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Short Communication



Isolation and Characterization of Active Alkaloid Compounds from *Cinnamomum Verum Cortexes* and Proof of their Medicinal Efficacy against Pathogenic Fungus *Alternaria Alternate* Causing Upper Respiratory Tract Inflammatory Disease

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Abstract

Six alkaloid compounds were isolated (the discovery of a natural drug, which is a combination of the six alkaloid compounds). Alkaloids viz., 1,3,5-Triazine-2-carboxylic acid, 4-amino-6-methyl; 1,2,4-Triazino[5,6-E][1,2,4]-triazine-3,6-dione, hexahydro; 2-(4,5-Dihydro-3-methyl-5-oxo-1-phenyl-4-pyrazole)-5-nitrobenzoic acid; 4-methyl-3,4-dihydro-[1,2,3] trizolo [4,5-d] pyrimidine-5,7-dione; Propanoic acid-3-(perhydro-2,5-dioxo-imidazol [4,5-d] imidazole-1-yl) and 1,2,3-Triazolo[4,5-f] benzotriazole- 4,8(4H,8H)-dione, were isolated from *Cinnamomum verum cortexes* by using ethanolic acetic acid, sulphuric acid, and ammonia solvents, and they were characterized by using preliminary qualitative tests, gas chromatography-mass spectrum GC-MASS.

The medicinal efficacy was studied for these six alkaloidic compounds theoretically by using the Autodock program and the results showed the presence of high efficacy of the compounds. Then the medicinal efficacy was measured biologically for the six compounds mixture in vitro depending on the synergistic interaction principle by using various concentrations (5, 10, 15, 20, and 25 mg/ml) by using of agar diffusion technique. The results showed that the six alkaloidic compounds' mixture is biologically active against *Alternaria alternate* fungus, where the inhibition zone diameters were recorded equal to 27, 33, 41, 45, and 49 mm respectively towards the pathogenic fungus. Also, cytotoxicity tests for the different concentrations of six active alkaloid compounds mixture proved there is no toxic effect belonging to them towards red blood cells, and no hemolysis effect appeared in blood cells.

Therefore, six alkaloid compounds isolated from *Cinnamomum verum cortexes* can be used as active drugs for the treatment of various diseases especially those caused by pathogenic fungi represented by *Alternaria alternate*, without any side effects.

Introduction

The biological effectiveness of the extract of the cinnamon plant was studied due to the great medical importance of this plant. In 2019, researcher Nita Parisa1 and his group studied the effectiveness of the extract of the *Cinnamomum burmannii* plant as an antibacterial against *Staphylococcus aureus* and *Escherichia coli*, and the study proved the effectiveness of the extract as an antibacterial [1]. The antioxidant and antimicrobial ability of the raw extract from the leaves of the sage plant was also studied by researcher Liliane Bezerra de Lima and his group in 2022 [2]. A patent was also registered with the Shanghai Institute of Nutrition and Health of CAS under Application

No. CN2006101175121A events, as the invention relates to the process of preparing the extract.

The extract is used in pharmacy or health care product preparation. The prepared cinnamon extract contains cinnamic alcohol, cinnamic acid, cinnamic aldehyde, and eugenol. The extract of the invention can be used to prepare medicines or health care products that have the dual functions of lowering blood sugar, reducing blood lipids, and protecting liver functions [3]. In this patent application, six alkaloid compounds (which had not been previously extracted) were extracted from the peels of the Cinnamon plant, and their medicinal effectiveness was proven against the pathogenic fungus *Alternaria alternate*, which causes

upper respiratory tract infections (this effect has not been previously studied) at a low cost. Medicinal plants are one of the natural sources for treating many different diseases because they contain many effective metabolic compounds such as phenols, alkaloids, tannins, flavonoids, glycosides, terpenes, steroids, essential oils, and saponins, which are characterized by their high pharmacological effectiveness in reducing various pathological conditions caused by pathogenic microorganisms known for their ability to cause Inflammations and injuries inside the human body [4,5].

The active natural chemical compounds isolated and identified from medicinal plants are biochemically synthesized in the plant through secondary metabolism through many diverse biochemical pathways depending on the class of the active compound. Many effective natural compounds, such as phenols and alkaloids, have been isolated from various parts of many medicinal plants, and these chemical compounds have been used as therapeutic drugs for several diseases such as diabetes, high blood pressure, cancer, heart disease, and others.

It has led to amazing successes in this field [6-8]. The principle that distinguishes active metabolic compounds is what is called synergistic interaction, which is the contribution of all the active compounds to each other in the effective drug effect within the living cell of the pathogenic microorganism, as well as the absence of any effects. side effects of these compounds, which makes their use safe. The other thing that distinguishes the effective chemical compounds extracted from medicinal plants is that they are obtained from natural sources and are available at a very low price compared to the cost of industrially produced pharmaceutical compounds [9-11].

The alkaloids isolated from medicinal plants are heterocyclic organic nitrogenous compounds containing one or more nitrogen atoms within this ring structure, and the pharmacological effectiveness of these effective compounds is due to the nitrogen atom or atoms present and their derivatives, especially the imine group, which can hydrogen bond with various chemical systems. Found in the living cells of pathogenic microorganisms such as bacteria, fungi, and viruses [12]. Many previous studies have proven that alkaloid compounds isolated from medicinal plants have medical and physiological effects as anti-fungal, anti-parasitic, anti-inflammatory, anti-tumor, and anti-cancer compounds. anti-cancer [13-15].

Conclusion

The intervention includes the isolation of six novel

natural pharmaceutical alternatives that do not have any side effects instead of the antibiotics used that have side effects. The isolated compounds are characterized by their inhibitory effect on the fungus *Alternaria alternata*. The mixture of isolated compounds may be used as a safe drug because there were no cytotoxic effects noted on the red blood cells. Therefore, six alkaloid compounds isolated from *Cinnamomum verum cortexes* can be used as active drugs for the treatment of various diseases especially caused by pathogenic fungus represented by *Alternaria alternata*, without any side effects.

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