

Medicinal Plants and Infection

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Abstract

The term “medicinal plants” refers to a wide range of plants, not all of which are used for medicinal purposes. To develop and synthesise drugs that can be used for treating various diseases, one of them is infection. These medicinal plants are seen as valuable resources.

Keywords: medicinal plants, bacterial infection, viral infection, fungal infection, resistance

1. Introduction

Medicinal plants are popular in the whole world specifically in developing countries, not only because they have a lot of active ingredients, but also because they have a number of pharmacological properties, such as changing how parts of the immune system work (Olabisi O. Ogunrinola, Rahmon I. Kanmodi & Oluwaseyi A. Ogunrinola., 2022). Pathogens like bacteria, protozoa, and viruses need a strong immune response to stop them from doing harm. Some viral pathogen-caused diseases, like measles, chickenpox, Ebola, and human immunodeficiency virus, can kill or hurt mammals that don't have enough immunity (Olabisi O. Ogunrinola, Rahmon I. Kanmodi & Oluwaseyi A. Ogunrinola., 2022).

2. Medicinal Plants and Bacterial Infection

In traditional medicine, bacterial infections are commonly treated with several medicinal herbs. Though promising preclinical results have been found for the antibacterial activity of medicinal plants, but there is a dearth of evidence supporting their use in actual clinical settings (Silvia Bittner Fialová, Katarína Rendeková, Pavel Mucaji, Milan Nagy & Livia Slobodníková, 2021; Karen W. Martin & Edzard Ernst, 2003).

2.1 Medicinal Plants and Bacterial Resistance

Antimicrobial resistance has arisen from antibiotic misuse. The rise in antibiotic resistance in both nosocomial and community-acquired infections contribute to the worldwide burden of infectious disease (Mahady G.B., 2005; Uttpal Anand, Nadia Jacobo-Herrera, Ammar Altemimi & Naoufal Lakhssassi, 2019). Antimicrobial resistance has spread from an isolated case of *Staphylococcus aureus* to become a worldwide crisis that cuts across geography, culture, and ethnicity (Mahady G.B., 2005). Multidrug-resistant tuberculosis (MDR-TB) has spread throughout the world and into new populations in the twenty-first century, affecting healthcare workers and the general public in Eastern Europe, Africa, and Asia (Mahady G.B., 2005). Moreover, the trust between doctors and their patients suffers as a result of multidrug resistance (MDR), which also results in substantial financial losses (Uttpal Anand, Nadia Jacobo-Herrera, Ammar Altemimi & Naoufal Lakhssassi, 2019). Scientists fear that infectious disease outbreaks could return to pre-antibiotic era levels due to the rapid evolution of MDR in microorganisms, which is a major threat to global health today (Uttpal Anand, Nadia Jacobo-Herrera, Ammar Altemimi & Naoufal Lakhssassi, 2019). The last two decades have been dominated by research into new

therapeutics for treating MDR, particularly those derived from plants and deep-sea flora (Uttpal Anand, Nadia Jacobo-Herrera, Ammar Altemimi & Naoufal Lakhssassi, 2019).

3. Medicinal Plants and Viral Infection

Viral infections are currently the leading cause of death worldwide. Viruses like SARS corona virus-2 (CoV-2), HIV, hepatitis, human papillomavirus, and many others currently have no treatment options. Besides, the severe acute respiratory syndrome caused by the corona virus infection (also known as “the novel coronavirus disease”) (COVID-19) is associated with a high mortality rate. The situation has become even more dire due to the absence of safe and effective antiviral drugs targeting these viruses (Sitesh C. Bachar, Kishor Mazumder, Ritesh Bachar, Asma Aktar & Mamun Al Mahtab, 2021). Recently, medicinal plants and their bioactive metabolites have been one of the key areas of attention to find effective and affordable medications to meet contemporary needs (Sitesh C. Bachar, Kishor Mazumder, Ritesh Bachar, Asma Aktar & Mamun Al Mahtab, 2021).

3.1 Medicinal Plants and Viral Resistance

The search for effective and alternative treatment options, such as plant-derived antiviral drug molecules, has been bolstered by the toxicities and ineffective responses to resistant strains of synthetic antiviral drugs (Sitesh C. Bachar, Kishor Mazumder, Ritesh Bachar, Asma Aktar & Mamun Al Mahtab, 2021). A variety of plant-based and naturally occurring chemicals from various chemical families have been identified to have anti-HBV activity. Some plant extracts have been demonstrated to be as effective, if not more so, as interferons and/or lamivudine in combating this virus (Sitesh C. Bachar, Kishor Mazumder, Ritesh Bachar, Asma Aktar & Mamun Al Mahtab, 2021). All of this suggests that medicinal plants are an important source of novel antiviral drugs, which can be very effective in treating viruses that are resistant to currently available synthetic medication.

4. Medicinal Plants and Fungal Infection

More than a billion people have been diagnosed with serious fungal diseases, and it is estimated that 1.6 million deaths a year are caused by these illnesses. However, public health officials still don't talk much about them, and there isn't enough money to support surveillance systems that track the prevalence of fungal diseases and the development of resistance to antifungal medications (Lee Fang Tan, Vi Lien Yap, Mogana Rajagopal, Christophe Wiart, Malarvili Selvaraja, Mun Yee Leong & Puay Luan Tan, 2022). Humans, on the whole, have a high level of resistance to invasive fungal diseases. Opportunistic fungal infections, however, pose a greater threat to people with compromised immune systems or HIV; chronic diseases like diabetes mellitus, AIDS, and cystic fibrosis are included in this group, besides those undergoing chemotherapy or immunosuppression for organ transplantation (Lee Fang Tan, Vi Lien Yap, Mogana Rajagopal, Christophe Wiart, Malarvili Selvaraja, Mun Yee Leong & Puay Luan Tan, 2022). Presently, clinicians use three classes of antifungal agents to combat fungal infections: polyenes, echinocandins, and azoles (Lee Fang Tan, Vi Lien Yap, Mogana Rajagopal, Christophe Wiart, Malarvili Selvaraja, Mun Yee Leong & Puay Luan Tan, 2022). None of these currently available options for treating fungal infections are ideal, either because they are too expensive or because they come with undesirable side effects. Therefore, the discovery of novel antifungals is severely needed. Some medicinal plants have broad-spectrum antifungal activity as a result of the presence of various phytochemicals and have shown promise in treating a variety of fungal infections (Ghulam Murtaza1, Muhammad Mukhtar & Aysha Sarfraz, 2015).

4.1 Medicinal Plants and Fungal Resistance

Some fungi are resistant to all three classes of antifungal agents, and this problem has arisen because there are so few antifungal agents available (Lee Fang Tan, Vi Lien Yap, Mogana Rajagopal, Christophe Wiart, Malarvili Selvaraja, Mun Yee Leong & Puay Luan Tan, 2022). Therefore, there is a growing need for the discovery of new antifungal agents, ideally with a different mechanism of action, due to the rise in the prevalence of fungal infections, the emergence of resistance, and the limitations of the currently available antifungal agents (Lee Fang Tan, Vi Lien Yap, Mogana Rajagopal, Christophe Wiart, Malarvili Selvaraja, Mun Yee Leong & Puay Luan Tan, 2022; Ghulam Murtaza1, Muhammad Mukhtar & Aysha Sarfraz, 2015).

5. Conclusion

As a result, there is a huge opportunity for the development of treatments based on antimicrobial, antiviral, and antifungal compounds found in plants. In addition to traditional methods like animal and human testing, new studies should make use of cutting-edge methods like standardised testing procedures, minimum inhibitory concentration determination, and protocol standardisation.

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