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The thesis entitled “Search for natural antimicrobial and biologically active agents” is comprised of four chapters dealing with general introduction, antimicrobial screening of some compound Unani formulations, antimicrobial and biological activity of plants used as ingredients in Unani medicines and isolation and characterization of their phytoconstituents.

Growing concern about health and physical fitness has booming impact on renaissance of the traditionally used medicines as fast acting synthetic drugs, often have side effects on human body. These old miracle plants have their existence as herbal drugs despite considerable advancements in medical sciences and have the key root of traditional medicine system.

Chapter 1 deals the importance of medicinal plants and how they come in prominence in medicines through out the world. Impact of infectious diseases on human health, use of medicinal plants/phytoconstituents in infectious diseases and synergic action of phytomedicines has also been discussed in this chapter.

Chapter 2 describes antimicrobial activity of some Unani drugs used for the treatment of various infectious diseases. These Unani drugs are manufactured and marketed by Dawakhana Tibbiya College, Aligarh Muslim University, Aligarh.

The ethanolic extract of five Unani drugs (Qurs-e-Sartaan Kafoori, Qurs-e-Suzak, Dawa-e-Dibba, Safoof-e-Bars and Safoof-e-Kharish) having multiple botanical ingredients with some chemical substances and substances of animal origin was studied for scientific evaluation for their antibacterial and antifungal activity by agar well diffusion method against the Escherichia coli, Salmonella
typhimurium (clinical isolates), Staphylococcus aureus, Brucella abortus S-19 (standard strains) and a yeast Candida albicans, a clinical isolate.

The antibacterial and antifungal activity was assessed by presence or absence of zone inhibition or zone diameter. The antibacterial and antifungal activity was observed against all the tested bacteria and yeast for all the tested drugs, except Safoof-e-Kharish which is not active against Escherichia coli and Salmonella typhimurium. Escherichia coli seem to be least sensitive towards these drugs as revealed by its zone diameter.

In chapter 3 the antimicrobial activity and hepatoprotective effect of Operculina turpethum (roots) aqueous extract (OTE) have been discussed. Operculina turpethum, commonly known as trivrit or nishot, belongs to the Family Convolvulaceae, is of tremendous ethno-medicinal value. Mainly, roots or stem bark of this plant are traditionally used for medicinal purposes.

The antimicrobial activity of the Operculina turpethum extract (OTE) were tested against some pathogenic microbes includes Salmonella typhimurium, Listeria monocytogenes, Candida albicans and Cryptococcus neoformans by micro dilution method. The results of the antimicrobial screening are highly encouraging. The Operculina turpethum extract (OTE) of the plant inhibits the growth of Candida albicans at the lowest concentration of 6.25 µg/ml.

The therapeutic effect of Operculina turpethum extract (OTE) against NDMA induced hepatotoxicity in rats was assessed by histological observations and biochemical parameters.

Hepatic fibrosis was induced in adult male albino rats through serial intraperitoneal administrations of NDMA at a concentration of 10 mg/kg body weight on three consecutive days of each week over a period of three weeks. A
group of rats received *Operculina turpethum* extract (OTE) orally in doses of 75, 150 and 200 mg/kg body weight at 5 hours after the administration of NDMA. The controls and treated animals were sacrificed on days-7, 14 and 21 after the start of the administration of NDMA. The progression of hepatic fibrosis as well as the amelioration effect of *Operculina turpethum* extract (OTE) was evaluated histopathologically as well as by immunohistochemical staining for the activation of hepatic stellate cells. Alterations in serum and liver biochemical parameters and LDH isoenzymes were also studied. Serial administration of NDMA resulted in well formed fibrosis in the liver. Staining of α-SMA demonstrated activated stellate cells from day-7 onwards which was dramatically increased on day-21. An elevation of liver function enzymes, serum hydroxyproline levels and LDH isoenzymes 4 and 5 were also observed. All these changes were remarkably reduced in *Operculina turpethum* extract (OTE) administered animals and fibrogenesis was completely absent. Our results suggest that *Operculina turpethum* extract (OTE) has hepatoprotective effects against NDMA-induced hepatic fibrosis.

In chapter 4 antimicrobial activity and isolation and characterization of the constituent of *Acacia leucophloea* Willd. (stem bark) have been discussed. The antimicrobial activity of the fractions of ethanolic extract of the stem bark of *Acacia leucophloea* Willd. were tested by micro dilution method against the two bacteria and two fungi. Acetone fraction showed significant activity at 6.25 µg/ml against *Candida albicans* while the minimum inhibitory concentration of ethyl acetate fraction in *Salmonella typhimurium* and *Candida albicans* was 12.5 µg/ml.

The ethyl acetate fraction of ethanolic extract was adsorbed on silica gel and passed over a column of silica gel set with petroleum ether. The column was eluted with mixture of solvents increasing order of polarity and the fractions were mixed
together on the basis of TLC pattern. The antimicrobial activity of these fractions was tested also by the same protocol against the same microorganisms described above. These fractions showed activity against all the tested microorganisms.

The ethyl acetate eluent of the column chromatography affords a compound which is identified as a phenolic trimer (A-4) on the basis of spectral analysis (MASS, $^1$H-NMR $^{13}$C-NMR). $^1$H-NMR spectra of the compound was complex therefore the compound was further purified by preparative HPLC using C-18 column. This pre-purified compound was analyzed by UPLC-MS for purity using gradient system.

This chapter also includes comprehensive review of constituents isolated from the different part of the plant.