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Anticancer activity of Nyctanthes Arbortristis

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ABSTRACT

Nyctanthes arbotristis is a medicinal plant found in South Asia and Southeast Asia. .It was revealed that the plant exhibits various pharmacological activities because of the presence of secondary metabolites compounds. It exhibits different pharmacological activities like anticancer, antipyretic, antihistaminic, antibacterial, anti-inflammatory, antioxidant, antiviral and antifungal activities have been reported. This present review compiles the different phytochemical compounds and pharmacological activities reported so far by this plant in a comprehensive manner.

Keywords— *N arbotristis, DPPH, Arborsides A*

1. INTRODUCTION

A disease that originates by uncontrollable splitting up of anomalous cells in the part of the body is called cancer. Cancer cells attack as well as obliterate normal cells. Cancer is one of the foremost public health burdens in both developing and developed countries .[1]

Herbal medicine practice plays an important role in the health care system in most of the developing countries. *Nyctanthes arbotristis* is also called as *"Night flowering jasmine or parijat or coral jasmine or Paariijaatham* belonging to the family Oleaceae is one among the various important medicinal plant with a diverse range of pharmacological activities. The geographical distribution of this plant is more localized in the South Asian and Southeast Asian regions of the continent.[2,3,4]

Nyctanthes arbotristis grows well on the hilly region up to 1500 feet from sea level as a shrub with a maximum height of 3000 feet. Flowering usually occurs from July to October, the plant grows to the height of 10 m, their leaves have stiff whitish hair and rough leaves, Calyx is 6 to 8 mm long and they have glabrous corolla with more than length of 13 mm, and the length of the tube is 6 to 8 mm long and they are orange in color, also they have equal limbs, white lobes and obcordate are unequal and cuneate. The plant also bears simple and opposite leaves which are 6-12cm long.[5, 6]

Bansal *et al.,* (2015) [7, 8] reported that bioactive compounds of *Nyctanthes arbor-tristis* are very useful to provoke menstruation, treatment of scabies and other skin infections, as a hair tonic, chalogogue, laxative, diaphoretic, diuretic, treatment of arthritis, malaria, bronchititis and anti-helminthic.

1.1 Chemical constituents

The flowers contain essential oils, Glucose, Nyctanthin, d-mannitol, Tannin, Glycosides like β-monogentiobioside ester of α-crocetin (or crocin-3), β-monogentiobioside, β-digentiobioside ester of α-crocetin (or crocin-1), β-D monoglucoside ester of α-crocetin and carotenoids. Seeds of this plant consist of palmitic and myristic acids, arbortristoside AandB, Glycerides of linoleic acid, stearic acid, nyctanthic acid, 3-4 secotriterpene acid, oleic acid, lignoceric acid and a water dissolvable polysaccharide made out of D-mannose and D-glucose. The bark of Nyctanthes arbor-tristis comprises of alkaloids and glycosides. Glycoside-naringenin-4-0-β-glucapyranosyl-α-xylopyranoside and β-sitosterol are present have been isolated from the stem of the plant. Flower oil consists of different important phytoconstituents like anisaldehyde, phenyl acetaldehyde, α-pinene, p-cymene, 1-hexanol methyl heptanone, and 1-decanal. [(9)] It also consists of polysaccharides, phenyl propanoid glycoside, ß-sitosterol, ß-amyrin, hentriacontane, benzoic acid, glycosides, nyctanthoside- an iridoid, nyctanthic acid, friedelin and oleanolic acid and iridoid glycosides arbortristosides A, B and C, alkaloids, Phlobatanins, terpenoids and cardiac glycosides. [9]

1.2 Antimicrobial activity

The plant removes demonstrated antimicrobial movement against the Gram-positive (*Staphylococcus aureus*) and in addition Gram-negative (*Salmonella Typhi*) microorganisms. It likewise demonstrated the action against *Methicilline* Resistant *S. aureus.* An examination did by Sathiya et al demonstrated that the ethanolic remove shows the action against *Pseudomonas aeruginosa*,

Salmonella typimurium, staphylococcus aureus, Klebsiella pneumonia, Psudomonas sp. Staphylococcus epidermis, Escherichia coli, Micrococcus lutes, Streptococcus sp., Bacillus subtilis. [10, 11, 12]

An examination directed in India demonstrated that the chloroform remove has both against microbial and hostile to parasitic movement while oil ether and ethanol extricate had just antimicrobial movement. Cowman et al have said that the terpenoids and phenolic compound show the greater part of the antibacterial movement. It likewise said S. aureus are particularly helpless to phenolic compounds. Thus the movement of ethanolic concentrate of *N. arbor-tristis* against *S. aureus* might be because of phenolic compound or terpenoids or blend of both. Subsequently, the conceivable instrument of the movement might be phenolic compound interceded system like official with proteins, compounds, cell divider or substrate hardship. On the off chance that it is expected to terpenoids, it might be because of film interruption by lipophilic however nothing can be said except if correct compound in charge of such action is disconnected. [13]

1.3 Antioxidant activity

The study of antioxidant activity of *N. arbortristis in vitro* examination, for example, 1,1-diphenyl-2-picrylhydrazyl (DPPH), hydroxyl and superoxide radicals and hydrogen peroxide scavenging assays 2Co solvent division of ethylcetic acid derivation crisp leaf concentrate of the plant demonstrated wonderful action. The plant has a reducing power which is attributed to high phenolics and flavonoid contents. Leaves shows concentration of dependent free radical scavenging activity in in vitro DPPH assay assessment of free radicals searching action of the distinctive dissolvable concentrates of dry and new flowers utilizing diverse techniques, lipid peroxidation assay, reducing action and H2O2 scavenging test alongside different dimensions of enzymatic and non-alcoholic enzymatic cancer prevention agents demonstrates that methanol concentrates of dried flowers displayed high phenolic substance and cell reinforcement movement while watery concentrate of dry flowers appeared in high enzymatic action. [14-17]

2. MATERIALS AND METHODS

2.1 Collection

Nyctanthes arbor-tristis was collected from Tambaram Chennai Tamil Nadu. Leaves first washed thoroughly with water to remove the soil particles. The parts of the plant were dried on the sun and powdered by grinding.

2.2 Extraction

The powder material was weighed about 50g each and was socked in 250mL of Chloroform, Petroleum ether, Ethanol and Ethyl acetate respectively. The plant was subjected to maceration for 7 days. The extracted material was filtered using a muslin cloth and d the filtered solvent was allowed to concentrate for 7 days using evaporation. The concentration filtrate was collected in sample vials and further subjected to anticancer activity.

2.2.1 Methodology of extraction

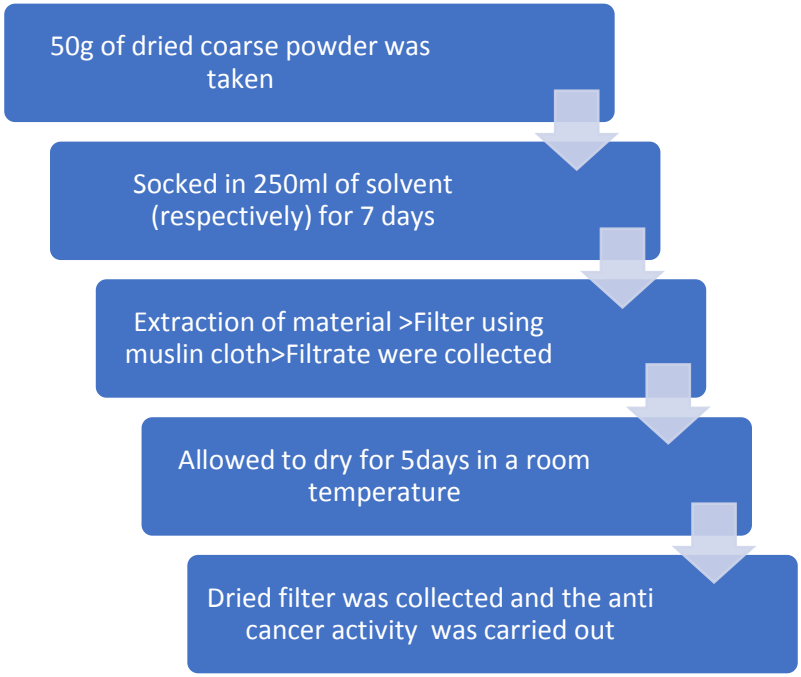

Fig. 1: Methodology of extraction

(a) Seeding of cells: 1mL of the homogenized cell suspension was added to each well of a 24 well g/mL) and then incubated atμculture plate along with the different concentration of sample 1(0 to 200 37°C in a humidified CO_2 incubator with 5% CO_2. After 48 hrs incubation, the cells were observed under an inverted tissue culture microscope. With 80% confluence of cells, cytotoxic assay was carried out.

(b) Cytotoxicity assay: These was carried out using (3- (4, 5-dimethyl thiazol-2yl) -2, 5-diphenyltetrazolium bromide (MTT). MTT is cleaved by mitochondrial Succinate dehydrogenase and reductase of viable cells, yielding a measurable purple product

formazan. This formazan production is directly proportional to the viable cell number and inversely proportional to the degree of cytotoxicity. After 48 h incubation, the wells were added with MTT and left for 3h in room temperature. All wells have removed the content using a pipette and 100µl SDS in DMSO was added to dissolve the formazan crystals, absorbances were read in Lark LIPR9608 micro plate reader at 540nm (Mosman et al 1983).

3. RESULT AND DISCUSSION

3.1 Anti-cancer

The *in-vitro* cytotoxicity activity results of the ethanol extract and ethyl acetate extract samples against HeLa cancer cells were triggered significantly with the increasing of sample concentration and it was observed in results (table 1).

Table 1: In vitro cytotoxicity effect of ethanol and ethyl acetate extract against HeLa cell lines

Sample Conc. (µg/mL)	Percentage Cell Viability	
	Ethanol extract	Ethyl acetate extract
0	100.00	100.00
1.5625	93.79	88.91
3.125	83.71	78.33
6.25	70.27	68.90
12.5	57.85	60.91
25	45.58	50.54
50	36.60	41.18
100	23.67	25.05
200	13.81	15.91

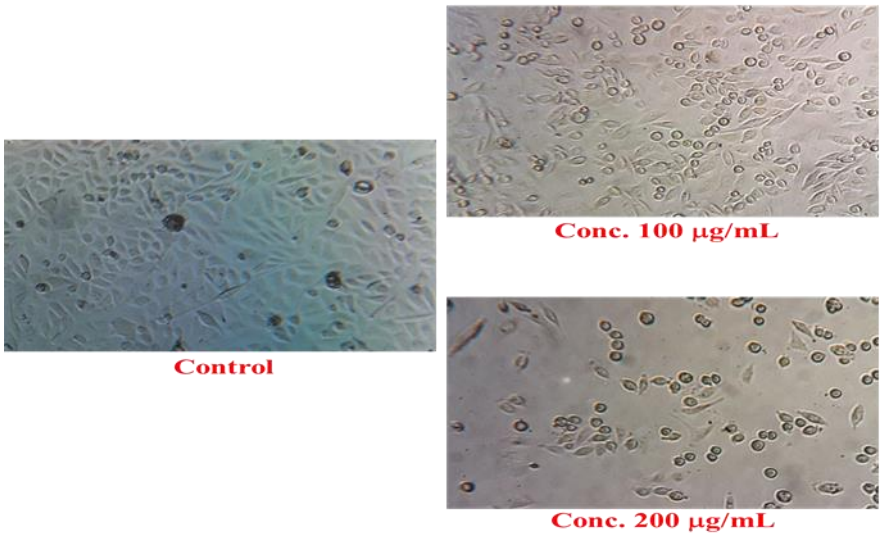

Fig. 2: Anticancer activity ethanol extract against the HeLa cell lines

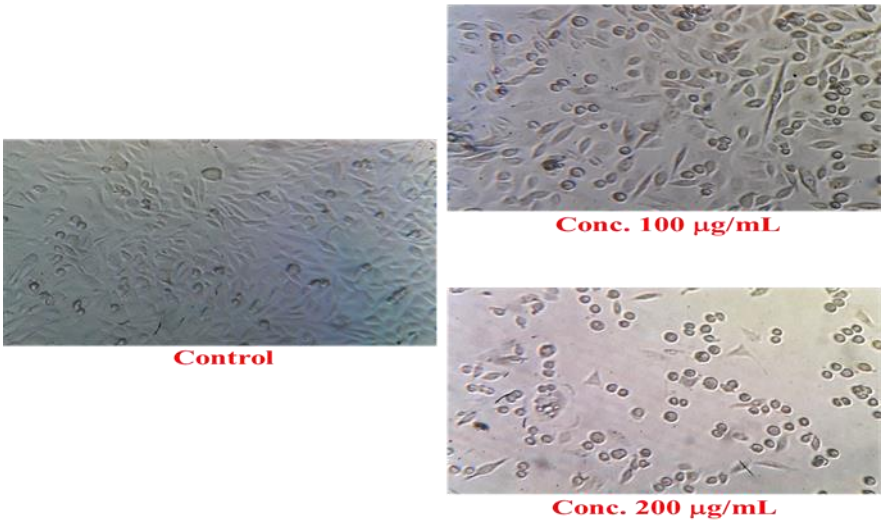

Fig. 3: Anticancer activity ethyl acetate extract against the HeLa cell lines

It was observed that the ethanol extract and ethyl acetate samples tested at low as 1.625 µg/ml showed significantly reduced the viability of selected cell lines as nearly 90% against HeLa cell lines. In this cell lines cytotoxicity effect was observed in tested sample concentrations in 48 hours treatment, it also revealed that increased concentration of test samples shown increased cytotoxicity over the tested cell lines (figure 2, figure 3). It was evident that the potency of the test samples showed cell

disintegration and migration after 48 h of treatment against the selected tested cell lines. It was calculated that the IC50 of the test samples against HeLa cancer cells were 66.24 µg/ml and 68.85 µg/ml by ethanol extract and ethyl acetate extract, respectively.

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