A REVIEW ON THERAPEUTIC POTENTIAL OF AMLA DRUG (EMBLICA OFFICINALIS)

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***Abstract*- Indian gooseberry or Amla or Emblica officinalis Gaertn. or Phyllanthus emblica Linn, one of the most important medicinal plant in the Ayurveda which is the world's most ancient traditional medicine system. Various parts of this plant are used in different diseases, but the most important and potent part is the fruit which contains majority of active constituent. Amla or Emblica officinalis is used either alone or in combination with other plants to treat several ailments like cancers, chronic inflammatory diseases like hypertension, high Cholesterol, Diabetes, influenza, Chronic cough, cold, Chronic infections, Chronic fatigue, liver problems, heart disease, ulcer, anemia and various other diseases. The major properties of Amla are Anti-inflammatory, Antioxidant, free radical scavenging, Antidepressant, Antifungal, Anti-diabetic, hypoglycemic, Anti ulcerogenic, Antimutagenic, Anti-cancer, anti-proliferative, Cytotoxic effects, Insecticidal, Larvicidal, mosquitocidal, Immunomodulatory, Hepato-protective, Radioprotective, Hypolipidemic and several other activities as demonstrated in numerous preclinical studies. This review summarizes the results related to these properties and also emphasizes the aspects that warrant future research establishing its activity and utility in different disease conditions specially in humans.**

***Keywords:* Amla; Emblica officinalis; Ayurveda; Traditional Uses; Medicinal Effects; Chemical Constituents; Pharmacological Activities.**

Introduction

Emblica officinalis commonly known as Indian gooseberry or Amla, family Euphorbiaceae, is a main herbal drug utilized in ayurvedic and unani systems of medicine. This species is medium sized deciduous tree with 8-18 meters height and is native to tropical southeastern Asia, particularly in central and southern India, Pakistan, Bangladesh, Sri Lanka, southern China and Malaysia. In India, Amla trees are found throughout the forests of tropical area ascending up to 4500ft on hills [1] . Amla is rich in fiber, carbohydrate, iron and vitamin C. The fruit is also used in a combination formknown as Triphala, A very famous ayurvedic formulation composed of Emblica officinalis, Terminalia belerica and Terminalia chebula . Many herbal and patent drugs of Ayurveda and unani system of medicine have been formulated by the use of different part of this plant E. officinalis plant contains tannins, flavonoids, phenolic compounds, saponins, terpenoids, ascorbic acids, carbohydrates and many other compounds [2].

The whole part of this plant is used for medicinal purposes, particularly the fruit, which has been used in Ayurveda as a rasayana and in the form of VayahSthapana. Amla is also described in the treatment of diarrhea, jaundice, and inflammation. The fruit is used either alone or in combination with other plants to treat many ailments of body such as common cold, fever; urinary problems, constipation, liver problems, allergy, stomach pain, chronic inflammatory conditions, hair fall, peptic ulcer, acidity etc. Moreover, plant parts show Anti-inflammatory, Antioxidant, free radical scavenging , Antidepressant, Antifungal, Anti-diabetic, hypoglycemic, Anti ulcerogenic, Antimutagenic, Anti-cancer,anti-proliferative, Cytotoxic effects, Insecticidal, Larvicidal, mosquitocidal, Immunomodulatory, Hepato-protective, Radioprotective, Hypolipidemic and several other activities [3] .

Emblica officinalis

Indian gooseberry or Emblica officinalis was also known as and Avala or Amla in India It is a precious gift of nature to human health and vividly described in all ancient ayurvedic text of India. It belongs to family Euphorbiaceae found almost in all part of India. In Ayurveda, it is also known as "Dhatriphala", "Amalaki", "Vayasya" As per Ayurveda Emblica officinalis possesses Chakshusya (Eye tonic), Pittashamaka (Antacid), Balya (General tonic), Pramehaghna (Antidiabetic), Vrishya (Aphrodisiac) and Rasayana (Antiaging) properties. Emblica officinalis (Amla) fruits are an integral part of most of the ayurvedic formulations, the most famous formulation of this fruit is known as chavanprash.[4].

Scientific Classification
Kingdom: Plantae
Order: Malpighiales
Family: Euphorbiaceae
Genus: Phyllanthus
Species: P. Emblica
Botanical name: Emblica officinalis Gaertn.

Pharmacological properties
Astringent, antihaemorrhagic, anti-diarrhoeal, antiemetic, digestive,carminative, laxative, hepatoprotective, cooling, stomachic, tonic, anabolic, diuretic, antidiabetic, antioxidant, resistance building properties, immunomodulator, anti-ageing, restorative, anti-inflammatory, antipyretic, analgesics, antitumor, anticarcinogenic, antibacterial, antiviral, antifungal, expectorant, antispasmodic anti sclerotic, hypolipidemic, antiulcerogenic, adaptogenic, cardiac stimulant [5].

Plant morphological description
Amla (Emblica Officinalis) is a small to medium-sized tree with greenish-gray or red bark that grows to a height of 8-18 m. Flowering season is from March to May, and fruiting season is from September to November.
Leaves :They are 3 mm wide and 1.25-2 cm long, Alternate, Bifurious, Pinnate, with numerous leaflets that are Alternate, Linear-obtuse, and entire, and Striated, Round petioles.
Bark: Thin, light grey bark that exfoliates in small, irregular flakes.
Flowers Small, inconspicuous greenish-yellow flowers grow in compact clusters in the lower leaf axils. Male flowers are unisexual and numerous on short, slender pedicels, while females are few, sub sessile, and have a three-celled ovary.
Fruit Pale yellow, depressed, fleshy, globose, about 2 cm across, with 6 obscure vertical furrows enclosing 6 trigonous seeds in 2 seeded 3 crustaceous cocci.[6].
Organoleptic properties
Colour: Yellowish green
Consistency: Hard
Odour: Aromatic
Taste: Sour
Shape: The fruits are globose and depressed.
Size: 1.5 to 2.5 cm in diameter.

Phytochemistry
E. officinalis is one of the most thoroughly researched plants, and reports indicate that it contains Tannins, Alkaloids, and Phenolic Compounds. It has been reported that the fruits of E. officinalis contain significantly higher concentrations of most minerals, protein, and amino acids such as Glutamic acid, Proline, Aspartic acid, Alanine, Cystine, and Lysine. It contains more Vitamin C than oranges, tangerines, or lemons.
The fresh pericarp of E. officinalis contains more hydrolysable tannins such as emblicanin A and B, punigluconin, and pedunculagin.
An activity directed fractionation and purification process was used to identify phytochemicals in E. officinalis. They used a chromatographic and spectroscopic method to identify gallic acid, methyl gallate, corilagin, furosin, and geraniin in E. officinalis.
Phytochemical studies revealed that E. officinalis contains a higher concentration of flavonoids such as quercetin. Fruits were also tested for Alkaloidal content [7].
Chromatography and infrared spectral studies confirmed the presence of alkaloids such as Phyllantine and Phyllantidine. The fruit also contains gallic acid, ellagic acid, chebulinic acid, chebulagic acid, emblicanin A, emblicanin B, punigluconin, pedunculagin, citric acid, ellagotannin, trigallaylglucose, pectin, 1- O- galloyl- β- D- glucose, 3,6- di- O- galloyl- D- glucose, chebulagic acid, corilagin, 1,6- di- O- galloyl- β- D- glucose, 3 ethylgallic acid (3 ethoxy 4,5 dihydroxy benzoic acid), and isostrictiniin. It also contains flavonoids such as quercetin kaempferol 3 O- α- L (6″ methyl) rhamnopyranoside and kaempferol 3 O- α- L (6″ ethyl) rhamnopyranoside [8]. Source of different phytochemicals from emblica offcinalis gaertn. syn. Phyllanthus emblica linn Plant part and Phytochemical Constituents.
Bark β-sitosterol, Leucodelphinidin, Lupeol, Tannin
Fruit 3–6-di-O-galloyl-glucose, Alanine, Ascorbic acid, Aspartic acid, Arginine, β-carotene, Boron, Calcium, Carbohydrates, Chebulagic acid, Chibulinic acid, Chebulaginic acid, Chebulic acid, Chloride, Copper, Corilagic acid, Corilagin, Cystine, d-fructose, d-glucose, Ellagic acid, Emblicanin-A, - B, Emblicol, Ethyl gallate (syn. Phyllemblin),

Gallic acid, Gallic acid ethyl ester, Gibberellin A1, Gibberellin A3 (syn. Gibberellic acid), Gibberellin A4, Gibberellin A7, Gibberellin A9, Glucogallin, Glucose, Glutamic acid, Glycine, Histidine, Iron, Isoleucine, Leucine, Lysine, lmalic acid 2-O-gallate, Manganese, Magnesium, Methionine, Myo-inositol, Myristic acid, Niacin, Nitrogen, Pectin, Phenylalanine, Phosphorus, Phyllemblinic acid, Phyllemblic acid, Polysaccharide, Potassium, Proline, Protein, Quercetin, Ribofavin, Rutin, Selenium, Serine, Silica, Sodium, Starch, Sucrose, Sulfur, Tannin, Terchebin, Thiamin, Threonine, Trigalloyl glucose, Tryptophan, Tyrosine Zinc, Zeatin, Zeatin riboside, Zeatin nucleotide, Phyllantidine, Phyllantine.[9].

Leaf

Amlaic acid, Astragalin, Ellagic acid, Gallo-tannin, Kaempferol, Kaempferol-3-O-glucoside, Phyllantidine, Phyllantine, Rutin, Tannin

Root: Ellagic acid, Lupeol

Seed

β-sitosterol, Flavonoid, Linolenic acid, Myristic acid, Oleic acid, Palmitic acid, Stearic acid, Tannin

Shoot 3–6-di-O-galloyl-glucose, β-sitosterol, Chebulagic acid, Chibulinic acid, Ellagic acid, Gallic acid, Glucogallin, Lupeol.

Twig: Tannin Whole plant: Ascorbic acid, Lupenon

Whole plant: Ascorbic acid, Lupenon.

Nutritional value[10]

E. officinalis (Amla) has been dubbed the "Queen of the Ayurvedic Rejuvenating Herbs" due to the usual balance of tastes (sweet, sour, pungent, bitter, and astringent) multi-function fruit and is well known for its dietary properties. The fruit of E. officinalis (Amla) is frequently the richest known natural source of Vitamin C (200-900 mg/100 g of safe to eat component). Fruit juice contains nearly 30 times as much Vitamin C as orange juice, and a single fruit has the same antiscorbutic value as at least one or two oranges. Minerals and amino acids are also present, as well as calcium, phosphorus, iron, niacin, carotene, thiamine, riboflavin, and nicotinic acid.

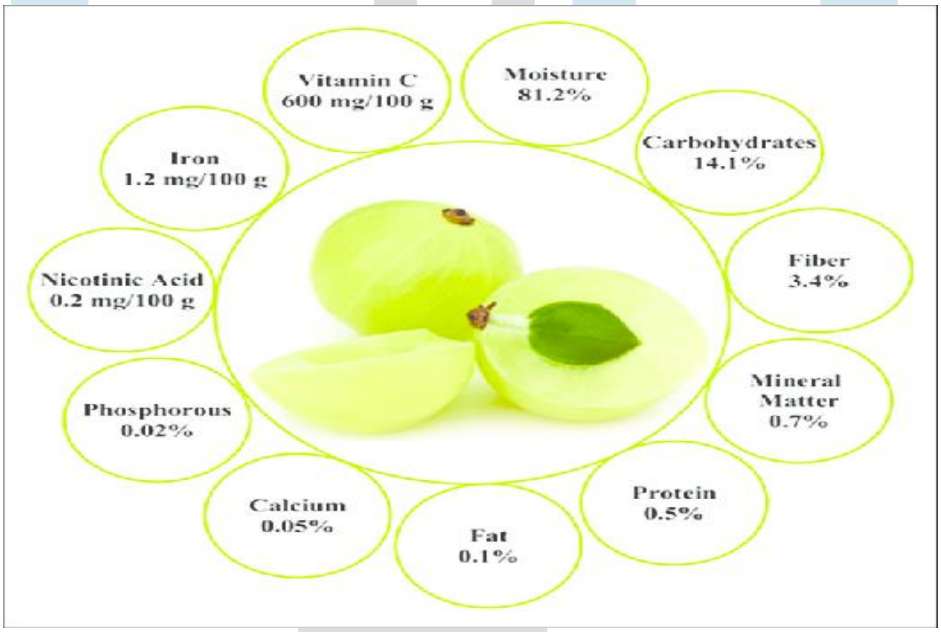

Fig 5: Nutritional value of fruit of Emblica Officinalis (Amla) (% or per 100g) [9] +++

Pharmacological importance [11]

Diabetes and Related Complications

Daily routine foodstuffs participate in controlling the diabetes level. Like garlic, onion, and turmeric, amla (E. officinalis) shows also positive effect in lowering the diabetes level. Approximately 2-3g of E. officinalis powder efficiently helps in improving the HDL cholesterol level and controlling the LDL cholesterol level. Furthermore amla fruit is also being in use to get remedy from neuropathy development, for diabetic patient .

(ii) Eye Disorders

For remedy of eye disease, E. officinalis and its tannoids are used which decreased the possibilities of oxidative pressure as there was a reversal of adjustments with appreciate to lipid peroxidation, carbonyl content of protein, and roles of anti-oxidant enzymes. Amla additionally prevented aggregation and insolubilization of lens proteins resulting from hyperglycemia

(iii) Nephroprotective

The study about amla also describes its efficacy against kidney-infection within the body of rats which promote with aging process.

(iv) Cardioprotective

Beside the other benefits, its major advantage is protection from CVD, atherosclerosis and other heart diseases. The remedy from atherosclerosis is possible only when the oxidation of injury or LDL is minimized. The juice of amla fruit ensured that it is rich in polyphenol amount. Moreover the surgical pathology recovery of cardiac muscles guaranteed the preventative activity of E. officinalis. All the research and discussion argued that E. officinalis shows heart-protective, antioxidant and free radical scavenging Properties.

(v) Anticancer

Like other natural medicinal plant, E. officinalis is better for anticancer because of high concentration of polyphenol constituents in it. Polyphenols involve the mechanisms associated with anticarcinogenic effect, inflammation and radiation retardant.

(vi) Osteoporosis

Amla (E. officinalis) fruit is very useful for strengthening the weak and fragile bones (i.e., osteoporosis). It often takes more time even several years to appear or required only diagnoses the E. officinalis extract is used to mature OCs. Penolazzi et al., reveals the implement of extracts of E. officinalis.

(vii) Dermoprotective

Beside the other medicinal plants, E. officinalis extract is very useful in skin care, antiaging, dermatological disorder since more than 20 years. Amla extract protects human skin against oxidative stress because of its antioxidant nature. E. officinalis defends the skin from free radical that causes skin-damage. Furthermore amla (E. officinalis) is best for anti-aging, and used for production of cosmetics for skin care .

(viii) Immuno stimulant

As we are familiar with various plants, that are immune stimulant in nature. Similarly, amla is best source of ascorbic acid that enhances immuno-activity (i.e. make 2-times more effective) by stimulating immune cells and antibodies .

(ix) Gastroprotective

According to Mehmood et al., amla (E. officinalis) extract is used in treatment of diarrhea and showed spasmolytic activities [11].

Ethnomedicinal uses [12]

E. officinalis is regarded as a potent rasayana (rejuvenator) and is beneficial in delaying the degenerative and ageing processes. It promotes longevity, improves digestion, and relieves constipation. According to the ayurvedic medical system, it also reduces fever, cleanses the blood, reduces cough, eases asthma, strengthens the heart, benefits the eyes, encourages hair growth, invigorates the body, and enhances the intellect. Fruit contains chemical constituents such as alanine, alagine, gallic acid, glucose, Glutamic acid, niacin, pectin, phenylanaline, glucogallin, manganese, magnesium, ethyl gallate, calcium, carbohydtrate chebulic acid, fat, fibre, and flavonoids that are edible and increase appetite; when applied to the scalp, it blackens and strengthens hair and prevent premature greyings of hair. Diarrhoea, ingestion, ulcers, inflammation, sickness, nausea, fever, skin sores, wounds, and scurvy are all treated with it. Red blood cell production. Astringent fruits are used to treat inflammation, skin sores, wounds and scurvy, ophthalmic problems, gastritis, hyperacidity, colitis, haemorrhoids, hematuria, menorrhagia, anaemia, diabetes, asthma, osteoporosis, weakness, and fatigue in several folk medicines

Applications of Emblica officinalis

Role in cancer treatment

Earlier Triphala was considered to reveal some prospective for chemoprevention. The benzo-a-pyrene (B-a-P) responsible for papilomagenesis incidence in the fore-stomach of mice could be reduced through the addition of Triphala in the diet. It has become more active in decreasing tumor incidences relative to its components. The antioxidant level of animals which would have led to chemoprevention also increased substantially with Triphala . Breast cancer considered one of the most communal cancers among females. Major factors associated with breast cancer were lipid metabolism enzymes, fats, and lipoproteins. Kalpaamruthaa (KA) is a improved preparation of Siddha which contains EO, honey and Semecarpus Anacardium. As treated by KA and SA, the raised levels of phospholipids, free fatty acids triglycerides, total cholesterol, free cholesterol, and the replacement of ester cholesterol in blood, liver, and kidney in animals with cancer have reversed to amost normal rates [13].

Chemoprevention with food phytochemicals is generally recognized to be one of the most vital cancer control methods. EO is known for its special flavonoids and tannins, which reveal very strong antioxidants properties. In Swiss albino mice, the inhibition of tumor incidence rate from this plant's fruit extract was tested on a two-stage cycle of skin carcinogenesis. Chemopreventive potential of the EO fruit extract was found on skin tumorigenesis induced by 7,12-

dimethylbenz(a)anthracene (DMBA) in Swiss albino mice . A significant polyphenol, gallic acid, observed in Triphala responsible for the reduction of cancer cell growth [14]. Experimentally, EO ethanoic extract was probed for protection against DMBA induced genotoxicity. Before single intraperitoneal DMBA injection different concentrations (100, 250, 500 mg/kg) of EO fruit administered orally to Swiss albino mice for seven consecutive days which significantly reduced the frequency of bone marrow micronuclei. The anti-oxidant ability and modulative impact on detoxification of enzymes and hepatic activation are the main factors in EO's Défense system [15].

Diabetic uses

Blood sugar levels fell significantly in healthy rats and alloxan (120 mg/kg) after oral administration (100 mg/kg body weight) within 4 hours. Production of diabetic cataract substantially decreased by EO and a supplemented fraction of its tannins in rats . Aldose reductase (AR) engages in the growth of complications of secondary diabetes comprising cataracts. EO as a verified inhibitor of Aldose reductase. A significant approach to managing diabetic problems would be to examine the medicinal advantages of natural ingredients which would incorporate people into their everyday lives [16].

Impacts on the liver

Amla fruits reportedly have been used in Ayurveda , for hepatoprotection, and Phyllanthus emblica extract has been tested for hepatic rat damage due to ethanol .The extent of hepatic fibrosis caused by thioacetamide and carbon tetrachloride was lessened by a hydroalcoholic (50%) extract of EO fruit (EO-50). Because of its antioxidant function, EO-50 effectively reverting profibrogenic events. EO-50 probed hepatoprotective role in antituberculosis drug-induced hepatic injury. Due to the perceived character of antioxidant, membrane stabilizer, and inhibitory CYP2E1, the EO-50 has hepatic protection activity [17]. Liver toxicity in Wistar rats also inhibited by EO [21]. EO and Chyayanaprash hepatoprotective functions were reviewed in rats with CCL causing liver damage. The extracts revealing reduced liver and serum peroxide, alkaline phosphatase (ALP), and glutamate-pyruvate transaminase (GPT) have been reported to suppress hepatotoxicity triggered by acute as well as chronic CCl4 administration extract. The use of CCl4 also induces hepatic fibrosis as revealed with elevated levels of pathological and collagen-hydroxyproline testing. The two extracts have been reported to significantly hinder these increased levels, suggesting that extracts can decrease the induction of fibrosis in rats [18].

Thus, urging that oxidative stress undergoing would be ameliorated by Amla. Moreover, EtoAc extracts from Amla or sun Amla extracts have substantially prevented up-grades in the COX-2 aorta of aged mice of nitric oxide synthase (iNOS) and cyclooxygenase. Restricting the NF-Kappa B activation in the aged rats, the expression levels of COX-2 and iNOS are leveled down by the EtoAc extracts of Amla or Sun Amla. Ultimately for the prevention of age-associated renal ailments, Amla will come to be a very fruitful antioxidant [21]. Chashan the increase in renal gamma-glutamyl transpeptidase (GGT) activity triggered via hexachlorocyclohexane (HCH) was declined by pre-feeding Amla. Amla feeding was recognized to be an excellent part of a hepatic antioxidant mechanism and to deplete cytotoxic products which could be caressed by feeding HCH . The rat's gut revealed for the entire body gamma radiation (WBI) was reported to have strengthened the activity of xanthine oxidoreductase and decreased superoxide dismutase activity, However, the amount of sham irradiation was retrieved for 7 days when animals were treated with Triphala. Administration with Triphala recommended as the prevention from oxidative detriment caused by the exposure of the whole body to the radiation. The whole body of irradiated mice was shielded by Triphala. Protection was conciliated through repression of oxidative damage in cells and organs. The potential to thrive into a novel herbal radioprotector for practical application is signalled towards this drug . Sedimentary extracts of the Terminalia chebula, EO, and Terminalia belerica supplies and their combination of Triphala equi-portional were tested for their in vitro antioxidant activities. The gamma-radiation promoting a strand break in plasmid DNA (pBR322) was considerably dwindled by the Triphala and its constituents. [22].Terminalia chebula 's increased scavenging activities while its higher capability in lipid peroxidation and plasmid DNA testing is demonstrated by the EO, and their mixture Triphala is reckoned as more effective because of the incorporate activity of every single constituent.

Antipyretic and analgesic behaviour

The extracts of EO are strengthened by strong antipyretic and analgesic action. There has been a substantial decrease in brewer's yeast hyperthermia in rats with just a single dose of ethanol extracts and aqueous extract (500mg/kg). Prominent inhibitory effects on acetic acid-induced writhing retort in mice were reduced by both of these extracts was revealed in analgesic test Such symptoms may have been caused by the involvement of alkaloids, tannins, amino acids, phenolic compounds, or carbohydrates.[23]

Cytoprotective, gastroprotective and antitussive properties

Amla has been held responsible for its cytoprotective, chromium-induced immuno-modulatory effects of oxidative vandalism. Using the process of macrophage and phagocytosis gamma-IFN production was reinstated and chromium induced immunosuppression was obstructed by the EO. For the antitussive activity of EO in conscious rats, EO has been reviewed by mechanical stimulus of the air tracts tracheobronchial and laryngopharyngeal mucous region. Non-narcotic agent dropropizine was less effective in antitussive activity than that of EO but the classical narcotic antitussive drug, codeine is still at the highest efficiency for its antitussive activity. The antitussive activity shown by EO is presumed to be not only due to the antiphlogistic, anti-plasmolytic and antioxidant potency influences but also to its effects upon the mucous secretion in the airways . EO is screened for antisecretory and counter ulcer behaviours, using numerous experimental models in mice, such as pylorus ligation shay rats, indometacin hypothermic stress restriction triggered stomach ulcers, and necrotic ants. The exhibition of antisecretory, cytoprotective, and antiulcer properties by Amla was discovered then.[24].

Memory enhancing effects

A dose-dependent increment of Amla fine powder is observed in the memory of juvenile and old rats. It was the transposition of amnesia caused by scopolamine and diazepam. Amla Churna is displayed to be gratifying healing for the treatment of Alzheimer's disease because of its multiple advantages including memory enhancement and memory arrears [25]

Management of ophthalmic conditions

Curcuma longa, Terminalia belerica, OE, Cinnamomum, ocimum sanctum, acamphora, Medespumapum and rosa damascene have been integrated into the basic concepts of various herbs; ophthacare is an herbal eye-catcher. This herbal preparation was aimed at a clinical examination of those patients with various ophthalmic afflictions such as conjunctival xerosis, conjunctivitis, acute acryocytitis, and postoperative cataracts. The herbal eye drops primarily supplied the improved treatment for eye conditions. Patients well tolerated the eye drops and no side effects were ascertained for the time of the course of study. Ophthacare has shown its beneficial function in a variety of infectious, infective, as well as degenerative ophthalmic disorders [26]

Dyslipidaemia and cholesterol reduction role

Amla was investigated on low-density lipids (LDL) oxidation as well as cholesterol-induced in Cu2+ by cholesterol and LDL-fed rats, and its impact was examined in vitro and in vivo. For the hypercholesterolemia and prevention of atherosclerosis. Amla was concluded as an effective specimen. With the flavonoids that can curtail the volumes of lipids in serum and tissues of mice induced hyperlipidaemia, both EO and Mangifera are embraced, each causing breakdown and vanishing of cholesterol [27].

Snake venom neutralizer

It was the first time scrutinized that EO and vitex negundo have the anti-snake venom activity. The plant extracts were antagonized with both in vitro and in vivo models, Naja kaouthia and Vipera Rossellini venom. The V. Rossellini venom-induced coagulants, defibrinogenating haemorrhages, and inflammatory activities by these plant extracts were distinctly nullified. The strong neutralizing capacities of snake venom are seen in extracts of the plants and need even greater consideration in speculating no precipitation bands formation between snakelike venom and plant extract [28].

Antimicrobial and antimutagenicity activities

Due to its antimicrobial activities, EO has been divulged . Against Escherichia coli, K. ozaenae, Klebsiella pneumonia, Proteus mirabilis, Pseudomonas aeruginosa, S. paratyphi B, and Serratia marcescens, the EO plant is endowed with puissant antibacterial activities For an antimutagenic effect with a TA 98 and TA 100 Salmonella Typhimurium Test strain, using a histidine reversal assay to test a phenobarbitone-induced hepatic s9 rat, Triphala's chloroform, water, and acetone extracts were sussed out against the direct-active mutagens, 4 nitro phenylenediamine (NPD) and sodium azide and indirect- active promoutagents, 2 Amino fluorene (2AF).[29] The mutagenicity reticence of both direct and s9 – based mutagens in the chloroform and acetone extracts in a succession was evident.

Triphala, which contains one of the constituents in the EO cycle, is used to medicate the ailments including such as fever, constipation, chronic ulcers, anemia, asthma and jaundice. Secluded from Triphala, polyphenolic fractions possess the anti-mutagenic effects. Furthermore, the active principles of Triphala were reviewed and considered as a peerless clinical intervention for infected wounds . Aqueous plant extracts have been trialed on Swiss albino mice for their radio-protective effects against sub-lethal gamma radiation (9Gy).[30].The 100mg/kg body weight against radiation discovered to be the most effective dose of fruit pulp extracts. Conspicuously, the survival time was exalted and the mortality rate of mice was lessened with this dose. Moreover, it was noticed that the loss of body weight in extract administrated irradiated animals was noticeably low as compared to animals who were given radiations only , By prompting highly puissant hypolipidaemic and hypoglycemic activities maximum beneficial action is exhibited by

the flavonoids derived from EO , Furthermore, for elevating the hemoglobin level in rats, flavonoids are found to be very effective. It's being as anti-tumor in actions is also reported Against thioacetamide (TTA) and CCL4 ,induced changes in rat liver EO fruit has been examined. [31].Abnormal histopathology indicative of pre-fibrogenic events was caused by the treatment with TTA and CCL4 Such alteration was transposed by EO showing its preventive capability in pre-fibrogenesis of the liver . The extracts of Withania are the result of a repeatable dose-dependent, colonyforming inhibition in CHO cells , Hypercholesteremia is one of the key factors in the case of coronary artery disease. Besides, it has been documented that Triphala formulations show hypolipidemic properties on the experimentally induced hypercholesteraemic [32].

CONCLUSION

Amla (Emblica Officinalis) is a well-known Indian medicinal herb that has a variety of health benefits. Amla fruit is widely available in tropical and subtropical regions. All parts of this fruit are medicinal, especially the fruit, which is used in Ayurveda as a powerful Rasayana and in medicine to treat respiratory disorders, eye disorders, diabetes, inflammation, and a variety of other ailments. Antioxidants and Phytonutrients aid in the fight against free radicals. Because of its high polyphenol content, Amla has anticancer properties. Amla's rich phytochemistry composition can be viewed as a valuable source of compounds with potential health benefits. The antioxidant (derived from the rich polyphenol composition) is a significant property, with scientific evidence supporting the direct inhibition of oxidative reactions as well as the induction of an endogenous antioxidant defence system. Although there is a promising scenario for Amla, it is critical to encourage the progression of studies in order to strengthen the current evidence with more studies (especially at animal and human levels). Hence, it is summarized the nutritional value, ethno medicinal and pharmacological importance, and uses of Amla in this review, as well as their basic mechanisms. As Amla plays an important role in the treatment of various diseases, herbal medicine alleviates many of the problems. Because it contains important vitamins, particularly ascorbic acid, and has a higher antioxidant and biological nature, Amla can help you avoid a slew of health problems.

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