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INTERNATIONAL JOURNAL
EIJMRMS
Next Scientists
European International Journal of Multidisciplinary Research and Management Studies
SJIF 5.954 2022

EUROPEAN INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH AND MANAGEMENT STUDIES
ISSN: 2750-8587
DOI: https://doi.org/10.55640/eijmrms-02-04-50

https://eipublication.com/index.php/eijmrms
Volume: 02 Issue: 04 April 2022
Published Date:- 30-04-2022

Page No.-263-266

ANTIBACTERIAL ACTIVITY OF LINUM USITATISSIMUM L. SEEDS AND ACTIVE COMPOUND DETECTION

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ABSTRACT: - In the present article, antibacterial properties of four different extracts from Linum usitatissimum L. seeds were screened against four types of Gram-positive and negative bacteria: Staphylococcus aureus, Bacillus cereus, Klebsiella pneumoniae and Pseudomonas aeruginosa using agar-well diffusion method and comparing their antibacterial activities with the antibiotics Ampicillin, Cefalexin, Chloramphenicol and Tetracycline.

KEYWORDS: Linum usitatissimum, medicinal uses, linseed oil.

INTRODUCTION

Plants have long provided man kind with a source of medicinal agents, with natural products once serving as the source of all drugs. Dependence on plants as the source of medicine is prevalent in developing countries where traditional medicine plays a major role in health care. The rural population of a country is more disposed to traditional ways of treatment because of its easy availability and cheaper cost. Herbal therapy, although still an unwritten science, is well established in some cultures and traditions, and has become a way of life in almost 80% of the people in rural areas, especially those in Asia, Latin America and Africa. Medicinal plants, which form the backbone of traditional

medicine, have in the last few decades been the subject of very intense pharmacological studies, This has been brought about by the acknowledgement of the value of medicinal plants as potential sources of new compounds of therapeutic value and as sources of lead compounds in drug development. Linum usitatissimum L. (flax, linseed) is a species of the family Linaceae. It is an erect, herbaceous annual which branches corymbosely above the main stem. Two types of L. usitatissimum are cultivated: the linseed type, grown for oil extraction from the seed, is a relatively short plant which produces many secondary branches compared to the flax type, grown for the fibre extraction from the stem, which is taller and is less branched. Seeds contain 35-45% oil which comprises mainly linoleic and linolenic acids and 20-25% protein, the seed also contains cyanogenic glycosides (prussic acid) in small quantities these glycosides stimulate respiration and improve digestion. Seeds are used in breads and cereals, it can also be sprouted and used in salads. Linseed has a long history of medicinal use, its main effects being as a laxative and expectorant that soothes irritated tissues, controls coughing and relieves pain in addition of being analgesic, demulcent, emollient, laxative, pectoral and resolvent. The methanol extract from these seeds have been reported to have excellent antiviral activities. Extracted oil from flax seeds contains 4% L-glutamic acid, which is used to treat mental deficiencies in adults. It also has soothing and lubricating properties, and is used in medicines to soothe tonsillitis, sore throats, coughs, colds, constipation, gravel and stones.

Antibacterial activity .The antibacterial tests were performed using agar-well diffusion method described by. Agar plates were prepared using sterile Nutrient agar (Oxoid). The bacterial inoculum was evenly spread onto the surface of the agar plates using sterile swab sticks. Wells (6 mm diameter) were punched in the plates using a sterile stainless steel borer. Ten microliters of each extract concentrations were added to each well. Commercial antibiotics Ampicillin 250mg, Cefalexin 250mg, Chloramphenicol 250mg and Tetracycline 250mg were purchased from a local pharmacy, each antibiotic capsule (250mg) was dissolved in 10ml distilled water or ethanol (70% or absolute depending on antibiotic) to produce antibiotic solutions with a concentration 25mg/cm3 as described by (Adomi, 2006) with the assistance of a pharmacist. Ten microliters of each antibiotic solutions were filled in each well and used as positive control, and ten microliters of DMSO and water per well was used as negative control. Diffusion of the extracts and antibiotics was allowed at room temperature for 30 minutes. The agar plates were then incubated at 37°C for 24 h. The plates were observed for the presence of a clear zone around the wells. The size of the zones of inhibition was measured and the antibacterial activity expressed in terms of the average diameter of the zone inhibition in millimeters. The absence of a zone inhibition was interpreted as the absence of activity. Each experiment was tested in triplicate.

Active compound detection from petroleum ether extract . Thin layer chromatography (TLC) was used to identify the active ingredients of the petroleum ether extract. TLC plate (Merck) used was 0.25mm in thickness and 20×20cm in dimension, the plate was activated before use at 100°C in oven for one hour, then left to cool to room temperature. A capillary tube was used to apply the petroleum ether extract on an invisible line used as a start point, the plate was placed inside the TLC tank which contained the solvent system (methanol :

benzene : water) at a ratio of (1:2:7 v/v/v), the placement of the plate was vertical so that the side of plate containing the spot was in touch with developing solvents, the tank was covered and left until the developing solvent was raised to 13cm in distance, then the plate was up-lifted and left horizontally to dry out at room temperature for 1-2 hours. The TLC plate was immersed in a 15ml solution of (NH4OH : Ethanol) at a ratio of (5 : 95) for 5 minutes then washed with distilled water and analyzed by UV (254 and 366nm) Harborne, 1973.

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