Chapter 8
Role of Medicinal Plants Against Lung Cancer

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ABSTRACT

Nowadays for treatment of various diseases, scientific studies are conducted using the medicinal plants of both domestic and wild for curing purpose. Every plant contain compounds that have medicinal properties and can be isolated from the plants parts. Due to plants diversity in India and use in Ayurveda, Unani and Siddha, India is known as medicinal hub. Lung cancer is the third most common cancer, that develops in lung tissue and are of two type's non-small cell lung cancer and small cell lung cancer. Many factors cause lung cancer; tobacco smoking is the prominent cause of lung cancer. The individuals who smoke have 20-30% more chance of developing lung cancer than non-smokers. The conventional treatment of lung cancer, are chemotherapy, stem cell therapy, and electrochemical treatments. Plants and the compounds present can be used for treating lung cancer. So in this chapter will focus on plants Acalypha indica, Solanum trilobatum, Justicia adhatoda, Coleus amboinicus and Piper nigrum in lung cancer treatment and on the medicinal properties.

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INTRODUCTION

In recent years diseases have been high in number but more predominantly cancer is one of the most severe diseases which spread throughout the world (Sukumar et al. 2022).Cancer is nothing it is uncontrolled cell growth referred to as cancer, the cancer cells do not have a particular site they start growing in one site and spread throughout the body (WHO, 2016; Mohd et al. 2018).Also, caused by the elongation of DNA damage because of ionizing radiation, ultraviolet radiation, environmental agents and therapeutic agents etc. lung cancer (12.7%) is the most frequently diagnosed caused among all cancers. The X-chromosome inactivation leads to the development of single-cell origin tumours have demonstrated (Cooper, 2000). In numerous screening assays for modifying significant pathways or molecular targets in cancer, numerous chalcones of both natural and synthetic origin have been identified due to their relative ease of preparation, structural diversity, ease of chemical manipulation, and interactions of the enone moiety with cystein residues in proteins (Khanapure et al.,2018). Many treatments are developed to treat and diagnose cancer nowadays such as radiation therapy, selective surgery, target therapies and chemotherapeutic drugs (Mohd et al. 2021; Hyeda et al.2023).

Lung cancer is defined as uncontrolled cell growth in the way of the lungs. The third most common cancer after breast and prostate cancer is lung cancer (Jones and Baldwin, 2018) non-small cell carcinoma (NSCLC) and small cell carcinoma (SCLC) are the most common types of lung cancer. The primary risk factor for lung cancer is the intake of tobacco products like cigarettes, pipes and cigars but it affects the non-smoking people also affected by the inhale the smoke. A secondary risk factor is second-hand smoke and other risk factors are radon, occupational hazards, hereditary cancer syndrome, certain chemicals, air pollution, asbestos and previous chronic lung diseases (WHO, 2016). Lung cancer cannot be identified initially because it is asymptomatic it can be screened by the method of (LDCT) which is low-dose computed tomography. In the year of 2012, 1.8 million new people were diagnosed with lung cancer, and more than 230,000 new cases were estimated in the year of 2018 in the United States (Nasim et al. 2019). For the past 40 years the incidence rate has decreased in both genders it gets decreased but in females, it increased. The people who are diagnosed are in the advanced stage they are among 62%. Treatment and prognosis of the stage want to be accurately known in patients PET-CT (positron emission tomography scanning) and EBUS (endobronchial ultrasound) are used but mediastinal lymph node sampling is used to know the accuracy of the lung cancer (Goldstraw et al. 2016). Some of the treatments used to treat lung cancer are surgery, radiation therapy, chemotherapy, targeted therapy, immunotherapy, and supportive (palliative) care (Sesen et al. 2013). Gefitinib was the first NSCLC treatment that was genetically targeted. This medication is taken orally and inhibits tyrosine kinase, which affects EGFR. The binding of epidermal growth factor activates the transmembrane surface protein known as EGFR. An intracellular tyrosine kinase domain that is bound sets off a series of reactions that lead to the production of DNA and the division of cells. A mutation in the EGFR gene that causes unchecked proliferation results in the loss of control over the tyrosine kinase domain in 15% of patients with NSCLC. Gefitinib was shown to respond in a specific subgroup of patients, primarily Asian females with adenocarcinomas who had never smoked, when it was first administered to all NSCLC patients (Kris et al.,2003). This led scientists to seek for EGFR gene mutations, which they found to be overexpressed in patients who reacted to gefitinib (Lynch et al.,2004). Pembrolizumab, nivolumab, and atezolizumab are immune checkpoint inhibitors, the newest family of systemic therapies. They function via the receptor pathway for programmed death-ligand 1/2 (PD-L1 and PD-L2) and programmed death 1 (PD-1). Proteins called PD-L1 and PD-L2 are believed to inhibit the immune system by attaching to the PD-1 receptor on T cells