Plant Archives Volume 20 No. 2, 2020 pp. 9011-9018 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

A REVIEW ON PHYTOPHARMACOLOGICAL ACTIVITIES OF *ALPINIA MUTICA* AND *TRADESCANTIA SPATHACEA*

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Abstract

Alpinia Mutica plant, belongs to family Zingiberaceae, is mainly scattered in tropical areas and widely known for ethno medicine. Its rhizome extract has maximum inhibitory effect against fungi as well as bacteria. *A.mutica* is also used in medicine and food preparations. Rhizome extract own more phenolic and flavonoid substances when estimated and compared to leaf extract of plant with evident antimicrobial as well as radical scavenging potential. The greater part of the crude extracts and isolated compounds indicated antimicrobial, Antioxidant activities which are determined by diphenyl picryl hydrazyl radical scavenging action test (DPPH), Bleaching of β-carotene, (SOD) superoxide dismutase. Additionally, these mixes are fit to stop the advancement of colon neoplasm cells. *Tradescantia spathacea* is an herb of India, used as conventional remedy and it is under the belonging to family Commelinaceae. In Mexican country which is called as "Maguey Morado" (Purple Maguey), elixir of the leaf is regularly free-eaten as healing of endoplasmic carcinoma. Ethanolic extract of the plant has chemical constituents like anthocyanin, flavonoids, saponins, carotenoids, terpenoids and steroid compounds. The successive solvent extract of this plant has antioxidant activity, antimicrobial properties and also found to block antiadrenergic action of bretylium tosylate and showed contraceptive effect in experimental animals (rats). It is used in cosmetics to nourish skin.

Key words: *Alpinia Mutica*, *Tradescantia spathacea*, Phytochemical and Pharmacological activities.

Introduction

Plants are used as a primary source of treatment for many diseases from the ancient times and number of plants are known to have different medicinal activities. (Kakkar *et al.,* 2014). From the olden day's plants were used by all cultures of the world wide with India that has one of the ancient, prosperous and highly multiple cultures (Tandon *et al.,* 2004). Plant drugs have beneficial activity in analysing and treating more ailments in standard jurisdiction (Steven D. Ehrlich *et al.,* 2009). Medicinal value plants have various pharmacological activities such as antioxidant, anticancer, immunostimulant, anti-inflammatory, liver protective activity and spinal reflection activities. (Chang *et al.,* 2010).

Alpinia is the largest genera of the Zingiberaceae family, with about two hundred and thirty herbs widely distributed in peculiar and sub-peculiar Asia. The plant has been reported to have 9 species of plants in southern India. (John Kress *et al.,* 2005, Sabu *et al.,* 2006). *Alpinia Mutica* (A.M) is a perennial herb which produce horizontal, underground stem, fragrant plant indigenous to Malayan and Kingdom of Thailand. Although a few changes can be seen in farming, the sorted varieties are spread in northern Malaysia. Although there are some alternatives to A.M in agricultural sources, a variety of species are spread in the northern end of the Malayan foreland. Importantly, these plants are used by locals to treat gas problems in stomach and fruits are used to reduce swelling (Halijah Ibrahim *et al.,* 2014).

A.M rhizomes showed the presence of flavokavain B, pinocembrins, 5, 6-dehydrokawain and 1, 7-diphenyl-5-hydroxy-6-hepten-3-one (Sirat *et al.,* 1996) and methylene chloride extract was used for lipid oxidation and observed for the inhibition of growth of *Bacillus subtilis* and *Staphylococcus aureus* species (Mohamad *et al.,* 2004).

Tradescantia spathacea sw (T.S) is vegetative plant

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used for refreshment and decoction which is taken orally consistently as in treatment for malignant growth (Rosales-Reyes *et al.,* 2008). Commonly individuals in different parts of world regularly use equivalent or comparable plants to treat the same diseases, however, in different mixtures (Motaleb *et al.,* 2011).

The use of antioxidants, that are ubiquitously present in many herbal and herbal plants, its usage has been a lower risk of incidence of oxidative diseases, ranging from cancer, vascular disorders, diabetes mellitus, arthritis, to aging. (Halli well *et al.,* 1996). This herb has widely distributed in the Mexican country with a stable underground stem and has pink-color waxy spear molded leaves. This plant contains leaflets, they are dull to metallic green above, with uncontrolled purple underneath.

The leaves of this plant will reach up to 30 cm length by 7.5 cm width & extremely appealing greenery (Rajendran Prakash *et al.,* 2014). Leaf decoction can be used as a free radical to fight cancer (Argueta Villamar *et al.,* 1994). The aqueous extract of T.S inhibits antiadrenergic activity of bretylium tosylate (Garcia *et al.,* 1971) and involved in birth control of the rats (Weniger *et al.,* 1982).

T.S extract is used to improve the appearance of the skin (Rosales-Reyes *et al.,* 2008). Active constituents of T.S extract include flavonoids, anthocyanins, saponins, carotenoids, terpenoids, coumarinic and steroid compounds (Idaka., 1987, Ortiz *et al.,* Gonzalez-Avila *et al.,* 2003). On the other hand, Ethanolic extracts of T.S, evaluated in the in-vitro system, as proposed antioxidative activities (Parivuguna *et al.,* 2008), antimicrobial properties (Aswani *et al.,* 2015).

Alpinia Mutica

Botanical Description

The *Alpinia Mutica* Roxb. (1810) is a perennial rhizomatose herbaceous species, evergreen, forming dense 1.5-2 m tall tufts. These plants have thin pseudo-stems supplied with leaves, which are 0.5-1 cm long. Long petioles, alternate, linear-lanceolate with long pointed affixes, 28-50 cm. Length and 3-6 cm. Widespread, coriaceous, shiny with a heavy green color. It has crunchy leaves that have a similar odor to green cardamom (*Elettaria cardamomum* L., in groups of 2-3; Flowers are self-sterile, so they need cross-pollinating for fruit flavour Fig. 1.

Alpinia Mutica consist of Pubescent tubular calyx, long 1.5-2 cm, of white color accompanied by reddish tridentate margin, white corolla with tube shorter than the calyx and 2, 5-3 cm long lobes, the ovate dorsal, concave, 1.5 cm broad, the oblong lateral, 0, 6 cm broad, ovate labellum almost trilobed, length 3.5 cm and 4 cm broad, of intense yellow color veined and dotted of red, only one fertile stamen accompanied by two lodges, as long as the corolla and white-cream anthers.

The fruits are ovoid orange-red capsules, about long 2.2 cm and of 2 cm of diameter, persistent long on the plant, containing numerous seeds that at times germinate still attached to the mother plant. It reproduces by seed, previously kept in warm water for two days, in-organic draining loam at the temperature of 22-24°C, but usually and easily by division of the rhizomes Fig. 2 & Fig. 3.

This plant species can grow for vegetation and for flowering plants and herbs, in tropical and humid climatic areas, where it blooms most of the year and in temperate-warmer ones, where temperatures are temporarily short of 0°C. It requires a distinctive display of abundant organic matter in warm sunshine or in loose shade and blooming soils, sour to slightly alkaline, constantly moist, but without stability. *Alpinia Mutica* rhizome and young stem medulla are used in traditional medicine for a variety of pathologies.

The Morphology of the plant

Fig. 1: *Alpinia Mutica plant.*

Fig. 2: *Alpinia Mutica plant flowers.*

Taxonomy

Common names

Dwarf Cardamom, False cardamom, Narrow-leaved

Fig. 3: *Alpinia Mutica plant fruits.*

Alpinia, Orchid gingerpuibai (Indonesia); Chengkenam (Malaysia).

Alpinia Mutica has a place with the Tribe Alpinieae of Alpinioideae subfamily under the Zingiberaceae group of Zingiberales order.

Distribution

It is mainly distributed in Borneo, Penang, Perak, Singapore, Malaysia and North East and South India (Western Ghats in Kerala & Karnataka). It is mainly cultivated for ornamental purposes and it grows very well in swampy areas near springs or rivers at high altitudes. It grows in open sunny places, forests and brushwood and commonly cultivated in Malaysia and South America (Aswani *et al.,* 2015).

Traditional uses

Traditionally used to treat flatulence and fruits are used to reduce swelling (Sriet Nuestri Abdul Malek *et al.,* 2011). The plants have been cultivated as ornamentals and the rhizomes have been used as a stomach-ache (Burkill *et al.,* 1966). Methanol extract and several compounds isolated from fruits of A.M were reported to have strong antiplatelet aggregation activity (Jantan *et al.,* 2004) (Jantan *et al.,* 2008). Ethyl acetate extract of rhizomes showed significant anticancer properties towards several cancer cells besides exhibited substantial antioxidant activity (Sriet Nuestri Abdul Malek *et al.,* 2011) (Phang *et al.,* 2011).

Customarily, this herb was utilized by local people to delicacy tooting and the natural products are utilized to decrease expanding (Sriet Nuestri Abdul Malek *et al.,* 2011). The herbs have been developed as extravagant and rhizomes have been utilized as a stomachic (Burkill *et al.,* 1966). Methanol extract and several compounds confined from fruits of A.M were accounted for to have powerfully antiplatelet collection action (Jantan *et al.,* 2004) (Jantan *et al.,* 2008) and the ethyl acetic acid derivation concentrate of rhizomes showing compelling anticancer properties towards more than two, but not many cancer cells besides display considerable antioxidant activity (Sriet Nuestri Abdul Malek *et al.,* 2011) (Phang *et al.,* 2011).

Phytoconsituents

A.M leaf Oil is consisting rich in sesquiterpenes with β-sesquiphellandrene as major component, with different constituent of rhizome oil. Although rhizome oil previously reported to be rich in sesquiterpenes, the (E, E)-farnesol was the major constituent, which was not detected in leaf oil. The isolation and identification of leaf extract afforded two phenolic compounds, 5, 6-dehydrokawain, aniba A and an amide, auranamide identified for the first time in the Alpinia and Ginger family (HasnahMohdSirat *et al.,* 2013). The chemical components of the dried rhizomes showed the presence of phenolic compounds, such as 5, 6-dehydrokawain, flavokawin B, diarylheptanoid and 1, 7-diphenyl-3-hydroxy-6-heptene-5-one (Sirat *et al.,* 1996).

The Chemical Composition of the Fruit Oils of A.M consisting of a-pinene, camphene, b-pinene, Myrcene, α-phellandrene, 1, 8-cineole, β(Z)-ocimene, (E)-β-ocimene-terpinene, terpinolene, Linalool, α fenchol, Camphor, Isoborneol, borneolterpinen, α-terpineol, 3-phenyl-2butanone, Citronellol, Geraniol, Geranial, bornyl acetate, carvacrol, α-cubebene, Geranyl acetate, α-copaene, β-elemene, β caryophyllene, α-bergamotene, γ-elemene, α-humulene, β-farnesen, ar-curcumene, zingiberene, α-farnesene, β-bisabolene, β-sesquiphellandrene, (E)-nerolidol, caryophyllene oxide, a-bisabolol, (E, E)-farnesol, (E, E)-farnesyl acetate, docosane, tricosane, tetracosane, pentacosane (HasnahMohdSirat *et al.,* 2009).

Pharmacological Activities of *Alpinia Mutica*

Anti-microbial and anti-bacterial Activity

The unripe and ripe fruit oils of A.M was tested against two Gram-positive bacteria (*Staphylococcus aureus* and *Bacillus subtilis*), two Gram-negative bacteria (*Escherichia coli* and *Pseudomonas aeruginosa*) and four fungal strains (*Candida glabrata*, *Microsporumcanis*, *Trichophyton mentagrophytes* and *Trichophyton rubrum*). Both the unripe fruit oil and ripe fruit oil of A.M showed antibacterial activity against *B. subtilis* (2.50mg/mL and 1.25mg/mL, resp.) and S. aureus (2.50mg/mL for both).

The ripe fruit oil showed the highest activity towards *B. subtilis*; however, it is about nine-fold less active than the standard, oxacillin. Both oils showed potency of 2.50mg/mL to 5.0mg/mL against the dermatophytes *M.*

canis, *T. mentagrophytes* and *T.rubrum*. Interestingly both oils exhibited the same potency as the standard, cycloheximide against *T. mentagrophytes*. Overall the ripe fruit oil of A.M exhibited slightly higher activity (lower MIC against *B. subtilis* and *M. canis*) as compared to the unripe fruit. Both oils, however, showed no activity (MIC >5.0mg/mL) against the pathogens *E. coli*, *P. aeruginosa* and *C. Glabrata* (Halijah Ibrahim *et al.,* 2014).

Cytotoxic activity of *Alpinia Mutica*

Cytotoxic exercises of the organic product of A.M Rhizome and Fruit Skin Oils were performed by the Trypan Blue Rejection Technique. Dalton's lymphoma ascites (DLA) cells have been suctioned with phosphate supported saline, pH is 7.4 and a cell suspension of 1×10 6cell/milliliters in PBS was readied. Malignancy happens assessed by advance improvement of DLA cells (1×10 6cell cells/mL) in PBS with 0.1% DMSO (vehicle control), various centralizations of A.M rhizome and organic product skin oils in 0.1% DMSO (0.1, 1, 5, 10 and 20 µg/ml) for 3 hours at 37°C. After hatching the control and test cells are blended in with trypan blue and checked under microscope, magnifying lens and cell passing have been resolved and ethereal oils from dry crude drug and natural product skins were expelled and adjusted by GC-FID (Flame Ionization Detector) and GC-MS. Rhizome oil be revealed 47 constituents of which forty (92.8%) has been adjusted, most extreme constituents are ß-pinine (20.2%), camphor (13.3%), 1, 8-cinoeole (8.9%), camphine (7.9%) and a-pinine (6.2%). Organic product skin fundamental oil revealed 69 constituents of which sixty-three (97.8%) is distinguished. Significant components in natural product fruit skin oil was 1, 8-cineole (14.8%), camphor (11.7%), ß-pinine (7.6%) and camphene (4.8%). Four significant components in two parts, they are horizontal stem and natural product of fruit skin oils (camphine, β-pinine, 1, 8-cineole, camphor) were assessed by superficial standardization. Unstable oils, clear curves and obvious gravity are fixed and fruit skin oils represent exceptional cell reinforcement, cytotoxic and moderate antimicrobial practice, with exceptional applications in aromatherapy with dried organic production of fruit skin oils. (Mohamed Salim *et al.,* 2016).

Tradescantia spathacea

Botanical Description and Morphology of Plant

Tradescantia spathacea is a bunch like forming delectable plant, stems are small, leaves are overpopulated, enlarge, approximately one dimensional narrow and tapering to a pointed apex, length and width of the leaves are 30-40cm and 4-6cm and the above part of leaves are green colour, below part of leaf is progressively rosy purple. Flowers are the axillary lymph hubs of this plant, slightly; Brackets subclass, ship molded; The flowers are the color of silver; Leaflets 3; Stamens 6, ovary 3-cell, cells 1-ovary; Natural product capsular 3-valved are observed Fig. 4 & Fig. 5. *Tradescantia spathacea* seed is tough and will grow well on the rocks, it enjoys the soil with a clear natural point of view and it will develop in sand or coral stone, it falls short of rain, is safe, prefers ting and has backwoods under steer., it is often planted as a decoration in the cemetery. The plant fluid may affect quick penetrate and be irritated of the skin to certain individuals and when eaten, it can influence genuine consuming searing torment in the mouth and throat. Generally tolerant of the allopathic synthetic substances (intensifies that keep different herbs from developing) put out by Australia pine.

T. Spathacea can replicate by seeds, trimming and throw away the plants. Smashed pieces will re germinate

Fig. 4: *Tradescantia spathacea Plant.*

Fig. 5: *Tradescantia spathacea flower.*

easily, flowers are oval and is allow fertilization by insects, or pollinated by own. Essentially increase in size for bedding, herbaceous border and tropical, sub-tropical areas. The blushing impact of disturbing juice has been utilized for cheek shading moreover. Blossom is utilized therapeutically for the treatment of loose bowels, enterorrhagia and haemoptysis.

Taxonomic *Common names*

Moses in a boat (English)

Royster plant (English)

Boat lily (English)

Boat plant (English)

Classification of the drug

Kingdom of plant is Plantae

Subkingdom is Viridiplantae – Green plants

Super division: Embryophyta

Division: Tracheophyta

Subdivision: Spermatophytina

Class*:* Magnoliopsida

Superorder: Lilianae

Order: Commelinales

Family: Commelinaceae

Genus: Tradescantia L.

Species: *Tradescantia spathacea*

Synonym

Rhoeospathacea, (Sw.) Stearn

Distribution

T.S is belongs to a family, *Commelinacea* and it is outlined in the early year of 1788; indigenous origin to various countries they are Belize, Guatemala and southern Mexican country (Chiapas, Tabasco and Yucatán Peninsula) but extensively cultivated as a decorative and it lives wild in a region in parts of Florida state, Texas city, Hawaii city, India and different countries of the sea area (Madaleno *et al.,* 2009).

Traditional uses

Edibility of Plant: Leaves, flowers and stem reportedly used in making tea in western countries.

Folkloric: Dry or clean leaves are used for hack, cold, haemoptysis, challenging hack, nasal drain and in treatment of *Mycobacterium tuberculosis*. It has very cool properties; leaves are subjected to boiling or soaking in warm water, then cold. In Thailand and Islands of Caribbean, it is utilized treatment of fever and asthma. Cataplasms of this plant used as treatment of wounds in Cuba. In Puerto Rico, decoction of leaves is utilized for the treatment of psoriasis. In Mexican nation, it is utilized as a conventional drug and leaves are utilized treatment of "nervios." Used for the shallow Mycoses' treatment (Claribel Luciano-Montalvo *et al.,* 2013) (Laura Guzmán Gutierrez *et al.,* 2014).

Phytoconstituents

The phytochemical assessment of the leaf is the existence of Alkaloidal, Flavonoidal, Tannins and Phenolic mixes, Glycosidal and Terpenoidal and Some synthetic substances are distinguished or screened are Flavonoidal, Anthocyanins, Carotenoid, waxes, Coumarin and Steroidal constituents (Idaka *et al.,* 1987) (Ortiz *et al*. 2003).

Pharmacological Studies

Anti-tumor/Chemoprevention

Rosales-Reyes *et al.,* was reported different (mainly aqueous) solvent unrefined extract of T.S diminish the arrangement of hepatic precancerous foci in rodents - In Mexican country, it is also treated of Malignancy. This investigation exists to conclude to proof of their anticarcinogenic action. It is demonstrated bringing down of precancer sores, legitimizes proceeding next examinations for its chemoprevention potential (Rosales-Reyes *et al.,* 2008).

Reactive oxygen species scavenging and Antimutagenic Activities

Gonzalez-Avila *et al.,* was evaluated and confirmed an alcoholic pure natural concentrate from T.S for antitoxin activity and confirmed its antitoxin activity. Study reported that antioxidant action was may be due to the presence of quercetins, *α-tocopherols*, ascorbic acid and free radical scavenging activity, is due to presence of *α-tocopherol* and ascorbic acid (Gonzalez-Avila *et al.,* 2003).

Stimulation of Human Lymphocyte Proliferative Response

Busarawan, Sriwanthana *et al.,* was evaluated and identified the different extracts of eight Thai country natural remedies for *in vitro* activating human lymphocyte action. The various extracts importantly rejuvenate human lymphocyte proliferative reactions at different concentrations. Results propose ability for therapeutic action for the tweaking insusceptible responsibility of the body (Busarawan, Sriwanthana *et al.,* 2007).

Microbes inhibition activity

Rebeca Garcia-Varela *et al.,* was assessed in-vitro action of high phenolic extracts opposed picked microbes of people's wellbeing significance viz., *Escherichia coli,*

*Listeria innocua & other microbes a*nd *C. albicans*. While *P. aeruginosa* was less influenced by extricate introduction, small portions of the extracts created extraordinary bacteriostatic and bactericidal impact on the remainder of the microbes (Rebeca Garcia-Varela *et al.,* 2015).

Anti-Malignancy activity

Rosales-Reyes T *et al.,* was studied the defensive impacts of different fluid crude extracts against rodent liver malignancy utilizing unaffected by hepatocyte model. The watery pure extracts diminish numbered & zone of precancer sores. Finally, propose justification for pursuing studies on the chemoprevention plane of actions a choice in the treatment of malignant disease (Rosales-Reyes *et al.,* 2008).

Antioxidant/Leaves

Joash Ban Lee Tan *et al.,* was studied on watery leaf concentrates of *R. Spathacea* for cell reinforcement (DPPH, FRS, FRP and FIC assays) and antimicrobial action. Mixtures and decoctions were confirmed to have tantamount total phenolic compounds and antioxidant action with other herbal teas (Joash Ban Lee Tan *et al.,* 2015).

Antiviral Activity

Yik Sin Chan *et al.,* was studied on 20 Malayan natural remedies for against Chikungunya viral action; reported that alcoholic and chloroform leaves extracts of T.S possessed more cytopathic inhibitory effects on Vero cells, with cell viabilities of 92.6%, 91.5% and 88.8% respectively. This plant chloroform extract possessed CC50 of 285.5±3.1 µg/ml and EC50 of 69.2±0.6 µg/ml. (Yik Sin Chan *et al.,* 2016).

Antimycobacterial action

Maksum Radji *et al.,* was assessed some chosen Indonesian endogenous natural herbs, therapeutic separate the multi-drug resistance (MDR) *Mycobacterium tuberculosis*. *R. Spathacea* possessed 100% inhibition of *Mycobacterium tuberculosis* H37Rv strain and 100 inhibition opposed MDR strain. *P. indica and R. Spathacea* possessed high anti-microbial action opposed to MDR strains & potential possessed as complementary traditional therapy in treatment of emergent MDR strains of *Mycobacterium tuberculosis*(Maksum Radji *et al.,* 2015).

Conclusion

Alpinia Mutica, Tradescantia spathacea plants, has been reported to have great potential for medicinal value; these herbs have various phyto-ingredients that can be used in medicine for their significant pharmacological and medicinal value. *Alpinia Mutica*, *Tradescantia spathacea* herbs are known for their wide range of biological activity. For further research *Alpinia Mutica, Tradescantia spathacea* bioactive mixtures are should be detected, so that they can be used in experimental clinical applications, which can be used for the well-being and prosperity of humanity.

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