Chapter 11
Terpenes on the Frontline:
Potential Benefits in Breast Cancer

Minky Mukhija
https://orcid.org/0000-0002-8118-3843
Ch. Devi Lal College of Pharmacy, Jagadhri, India

Sonia Kamboj
Ch. Devi Lal College of Pharmacy, Jagadhri, India

Jyoti Monga
Ch. Devi Lal College of Pharmacy, Jagadhri, India

Devkant Sharma
Ch. Devi Lal College of Pharmacy, Jagadhri, India

Anurag Bhargava
Ch. Devi Lal College of Pharmacy, Jagadhri, India

ABSTRACT

Breast cancer is the common invasive cancer in women, affecting around 12% of all women globally. Many effective anticancer medications with different chemical structures have been developed to treat breast cancer. However, patients have severe adverse effects from their non selectivity. Terpenes are a broad and diversified class of naturally occurring substances. They are made by combining several isoprene units, which are five-carbon bases. Terpenoids are typically categorised as monoterpenes, sesquiterpenes, diterpenes, sesterterpenes, triterpenes, tetraterpenes and polyterpenes based on the number of building units. This class of phytochemicals include a number of possible anti-breast cancer medicines. Natural terpenoids have

DOI: 10.4018/979-8-3693-6972-2.ch011

given rise to paclitaxel, one of the most effective therapeutic medications for treating metastatic breast cancer. With the passage of time, other well-known terpenoids have emerged as essential components of contemporary breast cancer pharmacotherapy. The potential of terpenoids as anticancer medicines against breast cancer will be discussed in this chapter

INTRODUCTION

Globally, breast cancer (BC) is the most typical neoplasm to be diagnosed with cancer and the primary cause of death for women (Nascimento and Otoni, 2020). In 2022, 2.3 million women globally diagnosed with BC and 670,000 people pass away from the disease. BC can impact women at any age after adolescence, but its occurrence increases with advancing age (https://www.who.int/news-room/fact-sheets/detail/breast-cancer.).

Causes of breast cancer

Women may face more risk of getting BC if they: (1) have their first child after age of thirty; (2) experience early menarche or menopause; (3) have a family member with a history of breast cancer especially if it is linked to inherited BRCA1 or BRCA2 gene mutation; (4) are overweight; (5) are older; (6) have prolonged exposure to radiation; (7) excessive consumption of alcohol; and (8) use birth control pills for a long time. Frequently occurring signs and symptoms include breast lumps, inverted nipples, sore nipples, nipple discharge, skin redness, dark pigmentation, and discomfort (Negi, 2001).

Treatment for breast cancer involves hormonal, radiation, molecular, and chemotherapy interventions, and the results are often based on the subtypes. The recommendation for surgery is increasing, particularly in cases of metastasis. Because of the variation in presentation and treatment results, a multimodal and interdisciplinary strategy has been developed to improve survivability through the use of natural plant products. These multimodal strategies still rely on early illness identification and detection.

The proliferative index (Ki67), histological grade, immunohistochemistry, and clinical presentation of breast cancer can all vary significantly. The Bloom-Richardson scoring system and Ki67 are helpful in predicting the degree of tumour aggression, even though the same histological subtypes present differently in different age groups and are associated with different factors related to fertility, which may also have an impact on the disease's progression and treatment. These include menopausal symptoms, sexual dysfunction, and impairment to fertility.