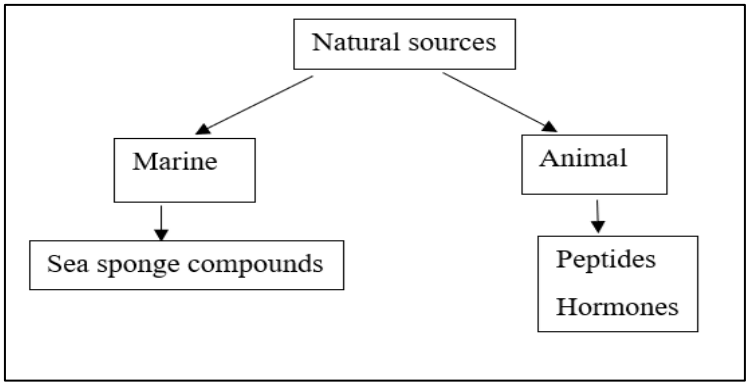


Fig 2: Natural Sources from Marine and Animal Source

Table 4: Major Approved Marine-Derived Anticancer Drugs and Sources.

Sr no.	Drug /Compound	Marine Source	Main Cancer Uses
1	Cytrabine	Sponge-derived nucleoside lead	Leukemia treatment: first marine anti-cancer drug approved[50,61,58]
2	Trabectedin	Tunicate *Ecteinascidia turbinata*	Soft tissue sarcoma, ovarian cancer[50,61,56]
3	Eribulin mesylate	Synthetic analogue of sponge metabolite halichondrin B	Metastatic breasts cancer[50,61]
4	Brentuximab vedotin (ADC using monomethyl auristatin E, a dolastatin analogue)	Cyanobacteria/ sea hare peptide scaffold	Hodgkin lymphoma and other CD30+ lymphoma[50,58,61]

➢ *Other Important Metabolites of Marine Anticancer:*

- In numerous tumor cell lines, compounds such as psammaplin, didemnin, dolastatin, ecteinascidin, halichondrin, bryostatin, calyculin, mycalamides, and halomon are produced by sponges, tunicates, soft corals, bryozoans, cyanobacteria, and seaweeds. These compounds have strong cytotoxic and antimitotic activity[54,48,61,49,52]
- Fucoidan, polysaccharides, polyphenols, carotenoids, and terpenoids produced from seaweed exhibit broad anticancer action in vitro and in vivo and cause apoptosis, cell cycle arrest, and anti-angiogenesis[52,58,59]

➢ *Anticancer Agents Derived from Animals:*

Venoms and peptides: Both terrestrial and marine species (fish, amphibians, mammals, and invertebrates) contain anticancer peptides (ACPs). They are frequently cationic antimicrobial peptides that specifically damage the membranes of cancer cells, trigger apoptosis, prevent angiogenesis and metastasis, and alter immunity[60,57,53,49].

➢ *A Few Examples are:*

- Melittin from bee venom,
- Esculent in[1]from frog skin,
- Brevinin[2]

Scorpion venom contains chlorotoxin, while snake venom contains L amino acid oxidase[47,47,49,56,51].

Various peptides, enzymes, and toxins from venom-derived combinations (bee, wasp, scorpion, and snake) are currently being investigated as cancer treatments or as warheads in targeted conjugates[60,57,47,56]

II. CONCLUSION

Natural products are being investigated extensively for the treatment of breast cancer, a significant worldwide health concern. Bioactive substances with anticancer properties include flavonoids, alkaloids, and polyphenols found in medicinal plants including turmeric, neem, and green tea. Herbal medications and extracts can cause apoptosis and stop the growth of tumors. Polysaccharides and carotenoids are among the special anticancer metabolites found in marine creatures such as algae and sponges. Bee venom and peptides are examples of chemicals originating from animals that show promise in attacking cancer cells. All things considered, plant, marine, and animal sources present encouraging substitutes for breast cancer treatment; however, more investigation is required to verify their safety and therapeutic efficacy.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26apr1561

REFERENCES

[1]. Almilaibary, A. (2024). Phyto-therapeutics as anti-cancer agents in breast cancer: Pathway targeting and mechanistic elucidation. *Saudi Journal of Biological Sciences, 31*. https://doi.org/10.1016/j.sjbs.2024.103935

[2]. Banerjee, A., Banerjee, S., Singh, A., Gravel, I., Debnath, A., & Singh, R. (2025). A Comprehensive Review on Promising Herbal Drug Discovery for Breast Cancer management current medical chemistry https://doi.org/10.2174/0109298673382636250829113449

[3]. Khalily, I., Megantara, S., & Aulifa, D. (2025). Targeting Molecular Pathways in Breast Cancer Using Plant-Derived Bioactive Compounds: A Comprehensive Review. *Journal of Experimental Pharmacology*,17,375-401. https://doi.org/10.2147/jep.s528132

[4]. Khan, M., Bouyahya, A., Hachlafi, N., Menyiy, N., Akram, M., Sultana, S., Zengin, G., Ponomareva, L., Shariati, M., Ojo, O., Dall'acqua, S., & Elebiyo, T. (2022). Anticancer properties of medicinal plants and their bioactive compounds against breast cancer: a review on recent investigations. *Environmental Science and Pollution Research, 29*, 24411 - 24444. https://doi.org/10.1007/s11356-021-17795-7

[5]. Kumar, S., Hemangini, H., Mazhar, M., Jogpal, V., Yadav, S., Jarag, R., Bhatt, S., & Patil, C. (2023). Active constituents of herbal medicines for breast cancer: current status. *Journal of Applied Pharmaceutical Science*. https://doi.org/10.7324/japs.2023.87630

[6]. Saini, H., Basu, P., Nesari, T., Huddar, V., Ray, K., Srivastava, A., Gupta, S., Mehrotra, R., & Tripathi, R. (2024). Therapeutic and pharmacological efficacy of plant-derived bioactive compounds in targeting breast cancer. *American journal of translational research, 16 5*, 1499-1520. https://doi.org/10.62347/nuzn4999

[7]. Shrihastini, V., Muthuramalingam, P., Adarshan, S., Sujitha, M., Chen, J., Shin, H., & Ramesh, M. (2021). Plant Derived Bioactive Compounds, Their Anti-Cancer Effects and In Silico Approaches as an Alternative Target Treatment Strategy for Breast Cancer: An Updated Overview. *Cancers,13*. https://doi.org/10.3390/cancers13246222

[8]. Shukla, S., Shukla, A., Upadhyay, A., Ray, N., Fahad, F., Nagappan, A., Dutta, S., & Mongre, R. (2025). Molecular Insight and Antioxidative Therapeutic Potentials of Plant-Derived Compounds in Breast Cancer Treatment. *Onco*. https://doi.org/10.3390/onco5020027

[9]. Silva, P., Silva, M., De Lima Filho, A., Batista, J., & Lima, S. (2023). PERSPECTIVES AND PHYTOTHERAPEUTIC APPROACHES IN BREAST NEOPLASMS: A SCOPE REVIEW. *International Journal of Health Science*. https://doi.org/10.22533/at.ed.15938423091010

[10]. Singh, V., Kumar, K., Purohit, D., Verma, R., Pandey, P., Bhatia, S., Malik, V., Mittal, V., Rahman, M., Albadrani, G., Arafah, M., El-Demerdash, F., Akhtar, M., Saleem, A., Kamel, M., Najda, A., Abdel-Daim, M., & Kaushik, D. (2021). Exploration of therapeutic applicability and different signaling mechanism of various phytopharmacological agents for treatment of breast cancer. *Biomedicine & pharmacotherapy = Biomedicine & pharmacotherapie, 139*, 111584. https://doi.org/10.1016/j.biopha.2021.111584

[11]. Singla, R., Wang, X., Gundamaraju, R., Joon, S., Tsagkaris, C., Behzad, S., Khan, J., Gautam, R., Goyal, R., Rakmai, J., Dubey, A., Simal-Gándara, J., & Shen, B. (2022). Natural products derived from medicinal plants and microbes might act as a game-changer in breast cancer: a comprehensive review of preclinical and clinical studies. *Critical Reviews in Food Science and Nutrition, 63*, 11880 - 11924. https://doi.org/10.1080/10408398.2022.2097196

[12]. Wu, H., Tsai, C., Hsu, P., & Kuo, C. (2025). Herbal Medicine in Breast Cancer Therapy: Mechanisms, Evidence, and Future Perspectives. *Current Issues in Molecular Biology, 47*. https://doi.org/10.3390/cimb47050362

[13]. Zhang, J., Wu, Y., Li, Y., Li, S., Liu, J., Yang, X., Xia, G., & Wang, G. (2024). Natural products and derivatives for breast cancer treatment: From drug discovery to molecular mechanism. *Phytomedicine: international journal of phytotherapy and phytopharmacology, 129*, 155600. https://doi.org/10.1016/j.phymed.2024.155600

[14]. Ahmed, F., Ijaz, B., Ahmad, Z., Farooq, N., Sarwar, M., & Husnain, T. (2020). Modification of miRNA Expression through plant extracts and compounds against breast cancer: Mechanism and translational significance. *Phytomedicine: international journal of phytotherapy and phytopharmacology, 68*, 153168. https://doi.org/10.1016/j.phymed.2020.153168

[15]. Dr.T. Karthiyayini, D., B. Diviniya, B., N. Jeyavarthani, N., S. Ragaswetha, S., M. Sneka, M., & R. Vishnupriya, R. (2025). Herbal Medicine: As a Complementary therapy to Traditional Treatment for Breast Cancer-A Systemic review. *International Journal of Pharmaceutical Research and Applications*. https://doi.org/10.35629/4494-100217891796

[16]. Hussain, A., Bourguet-Kondracki, M., Hussain, F., Rauf, A., Ibrahim, M., Khalid, M., Hussain, H., Hussain, J., Ali, I., Khalil, A., Alhumaydhi, F., Khan, M., Hussain, R., & Rengasamy, K. (2020). The potential role of dietary plant ingredients against mammary cancer: a comprehensive review. *Critical Reviews in Food Science and Nutrition, 62*, 2580 - 2605. https://doi.org/10.1080/10408398.2020.1855413

[17]. Kusane, H., & Kangralkar, V. (2024). Comprehensive Review of the Potential Anti-Breast Cancer Properties of Various Medicinal Plants. *Journal of Pharmaceutical Care*. https://doi.org/10.18502/jpc.v12i3.16774

[18]. Li, Y., Li, S., Meng, X., Gan, R., Zhang, J., & Li, H. (2017). Dietary Natural Products for Prevention and Treatment of Breast Cancer. *Nutrients, 9*. https://doi.org/10.3390/nu9070728

[19]. McGrowder, D., Miller, F., Nwokocha, C., Anderson, M., Wilson-Clarke, C., Vaz, K., Anderson-Jackson, L.,

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26apr1561

& Brown, J. (2020). Medicinal Herbs Used in Traditional Management of Breast Cancer: Mechanisms of Action. *Medicines, 7*. https://doi.org/10.3390/medicines7080047

[20]. Pandey, M. (2022). Medicinal Plants For Prevention And Cure Of Breast Cancer: A Review. *International Journal Of Scientific Research*. https://doi.org/10.36106/ijsr/8621019

[21]. Cao, X., & He, Q. (2020). Anti-Tumor Activities of Bioactive Phytochemicals in Sophora flavescens for Breast Cancer. *Cancer Management and Research, 12*, 1457 - 1467. https://doi.org/10.2147/cmar.s243127

[22]. Gunasekaran, M., Perumal, V., Somu, P., & M, S. (2025). Phytocompounds as sustainable therapeutics for breast cancer treatment: a comprehensive review on isolation and delivery strategies. *Discover Applied Sciences,7*. https://doi.org/10.1007/s42452-025-07745-0

[23]. Ju, Y., Liang, H., Du, K., Guo, Z., & Meng, D. (2020). Isolation of triterpenoids and phytosterones from Achyranthes bidentata Bl. to treat breast cancer based on network pharmacology. *Natural Product Research,35,5939-5942*. https://doi.org/10.1080/14786419.2020.1805603

[24]. Khan, M., Bouyahya, A., Hachlafi, N., Menyiy, N., Akram, M., Sultana, S., Zengin, G., Ponomareva, L., Shariati, M., Ojo, O., Dall'acqua, S., & Elebiyo, T. (2022). Anticancer properties of medicinal plants and their bioactive compounds against breast cancer: a review on recent investigations. *Environmental Science and Pollution Research, 29*, 24411 - 24444. https://doi.org/10.1007/s11356-021-17795-7

[25]. Lakshmi, B., Bidarur, J., Anilkumar, H., & Ravindranath, B. (2025). Prioritization of phytochemical isolation and characterization against HER2 as a breast cancer target based on chromatographic methods, DFT studies, 3D-QSAR analysis, and molecular docking simulations. *RSC Advances, 15*, 25103 - 25114. https://doi.org/10.1039/d5ra01800e

[26]. Nisa, S., Bibi, Y., Masood, S., Ali, A., Alam, S., Sabir, M., Qayyum, A., Ahmed, W., Alharthi, S., Santali, E., Alharthy, S., Bawazir, W., & Almashjary, M. (2022). Isolation, Characterization and Anticancer Activity of Two Bioactive Compounds from Arisaema flavum (Forssk.) Schott. Molecules,27. https://doi.org/10.3390/molecules27227932

[27]. Oben, E., Yuwong, G., Pierre, Y., & Shaiq, M. (2025). Abstract B016: Evaluation of the anti-breast cancer activity of isolates and semi-synthesized compounds from Alstonia scholaris leaves and Psorospermum guineense twigs. *Cancer Immunology Research*. https://doi.org/10.1158/2326-6074.cimm25-b016

[28]. Rahmawati, N., Ismail, N., Wahyuni, F., & Hamidi, D. (2024). Uncaria nervosa Elmer, a new herbal source for betulinic acid and ursolic acid: Metabolites profiling, isolation, and in vitro cytotoxicity studies against T47D breast cancer. *F1000Research, 13*. https://doi.org/10.12688/f1000research.152293.2

[29]. Triyasa, K., Diantini, A., & Barliana, M. (2022). A Review of Herbal Medicine-Based Phytochemical of Garcinia as Molecular Therapy for Breast Cancer. *Drug Design, Development and Therapy, 16*,3573-3588. https://doi.org/10.2147/dddt.s358229

[30]. Yap, K., Sekar, M., Seow, L., Gan, S., Bonam, S., Rani, N., Lum, P., Subramaniyan, V., Wu, Y., Fuloria, N., & Fuloria, S. (2021). Mangifera indica (Mango): A Promising Medicinal Plant for Breast Cancer Therapy and Understanding Its Potential Mechanisms of Action. *Breast Cancer: Targets and Therapy, 13*, 471 - 503. https://doi.org/10.2147/bctt.s316667

[31]. Alsubhi, N. (2023). The use of medicinal plants for combating breast cancer: A comprehensive review. *Journal of Experimental Biology and Agricultural Sciences*. https://doi.org/10.18006/2023.11(1).24.40

[32]. Anago, A., Segbo, J., Gnangnon, F., Akpovi, C., & Agbangla, C. (2023). Some Medicinal Plants with Anti-breast Cancer Activity and the Input of Phytotherapy in the Treatment of Breast Cancer. *European Scientific Journal, ESJ*. https://doi.org/10.19044/esj.2023.v19n18p66

[33]. Boontha, S., Buranrat, B., Saepang, K., Temkitthawon, P., & Pitaksuteepong, T. (2024). Cytotoxic, Cell Apoptosis, Colony Formation and Anti-Migratory Activity of Three Herbal Plant Extracts in MCF-7 Breast Cancer Cells. *Natural and Life Sciences Communications*. https://doi.org/10.12982/nlsc.2025.004

[34]. Kamble, S., & Gacche, R. (2019). "Evaluation of anti-breast cancer, anti-angiogenic and antioxidant properties of selected medicinal plants". *European Journal of Integrative Medicine*. https://doi.org/10.1016/j.eujim.2018.11.006

[35]. Khan, M., Bouyahya, A., Hachlafi, N., Menyiy, N., Akram, M., Sultana, S., Zengin, G., Ponomareva, L., Shariati, M., Ojo, O., Dall'acqua, S., & Elebiyo, T. (2022). Anticancer properties of medicinal plants and their bioactive compounds against breast cancer: a review on recent investigations. *Environmental Science and Pollution Research, 29*, 24411 - 24444. https://doi.org/10.1007/s11356-021-17795-7

[36]. Kumar, S., Gupta, A., Gauttam, V., Sharma, K., Deepak, A., & Thakur, R. (2023). Important Role of Herbal Extracts in the Management of Breast Cancer. *International Journal of Ayruveda and Pharma Research*. https://doi.org/10.47070/ijapr.v11i10.3003

[37]. Lee, J., Yazan, L., Kassim, N., Abdullah, C., Esa, N., Lim, P., & Tan, D. (2020). Cytotoxic Activity of Christia vespertilionis Root and Leaf Extracts and Fractions against Breast Cancer Cell Lines. *Molecules*,25. https://doi.org/10.3390/molecules25112610

[38]. Luo, H., Zhao, L., Li, Y., Xia, B., Lin, Y., Xie, J., Wu, P., Liao, D., Zhang, Z., & Lin, L. (2022). An in vivo and in vitro assessment of the anti-breast cancer activity of crude extract and fractions from Prunella vulgaris L. *Heliyon, 8*. https://doi.org/10.1016/j.heliyon.2022.e11183

[39]. McGrowder, D., Miller, F., Nwokocha, C., Anderson, M., Wilson-Clarke, C., Vaz, K., Anderson-Jackson, L., & Brown, J. (2020). Medicinal Herbs Used in Traditional Management of Breast Cancer:

Mechanisms of Action. *MEDICINES,7*. https://doi.org/10.3390/medicines7080047

[40]. S, K. (2022). Medicinal Plants in Combating Breast Carcinogenesis: A Review on Recent Investigations. *Open Access Journal of Cancer & Oncology*. https://doi.org/10.23880/oajco-16000182

[41]. Shareef, M., Ashraf, M., & Sarfraz, M. (2016). Natural cures for breast cancer treatment. *Saudi Pharmaceutical Journal: SPJ,24*,233-240 https://doi.org/10.1016/j.jsps.2016.04.018

[42]. Shrihastini, V., Muthuramalingam, P., Adarshan, S., Sujitha, M., Chen, J., Shin, H., & Ramesh, M. (2021). Plant Derived Bioactive Compounds, Their Anti-Cancer Effects and In Silico Approaches as an Alternative Target Treatment Strategy for Breast Cancer: An Updated Overview.*Cancers,*13. https://doi.org/10.3390/cancers13246222

[43]. Singla, R., Wang, X., Gundamaraju, R., Joon, S., Tsagkaris, C., Behzad, S., Khan, J., Gautam, R., Goyal, R., Rakmai, J., Dubey, A., Simal-Gándara, J., & Shen, B. (2022). Natural products derived from medicinal plants and microbes might act as a game-changer in breast cancer: a comprehensive review of preclinical and clinical studies. *Critical Reviews in Food Science and Nutrition, 63*, 11880 - 11924. https://doi.org/10.1080/10408398.2022.2097196

[44]. Wickramaratne, N., Jeyaraj, T., Senathilake, K., Tennekoon, K., Karunaratne, D., & Samarakoon, S. (2024). Screening of Anti-breast Cancer and Anti-oxidant Potentials of Selected Medicinal Plants from Sri Lanka. *European Journal of Medicinal Plants*. https://doi.org/10.9734/ejmp/2024/v35i61206

[45]. Yap, K., Sekar, M., Seow, L., Gan, S., Bonam, S., Rani, N., Lum, P., Subramaniyan, V., Wu, Y., Fuloria, N., & Fuloria, S. (2021). Mangifera indica (Mango): A Promising Medicinal Plant for Breast Cancer Therapy and Understanding Its Potential Mechanisms of Action. *Breast Cancer: Targets and Therapy, 13*, 471 - 503. https://doi.org/10.2147/bctt.s316667

[46]. Ahmad, M., Tahir, M., Hong, Z., Zia, M., Rafeeq, H., Ahmad, M., Rehman, S., & Sun, J. (2025). Plant and marine-derived natural products: sustainable pathways for future drug discovery and therapeutic development. *Frontiers in Pharmacology, 15*. https://doi.org/10.3389/fphar.2024.1497668

[47]. Bharadvaja, N. (2020). Venom-Derived Bioactive Compounds as Potential Anticancer Agents: A Review. *International Journal of Peptide Research and Therapeutics, 27*, 129-147. https://doi.org/10.1007/s10989-020-10073-z

[48]. El-Seedi, H., Refaey, M., Elias, N., El-Mallah, M., Albaqami, F., Dergaa, I., Du, M., Salem, M., Tahir, H., Dagliaa, M., Yosri, N., Zhang, H., El-Seedi, A., Guo, Z., & Khalifa, S. (2025). Marine natural products as a source of novel anticancer drugs: an updated review (2019–2023). *Natural Products and Bioprospecting, 15*. https://doi.org/10.1007/s13659-024-00493-5

[49]. Ghadiri, N., Javidan, M., Sheikhi, S., Taştan, Ö., Parodi, A., Liao, Z., Azar, M., & Ganjalikhani-Hakemi, M. (2024). Bioactive peptides: an alternative therapeutic approach for cancer management. *Frontiers in Immunology,15*. https://doi.org/10.3389/fimmu.2024.1310443

[50]. Khalifa, S., Elias, N., Farag, M., Chen, L., Saeed, A., Hegazy, M., Moustafa, M., El-Wahed, A., Al-Mousawi, S., Musharraf, S., Chang, F., Iwasaki, A., Suenaga, K., Alajlani, M., Göransson, U., & El-Seedi, H. (2019). Marine Natural Products: A Source of Novel Anticancer Drugs. *Marine Drugs,27*. https://doi.org/10.3390/md17090491

[51]. Khaliq, S., Khan, H., Ahmed, S., Khalid, S., & Fatima, A. (2025). Nature's Pharmacy: Harnessing Plant and Animal-Derived Agents for Cancer Therapy. *RADS Journal of Biological Research & Applied Science* https://doi.org/10.37962/jbas.v16i1.676

[52]. Lee, H., Selvaraj, B., & Lee, J. (2021). Anticancer Effects of Seaweed-Derived Bioactive Compounds. *Applied Sciences*. https://doi.org/10.3390/app112311261

[53]. Librizzi, M., Martino, C., Mauro, M., Abruscato, G., Arizza, V., Vazzana, M., & Luparello, C. (2023). Natural Anticancer Peptides from Marine Animal Species: Evidence from In Vitro Cell Model Systems.*Cancers,16*. https://doi.org/10.3390/cancers16010036

[54]. Lichota, A., & Gwoździński, K. (2018). Anticancer Activity of Natural Compounds from Plant and Marine Environment. *International Journal of Molecular Sciences, 19*. https://doi.org/10.3390/ijms19113533

[55]. Naeem, A., Hu, P., Yang, M., Zhang, J., Liu, Y., Zhu, W., & Zheng, Q. (2022). Natural Products as Anticancer Agents: Current Status and Future Perspectives. *Molecules, 27*. https://doi.org/10.3390/molecules27238367

[56]. Noble, K., Rohaj, A., Abegglen, L., & Schiffman, J. (2020). Cancer therapeutics inspired by defense mechanisms in the animal kingdom. *Evolutionary Applications, 13*, 1681 - 1700. https://doi.org/10.1111/eva.12963

[57]. Qu, B., Yuan, J., Liu, X., Zhang, S., X., & Lu, L. (2024). Anticancer activities of natural antimicrobial peptides from animals. *Frontiers in Microbiology, 14*. https://doi.org/10.3389/fmicb.2023.1321386

[58]. Santhi ravel, S., Dave, D., & Shahidi, F. (2024). Bioactive from marine resources as natural health products: A review. *Pharmacological reviews*. https://doi.org/10.1124/pharmrev.124.001227

[59]. Wali, A., Majid, S., Rasool, S., Shehada, S., Abdulkareem, S., Firdous, A., Beigh, S., Shakeel, S., Mushtaq, S., Akbar, I., Madhkali, H., & Rehman, M. (2019). Natural products against cancer: Review on phytochemicals from marine sources in preventing cancer. *Saudi Pharmaceuticals Journal: SPJ, 27, 767-777*. https://doi.org/10.1016/j.jsps.2019.04.013

[60]. Wang, L., Dong, C., Li, X., Han, W., & Su, X. (2017). Anticancer potential of bioactive peptides from animal sources (Review). *Oncology reports, 38 2*, 637-651. https://doi.org/10.3892/or.2017.5778

[61]. Zuo, W., & Kwok, H. (2021). Development of Marine-Derived Compounds for Cancer Therapy. *Marine Drugs, 19*. https://doi.org/10.3390/md19060342