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Antifungal activities of *Euphorbia nerifolia* plant extract

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Abstract:

The investigation were performed for analysis of antifungal activity of ***Euphorbia nerifolia*** plant extract on some fungal species. In the present study hydroalcoholic plant extracts of E.nrifolia was evaluated for potential antifungal activity against some pathogenic fungal strain. Antifungal activity was measured in the plant extract using agar disc diffusion method. The antifungal activities of extract 10, 20, 50,100 and 200 µ/ml of E.nerifolia were tested against fungal strain A.niger, A,clavatus and C.albicans. The zone of inhibition of extract was compared with different standard like miconazole and triazole for antifungal activity. The phytochemical analyses of plant extract were carried out. The antifungal activity of E. nerifolia was due to the presence of different secondary metabolites. Total 252 drugs are considered as basic and essential by the World Health Organisation (WHO) and out of those 11% are exclusively of plant originThe E.nerifolia plant can be used for to obtain bioactive compound and it help to develop pharmaceutical product.

Key words: E.nerifolia, antifungal activity, bioactive compound.

Introduction

Plants are well known source of secondary metabolites hence has been used in traditional medicine in the ancient times. Weeds have also been proved to contain various secondary metabolites and used in conventional medications. This has generated lot of interest in the last few years to investigate plant material for new secondary metabolites. So the need of traditional remedies which constitute a major part of the health care in the developing countries and is entering the therapeutics in the developed countries. Leaves produces white milky juicy latex when cut which has been traditionally used for the treatment for skin problems, respiratory disorders, asthma, bronchitis, high fever and gastrointestinal disorders (5). E. nerifolia is also shows activity such as antioxidant (3), antibacterial (5) and anti-cancer (22). E. nerifolia commonly occurrence, the aim was present study to evaluating E. nerifolia for its antifungal activity.

Material and methods:

The fresh plant leaf part of E.nerifolia were collected between January to march in 2022 from different area of Hingoli distract. The plant specimens were identified in the department of Botany Adarsh College, Hingoli. Each specimen of plant was labeled with date of collection and locality. The largest genus of family Euphorbiaceae is Euphorbia with about 1600 species.(1) Euphorbia neriifolia, is a xerophyte, erect, prickly, succulent, fleshy, large, much branched shrub, which sometimes grows into a small tree of 2-6 metres height or more with rounded branches. It is characterized by the presence of white milky latex that exudes when broken and which is more or less toxic.(2) This may also justify the frequent use of the leaf more than the stem, latex, and bark in the traditional medicinal systems for the cure of bronchial infections, abdominal swellings, inflammation, pain, and tumour. They are used as a drastic purgative in the enlargement of liver and spleen, syphilis, dropsy, general anasarca, leprosy, etc. E. neriifolia leaf extract was found to be a potent analgesic, anti-inflammatory, mild CNS depressant, wound healing activity along with humoral and cell mediated immunostimulating activity(7) Latex portion was found to contain Euphol, neriifoliol, neriifolene, Euphorbon.(9)

Preparation of plant extract:

Extraction of E.nerifolia was carried out using known standard procedure. The plant materials were dried in shaded places and grind to make fine powder. The 50 gms of plant powder were initially defatted with petroleum ether at 65 to 75^0 C than followed by 500 ml of hydroalcohol by using soxhlet extractor for 72 hours at a temperature not exceeding the boiling point of the solvent. The extract were filtered by using whatman filter paper no 1.(13) Concentrated plant extract in vacuum under reduced pressure using rotary evaporator. Finally dried in desiccator. This extract is dark brown solid mass weight is 10.30gms.The extract solid mass stored in sterile dark brown bottle under refrigerated condition. The dry weight of plant extract were obtain by using solvent evaporation and used to determine concentration in mg/ml. the extract preserved at 4^0c.The hydroalcoholic (ethanol: water solution of 70:30 v/v as solvent with a flow of 0.5 mL/min.) extract was used for to measure antifungal activity.(15)

Phytochemical analysis:

The extracts were used to detect for the presence of different secondary metabolites. The plant extract were screened for the presence of flavonoids, alkaloids, saponin, tannins, triterpenoids,steroids, glycosides, mucilage E.nerifolia contains rich source of alkaloids, triterponoids, euphpol, methylene cycloartenol taraxerol etc.(15)

Antifungal activity:

The three pathogenic fungal strain were used for antifungal activity, fungal strain are Aspergillus niger, Aspergillus clavatus and Candida albicans.The fungal stoclk culture were incubated for 24 hours at 37^0c on nutrient agar and potato dextrose agar(PDA) respectively.(8) The media were store in refrigerator at 4^0c.The antifungal activity can be measure to determine zone of inhibition. In vitro antifungal activities were measured for hydroalcoholic extract. Each purified extract were dissolved in dimethyl sulfoxide and stored at 4^0c.The standard antibiotics are taken for comparison of result. The extract were screened for antifungal

activity against the fungi A.niger, A. clavatus and C. albicans.Total five dilution of E.nerifolia extract and standard drugs were prepared in doubled distilled water using agar tubes.(13) The control experiment were carried out under similar condition by using antifungal drugs miconazole and triazole.The zone of growth inhibition around the disk were measured after 42 to 90 hours in incubation at 28^0c.The sensitivities of fungal species to plant extract were determined by measuring the size of inhibition zone on agar surface.(13)

Result and discussion:

The hydroalcoholic extract of E.nerifolia contained alkaloids, flavonoids, steroids and glycosides. The antifungal activities of E. nerifolia extract were studied in different concentration (10, 20, 50,100 and 200 µg/ml) against fungal species. The effect of plant extract on fungal growth in term of zone of inhibition. The result of antifungal activity are present in table no 1 and table no 2. Increasing in the concentration of plant extract the antifungal activity. When compared the result of plant extract with standard drug shows good result. The growth of inhibition zone measured range from 10 to 28 mm for fungal strain. The best result of plant extract against particular C.albicans at the concentration 50,100, and 200 µg/ml respectively.Most of the medicinal plants are used against different micro-organism.so, the different plant extracts are used as folk medicine. In present study, the plant extract of E.nerifolia shows good antifungal activity against C.albicans fungi at certain concentration. This study shows the E.nerifolia have the presence of certain phytochemicals constituents which affect the growth of pathogenic fungi.

Conclusion:

The hydroalcoholic plant extract are used for such study. The hydroalcoholic extract gives higher plant phytochemicals rather than the other solvent extract and hydroalcoholic extract are more stable than other solvent. Many plants from Euphorbiecae family used in traditional medicine system to treat various infectious diseases caused by fungi. It is necessary to investigate the natural bioactive compound from Euphorbia plant which has potential antifungal activity.

Table no 1: Antifungal activity (Standard drug)

Antifungal activity	Concentration (µg/ml)	Zone of inhibition in mm.		
		A	B	C
Miconazole	10	21	20	23
	20	25	24	25
	50	28	26	28
	100	29	27	29
	200	32	31	34
Triazole	10	20	20	22
	20	22	23	25
	50	24	26	27
	100	25	27	29
	200	30	29	35

Table no 2: Antifungal activity (Hydro alcoholic plant extract)

Pathogenic Fungi	Plant extract concentration (µg/ml)				
	10	20	50	100	200
A. niger	10	12	20	20	26
A. clavatus	08	13	19	18	25
C.albicans	08	12	20	22	28

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