

A REVIEW ON PHARMACOLOGICAL ACTIVITY OF *Annona reticulata* Linn.

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ABSTRACT

Indian literatures like Ayurveda and differing old literatures have established Traditional medicine for any of human diseases. *Annona reticulata* that is commonly popular as Bullock's-courage in English and Ramphal in Hindi and Marathi is bearing differing Pharmacological ventures to a degree antioxidant, anticancer, painkiller and CNS sedative, Antimalarial, anthelmintic, in disease given through sexual relations and few more. Some Compounds have happened private and stated from the extract of various parts of the plant Retaining good pharmacological venture. The studies acted on the beginning and root extract More proved that the unchanging compounds causes container afterlife in miscellaneous tumor Container lines. This review item is a sincere work to suggest the curative significance and Horticultural, phytochemical, pharmacological analyses of the plant.

Keyword : - Ayurveda, Indian literature, *Annona reticulata*, Antimicrobial activity, Antioxidant, CNS depressant, Pharmacological activity.

INTRODUCTION :-

The curative plants are rich in subordinate metabolites and essential oils of healing importance. The main benefits demanded for healing uses of medicinal plants in miscellaneous illnesses are their security besides being inexpensive, effective and their smooth chance. By way of these benefits the medicinal plants have existed established for one usual healing practitioners in their epoch to epoch practice. From miscellaneous plants that are known for their curative worth, the plants owned by type *Annona* are rich in phenolic compounds and are very useful for their healing potentials. The *Annona* type (Annonaceae) exists of about 119. *Annona reticulata* is a semi-conifer and limited temporary sapling from the plant family Annonaceae. *Annona reticulata* Linn. Is one of the ordinarily main plant second hand for the situation of miscellaneous ailments. It belongs to classification Annonaceae. The synonyms of plant are Ramphal, Bullock's soul and Mousse sphere. Forthcoming about 119 various variety of the *Annona* type (Annonaceae) are labeled with which most of bureaucracy are bushes and wood. As a rule the plant extract is secondhand for the situation of diarrhoea and pediculosis ^{1,2}.

Taxonomic classification of Moringa oleifera :

Kingdom	Plantae
Division	Magnolids
Class	Angiosperms
Order	Magnoliales
Family	Annonaceae
Genus	Annona
Species	Reticulata

BOTANICAL DESCRIPTION :-**Synonyms :**

Botanical name:- Annona reticulata Linn.

Common name:- Netted Custard apple

English:- Bullock's heart, Corazon

Portuguese:- Frutada-Condessa

Indonesian:- Buah nona

India:- Ramphal

Tamil:- Ramachita

Telegu:- Ramasitapalam

Malayalam:- Manilanilam

Kannada:- Ramaphala

Phytoconstituents:- Several phytoconstituents have been identified from different parts of *A. reticulata*. Stem bark contains tannins, alkaloid and phenolic compounds. Leaves contain wide range of chemicals like alkaloids, amino acids, carbohydrates, steroids, flavonoids, proteins, tannins, glycosides and phenolics. Root has been identified for the content of acetogenin, alkaloid, carbohydrates, proteins, flavonoids, tannins. The plant also found to be rich in minerals such as Ca, P, K, Mg, Na, Cl, S, Mn, Zn, Fe, Cu, Se, Co, Ni and Cr.⁵



Whole plant



Leaves



Stem



Unripe fruit



Ripened fruit



Seeds



Flowers



Stem bark

Pharmacological properties of *Annona reticulata*:-

1) **Antioxidant and antimicrobial activity :-** The root extract of *A. reticulata* was examined for antioxidant and antimicrobial potential. DPPH free radical scavenging and hydrogen white assay were working for antioxidant protect. Completely clean and antifungal study was acted utilizing agar drink order and poison plate arrangement. Ancestries were drained, grated and derived by Soxhlet appliance. Antioxidant project was check-mined by DPPH free radical scavenging assay and hydrogen white (H_2O_2) assay at 20, 40, 60, 80 and 100 mg/ml concentrations of extract and absorbance was calculated at 517 nm and 230 nm individually. Decontaminating exercise was completed

activity against three grandma negative (*Escherichia coli*, Poisoning caused by eating food typhi, Almost monas aeruginosa) and grandma definite (*Staphylococcus aureus*, *Bacillus subtilis*, *Bacterium cereus*) strains of microorganisms utilizing vitamin agar publishing. The antifungal action of the extract was completed activity against *Aspergillus niger*, *Penicillium chrysogenum*, *Fusarium moneliforme*, *Aspergillus flavus*, *Trichoderma viride*, and *Candida albicans* utilizing vegetable hydrogen agar radio. For uncontaminated study 100 ml of DMSO was secondhand as negative control and medicine plate, medicine as standard citation medicine (definite control). District of hindrance of extract sample was calculated by medicine scale and distinguished accompanying standard. Likewise for antifungal study DMSO was working as negative control and 1% griseofulvin as certain control. Increase or decrease in development of fungi was thought-out to judge antagonistic-fungal endeavor. Extract shown lot weak scavenging as that of standard, ascorbic acid. Extract was erect to have supporting-nounced skill to prevent *B. cereus* and likewise shown important action against all strains of microorganisms. Ruling antifungal activity was revealed against *T. viride*, and *C. albicans* fungi. The results got from this study told that root extract of *A. reticulata* has extraordinary antimicrobial venture.¹³

2) Analgesic and anti-inflammatory activity:- The sesquiterpene part of *A. reticulata* bark was secluded for central in addition to minor painkiller and anti-angering activities. Study was completed activity utilizing sesquiterpene part obtained from unsaponified petroleum heavenly extract that holds mixture of three main sesquiterpenes. The allotment of sesquiterpene present in the part was 71.66%. Sesquiterpene fraction was intentional by GC/MS that displayed presence of copaene(35.40%), patchoulane (13.49%) and 1H-cycloprop€azulene(22.77%). Current's portable stove test and tart acid-induced twisting order was used to screen principal in addition to peripheral painkiller endeavor inasmuch as carrageenan-induced fondle oedema design was used to judge anti-instigative ventures. Meaningful central as well as minor pain remover action was observed for sesquiterpenes part at doses 12.5 and 25 mg/kg and for unsaponified heavenly extract at a prescription of 50 mg/kg. Pentazocin and aspirin were secondhand as standard for anodyne exercise. The significant dosage-contingent restriction of carrageenan-induced fondle oedema was in the direction of the groups acted with unsaponified oil heavenly extract and sesquiterpene part. The belongings shown by extract and part were corresponding accompanying that of standard drug, aspirin.^{6,7}

3) Antipyretic activity:- Natural liquid extract of leaves of *A. reticulata* has existed secluded for painkiller action at quantity of 200 mg/kg and 400 mg/kg. Hyperpyrexia was persuaded by injecting 20% liquid delay of Brewer's foam subcutaneously in rats. Rats show 0.5 -Ce1 -Crises or more in stomach hotness subsequently 18 h of dose were divided and picked for the study. The results created for one extract were distinguished to the standard drug, paracetamol at a shot 150 mg/kg of bulk burden. Overall study displayed that extract of leaves of *A. reticulata* has important antipyretic exercise.⁸

4) Anthelmintic activity :- anthelmintic activity⁸the anthelmintic exercise of leaves of *a. reticulata* was secluded utilizing Indian earthworm, *pherentima posthuma*. Leaves were strengthen and gleaned utilizing flammable liquid by cold maceration. Emptiness distillate was used to collect extract and 15.83 g yield was got. The total ethanolic extract was fractionated using petroleum heavenly, kill, ethyl acetate and flammable liquid in divorcing funnel. Parts were condensed. 3.39 g, 0.15 g, 0.13 g and 1.51 g yield was acquired for heavenly, anesthetic, ethyl acetate and ethanol individually. *Pheretima posthuma* of height 3e5 cm in time and 0.1e0.2 cm in breadth were considered for the study. Albendazole was secondhand as standard. Flammable liquid part presented less time to produce deadness that signifies intoxicating fraction has more distinct project than different parts.¹¹

5) Antihyperglycemic activity:- The antihyperglycemic effect of methanolic extract of *A. reticulata* L. leaves were examined utilizing spoken glucose fortitude tests in sweet substance tricky rodent. Leaves were powdered and gleaned accompanying flammable liquid (1:5 W/v). Male Swiss light rodent of weight 18e22 g were secondhand. Rodent were detached into various groups each holding six mice. Control group was discussed accompanying 1% tween-80 at 10 ml/kg carcass pressure in water whereas standard drug, glibenclamide at 10 mg/kg physique pressure was secondhand for standard considered group. Different four groups were orally acted accompanying 50, 100, 200 and 400 mg per kg bulk pressure of intoxicating extract. After individual period of administration all rodent were acted with 2 g and oxygen/kg of physique burden and ancestry samples were composed. The dose-weak and statistically meaningful antihyperglycemic venture was noticed. Antitoxin glucose level was shortened to 34.8, 37.0, 49.6 and 56.1% at the prescription 50, 100, 200 and 400 mg/kg carcass pressure. Glucose oxidase pattern was used to estimate antitoxin organic compound composed of carbon levels. Overall results displayed that leaves of *A. reticulata* maintain significant and effective antihyperglycemic venture.¹²

6) Anti-proliferative activity:- Antiproliferative potential of aporphine alkaloids liriodenine, norushinsunine, reticuline and individual acetogenin neoannonin unique from the ancestries of *A. reticulata* has happened investigated against A-549, K-562, HeLa, MDA-MB malignancy container lines and rational container line (Vero containers) by MTT assay. The compounds were structurally recognized by ¹H NMR, ¹³C NMR and bulk spectroscopic methods. Aporphine alkaloids were got from ethanolic extract of ancestries by line chromatography (noncommittal alumina) utilizing stable structure toluene: ethyl acetate: diethyl amine (70:20:10). Similarly acetogenin was unique by partitioning of intoxicating extract accompanying ethyl acetate and pillar chromatography utilizing n-hexane, ethyl acetate and pillar with stimulant-anol as solid system. Exercise was completed activity utilizing 100 ml of private compounds, each at the aggregation 5, 10 and 20 mg individually. Not cooked micro titre plates of container lines holding DMSO (0.3 % v/v in water) was thought-out as proliferative control. Neoannonin presented forceful cytotoxicity (IC₅₀ profit from 5.8 to 6.9 mg/ml) against all malignancy cell lines inasmuch as norushinsunine shown moderate cytotoxicity (IC₅₀ advantage from 7.4 to 8.8 mg/ml). Test compound revealed less cytotoxicity (IC₅₀ worth from 13.8 to 26.0 mg/ml) on usual container line (Vero cells) as distinguished to malignancy container lines. The study decided that famous cytotoxicity of isolated aporphine alkaloids is by way of isoquinoline moiety, presence of hydroxyl group and apoptosis encouraging skill of these private compounds in malignancy container lines.^{9,10}

7) Wound healing and anti-marking activity:- Ethanolic seed extract of *A. reticulata* was investigated for anti-marking and wound healing potential in combination with neem oil, honey and ghee. Seeds were dried, powdered and extracted in Soxhlet extractor using methanol as a solvent. Ointment was formulated containing *A. reticulata* seed extract (10 g), grape seed extract (3 g), ghee (4 g), honey (2 g) and neem oil (2 g). For the study 24 male Wistar Albino rats weighing 150-200 gm were used. Rats were anesthetized by intraperitoneal injection of ketamine (50 mg/kg) and back surface was shaved to create wounds. Paravertebral area was selected and wounds of thickness 500 mm² were created in the rats. Rats were divided into control group treated with simple ointment B.P, standard drug treated group, 5% w/w test ointment treated group and 10% w/w test ointment treated group. All rats were treated from day 0 to day 27 once in a day. Wound area was observed for the progress in the wound healing and percentage reduction in original wound size was determined by measuring the wound area on graph paper. Also one incision of thickness 6 cm was made on paravertebral area and stitched with nylon thread. No antimicrobial drugs were used during this period. Rats were treated with test formulation (5% w/w and 10% w/w ointment), standard drug (nitrofurazone ointment) and simple ointment B.P. for twice daily, until complete recovery is obtained. On day 8 sutures were removed. The complete healing strength or tensile strength of healing of incision wound was measured on day 10. The test formulation treated rats showed faster wound closure and wound contraction as compared to other rats. Significant increase in tensile strength was observed in formulation treated rats. The tensile strengths for 5% w/w ointment treated group and 10% w/w ointment treated group were 579 ± 22.7 and 673 ± 15.9 respectively which were comparable with that of Standard ointment treated group (659 ± 27.1). Study suggested that the test formulation is equally effective as that of standard drug formulation.⁵

8) Anti-Cancer Activity: Annonaceous acetogenins are a group of constituents obtained from plants belonging to Annonaceae, having potentials of anti-neoplastic, annomonicin, squamone, and rolliniastatin are having cytotoxic activities. Acetogenins isolated from the seeds of *A. reticulata* are bullatacin, cis-/trans-isomurisolenin, cis-/trans-bullatacinone, Annoreticulin, annoreticulin-9-one, cis-/trans-l Murisolinone and squamoci having cytotoxic activities. Acetogenins isolated from the seeds of *A. reticulata* are bullatacin, cis-/trans-isomurisolenin, cis-/trans-bullatacinone, annoreticulin, annoreticulin-9-one, cis-/trans-murisolinone and squamocin.^{14,15}

CONCLUSION:-

The Nature personified has supported us with a immense count of vegetation and fauna. Few of the organic curative plants are so common that we use bureaucracy in everyday life outside aware their curative importance. *Annona reticulata* is the best model of it. The far-reaching survey literature inspected that *Annona reticulata*, is a main curative plant with various pharmacological range. Few novel chemical constituent unique from the *Annona reticulata* accompanied anti-malignancy, features for pouch cancer and miscellaneous malignancy cell lines also. It's establish expected a chemo preventive agent in malignancy cure. Further evaluation is wanted expected transported out on *A. reticulata* in order to survey secret areas and their experienced dispassionate use, which maybe secondhand for the welfare of the society.

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