

The inhibitory effect of aqueous and alcoholic extract of *Lavandula Officinalis* L. on Some type of Pathogenic

Fatimah Ali Hasan 

University of Basra - College of Agriculture - Medicinal and Aromatic Plants Unit

E- mail: fatimah.hasan@uobasrah.edu.iq

Abstract

The purpose of this study is to know the inhibitory ability of alcoholic and aqueous extracts of lavender leaves *Lavandula Officinalis* L. to the growth of some human pathogenic organisms represented by two types of bacteria, *Candida Albicans* and *Escherichia coli* (E. coli) and *Klebsiella pneumonia* (Kleb). Ethanol and distilled water were used as solvents for extraction at concentrations of 0, 25, 50, and 100 mg ml⁻¹ for each. The alcoholic and aqueous extracts showed an inhibitory effect on the growth of the three species at a concentration of 100 mg ml⁻¹, and the aqueous extract showed an inhibitory effect on *Candida* and *Kleb* at concentrations of 25 or 50 mg mL⁻¹. The concentrations showed variation in their inhibitory effect on pathogenic organisms, as the alcoholic extract at a concentration of 100 mg ml⁻¹ inhibited the growth of *Candida* and E. coli with a larger inhibitory diameter than the aqueous extract, and the aqueous extract at a concentration of 100 mg ml⁻¹ inhibited the growth of *Kleb* with a larger diameter than the alcoholic extract. GC-MAS analysis of the volatile oil sample of lavender leaves showed the appearance of some compounds with an important effect on the inhibitory activity, such as 1,8-cineole, alpha-pinene, beta-pinene, Camphor, and Terpineol.

Keywords: Extract type, Lavender plant, Inhibitory activity, *Candida Albicans*, *Escherichia coli* (E. coli), *Klebsiella pneumoniae*, GC-MAS

I. Introduction:

The escalating global crisis of antibiotic resistance demands the urgent development of novel antimicrobial strategies (Truong and Mudgil, 2023). Although a focused area of synthetic chemistry and biotechnology is slowly dictating the practice of medicine today, the natural products, especially the medicinal plants continue to provide significant bioactive source for controlling infectious diseases. In fact, it is estimated that about 40% of the drugs that are in use today are derived from natural products where plant derived drugs still remain relevant (Srivastava and Singh, 2020). Therapeutic benefit of exercising pharmacognosy on plants As it is established that the plant kingdom is home to an estimated 500,00 species, exploring its possibility in the provision of therapeutic agents is still limited (Singh, 2015). This inherent potential is particularly apt if the target is antimicrobial drugs since the world has begun to face challenges arising from multi-drug-resistant pathogens.

Among the promising candidates for antimicrobial drug development is *Lavandula officinalis*, a Lamiaceae species with a long history of traditional medicinal and cosmetic applications (Basch *et al.*, 2004; Meftahizada *et al.*, 2011; Jigău *et al.*, 2022). The essential oils of *L. officinalis* are rich in a diverse array of bioactive compounds, including phenolic compounds, monoterpenes (such as linalool and linalyl acetate), sesquiterpenes, flavonoids (including luteolin), triterpenoids (such as ursolic acid), and coumarins (including umbelliferone) (Hajhashemi *et al.*, 2003; Slimani *et al.*, 2022; Rao *et al.*, 2023). These compounds have been implicated in the plant's reported antimicrobial properties, making it an attractive candidate for investigation as a source of novel antimicrobial agents.

This study evaluates the antimicrobial efficacy of both aqueous and alcoholic extracts of *L. officinalis* against a panel of clinically relevant, antibiotic-resistant pathogens. Specifically, the activity of these extracts against *Klebsiella pneumoniae*, a Gram-negative bacterium associated with various infections

