



An Extensive Review Of The Antioxidant, Antihyperlipidemic, And Antidiabetic Properties Of An Extract Of *Amaranthus viridis* Linn In The Biological Status Of A Potential Medicinal Plant

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ABSTRACT:

Amaranthus viridis, commonly known as slim amaranth or green amaranth, may be a little-known plant species of botanical, biological and catholic significance having a place to the family Amaranthaceae. This comprehensive survey investigates the scientific categorization, phytochemistry and pharmacology of the Amaranth class. Ordered and morphological segments illustrate the botanical characteristics of Amaranth, appear its special characteristics and recognize it from species within the Amaranth sort. The geographical dispersal and region slants of this plant are talked around, and its natural centrality, such as its dietary portion for wild animals and its green potential, is clarified. In extension, this audit gives an in-depth examination of the utility of amaranth in various social orders, outlining its benefits in individual's medicine inside the treatment of distinctive illnesses. Afterward considers on its bioactive compounds, restorative properties and applications in display day medicine are additionally inspected. These disclosures propose that help ask almost is required to form strides ask almost capacity of this plant.

INTRODUCTION:

In the tropics and subtropics, *Amaranthus viridis* L. (Family Amaranthaceae) is found. Additionally, the whole plant has analgesic and antipyretic qualities and is utilized in traditional medical systems to treat pain and fever, respectively [1]. It is found on well-drained soils in open areas and cultures, preferably on sandy soil or humus-rich and rather humid. The plant grows best on land where water is not stagnant. There are 70 species of Amaranth in the family Amaranthaceae, of which 17 produce leaves and 3 produce edible grains [2]. Traditionally it is eaten as a leafy vegetable in south India. The leaves and seeds are highly nutritious. The nutrients present in the leaves include fiber-containing vitamins- A, B, B2, C and minerals [3]. C4 plants called amaranths provide grain, ornamental, and

vegetables with rapid growth. Asia, Africa, North America, Australia, Europe, and other regions all have large populations of it and cultivate it. An inexpensive and high-quality source of protein, amaranth's leaves and fleshy stems also include critical minerals including calcium, magnesium, potassium, phosphorus, iron, zinc, copper, and manganese. They also contain the essential amino acids lysine and methionine, carotenoids, and ascorbic acid [4]. It is employed in India as an antidote for both scorpion and snake bites. Diuretic, anti-rheumatic, anti-ulcer, laxative, anti-malarial, anti-cancer, and utilized to treat respiratory conditions are some of its further medicinal applications. To cure inflammation and diarrhea, the whole plant is used in a decoction [5, 6].

Taxonomical classification:

Taxonomical classification of *Amaranthus viridis* L. is [7]



Taxonomical classification	
Domain	Eukaryota
Kingdom	Plantae
Phylum	Spermatophyta
Subphylum	Angiospermae
Class	Magnoliopsida
Order	Caryophyllales
Family	Amaranthaceae
Sub-family	Amaranthoideae
Genus	Amaranthus
Species	Amaranthus viridis

Table No .1. Taxonomical classification



Fig 1: Image of *Amaranthus viridis*

BOTANICAL DESCRIPTION:

Amaranthus viridis is a cosmopolitan species in the botanical family Amaranthaceae and is commonly known as slender amaranth or green amaranth. L. [8]

Stem

Erect stem and they are generally rounded, may have some ridges, and glabrous (without hairs)

Leaf

Leaves are mid to light green and deeply veined and up to 15cm long. Leaves have a long leaf stalk and have a broad base tapering to a pointed tip.

Flower

Flowers are small and green (sometimes with a reddish tinge). Flowers are generally radiating around the stem

Seed

1.25 mm in diameter, brown or black, shiny, slightly compressed, reticulate and with shallow out growths on the reticulu
m

Fig no. 2: Botanical description

**Geographical source:**

Amaranthus viridis is native to Central and South America as well as in India, Iraq, Italy, Ivory Coast, Japan, Jawa, Kenya, and Korea [9]

Traditional uses:

Traditional medicine uses amaranth to treat a variety of conditions, including hepatitis, diabetes, asthma, arthritis, stomach and urinary tract infections, hepatitis B, eye infections, and sexual illnesses. Additionally, the herb possesses antimicrobial qualities. [10]

Nigeria	Both the crushed roots and an infusion of the whole plant are used to cure diarrhea and clean blood, respectively.
Nepalese	Traditional Nepalese medicine decreases fever and eases discomfort.
Philippines	Rotten leaves directly cause eczema, psoriasis and skin rashes.
Indian	Always used to treat body aches and fever.

PHYTOCHEMISTRY:

Standard techniques were used to analyze the phytochemistry and antioxidant activity of *Amaranthus viridis* L (Green leaf). According to the information, the preparation was examined for the presence of alkaloids, saponins, tannins, steroids, flavonoids, anthraquinones, cardiac glycosides and reducing sugars, triterpenoids, and protein amino acids [11, 12, and 13].

PHARMACOLOGY ACTIVITY OF AMARANTHUS VIRIDIS:

Amaranthus viridis is a medicinal plant with a wide range of pharmacological effects. An herbal plant called *Amaranthus viridis* has a lot of potential in the pharmaceutical, cosmetic, and medical fields. Its bioactive ingredients, including as flavonoids, cardiac glycosides, and zinc, support its wide range of medicinal functions, including antioxidant, anti-inflammatory, antibacterial, antifungal, anti-diabetic, and anthelmintic qualities. It is a plant used in Indian traditional medicine to ease labor discomfort. [14]

Antioxidant activity:

Amaranth's antioxidant activity makes it a particularly healthy diet. The purpose of this study is to examine how nitrogen (N) fertilization affects the photosynthetic, growth, and antioxidant abilities of *A. viridis*. *A. viridis* in low nitrogen (LN), medium nitrogen (MN), and high nitrogen (HN) environments, plants were grown and harvested at a young stage. With increasing N, *Artemisia* annual plants produced more dry mass and taller plants, and the dry mass of HN approached saturation. HN leaves had increased stomata conductance, net photosynthetic rate, and water efficiency. Chlorophyll (Chi), as well as its precursors and degradation intermediates, accumulated in enormous amounts in the leaves under the impact of HN at the same time. The second pathway of Chl breakdown is the high stimulation method. The capacity of ferrous metals to reduce, chelate, and scavenge free radicals is, however, removed under the influence of HN. In conclusion,

proper nitrogen fertilization may balance yield and antioxidant power of green. [15]

Anti-Inflammatory Activity:

The anti-inflammatory properties of yeast infection and the activities of full amaranth extract (MEAV) were examined using the tail immersion, hot plate, and rat acetic acid writhing tests. 200 and 400 mg/kg body weight is the dosage given to mice. Two hundred and four hundred mg/kg were shown to have significant ($p < 0.01$) anti-inflammatory and anti-inflammatory dosages. [16]

Antiproliferative and Antifungal Lectin Activity:

Amaranth seed lectins were isolated using affinity chromatography on asialofetuin-linked amino-activated silica. The typical molecular mass of amaranth lectin (AVL) is 67 kDa. It's a homodimer made up of two 36.6 kDa subunits. The lectin displayed a band in native PAGE at pH 4.5 and pH 8.3 and a peak in HPLC size and cation exchange lines. T-antigen and N-acetyl-D-lactosamine (markers of different cancers), as well as N-acetyl-D-galactosamine, asialofetuin, and fetal globulin, are specific for purified lectins. This lectin is highly reactive with human ABO blood and red blood cells (RBCs). It also interacts with red blood cells from rabbits, lambs, goats, and guinea pigs. Lectins are glycoproteins that do not need metal ions to function. For 15 minutes, denaturants such as urea, thiourea, and guanidine hydrochloride had no effect on its activity. AVL has antiviral action against HB98 and P388D1 murine cancer cells. It is also antibacterial against the phytopathogenic fungus *Botrytis cinerea* and *Fusarium oxysporum*, but not against *Rhizoctonia solani*, *Trichoderma reesei*, *R. solani*, and *F. graminearum*. [17]

Anti-diabetes Activity:

As a consequence of worldwide concern, type 2 diabetes is defined by hyperglycemia, which causes blood sugar to remain constant due to inadequate glucose absorption



and metabolism. One method of treating this condition is to employ alpha-amylase inhibitors and retain glucose in the intestines for an extended period of time. The purpose of this study is to assess the anti-diabetic potential of amaranth extract in vitro. The antidiabetic efficacy of *A. viridis* extract was substantiated by its inhibitory effect on -amylase activity and capacity to influence glucose. In the dialysis tube replicating the human intestine, methanol extract *A. viridis* leaves had the maximum glucose retention capacity of 47.05% (40.125g/mL). After 15 minutes of incubation, the aqueous extract of Artemisia annual stems exhibited the most significant inhibitory impact on -amylase activity (100%) with an IC50 value of (5.058 0.41g/mL) and comparable activity to other extracts. So far, acarbose has been employed as the standard medication in the analysis. Interestingly, the methanol extract of the leaves inhibited glucose diffusion and -amylase. This work advises more in vivo investigations to investigate their activity and toxicity in biological systems, as well as to extract chemicals that limit bioactivity for novel medication development. [18]

Antibacterial Activity:

Antibacterial drugs are not as it was costly but are frequently related with poisonous quality, side impacts, and medicate resistance. Therefore, there must be common cures that have small or no issues with engineered drugs. In this consider, the antibacterial movement of methanol leaf extricate and home grown corrective cream details containing bother leaf extricate, amaranth leaf extricate and aloe vera leaf extricate extricated by cold maceration with methanol was assessed. Anti-microbial resistance of a few microscopic organisms to leaf extricates and creams was decided by the agar well dissemination strategy utilizing tall concentration extricates of 100 mg/mL, 200 mg/mL, and 400 mg/mL and refined water as a negative control. Neomycin® at concentrations of 6.25 µg/mL, 12.5 µg/mL, 25 µg/mL and 50 µg/mL was utilized as a positive control for the leaf extricate, whereas 2% w/v mupirocin (Supirosin®) cream and Penicillin® treatment. was utilized. It is utilized as a positive control in home grown restorative investigations. The MIC of the leaf extricate was decided by the agar weakening strategy utilizing diverse concentrations (20 mg/mL to 210 mg/mL). The leaf extricates and treatment appeared anti-inflammatory properties compared to standard anti-inflammatory drugs and arrangements. Bother appears the most noteworthy antibacterial properties. Creams containing a blend of 20% each of bother and aloe vera show up to be the leading anti-inflammatory specialists. These comes about show that home grown medication containing leaf extricates of this plant has the capacity to treat skin maladies. [19]

Geomorphology and Pharmacological activities:

Amaranthus viridis L. may be a member of the Amaranthaceae family, which includes the "Chowlai" plant, a common weed and wild vegetable. The viridis contains several substances, including the amino acids lysine, histidine, cystine, arginine, phenylalanine, leucine, isoleucine, methionine, valine, tyrosine, and threonine. Phytochemical screening of *Amaranthus viridis* Linn. leaf extract reveals the presence of naturally dynamic components such as triterpenes, alkaloids, cardiac glycosides, flavonoids, tannins, and phenols. A few chemical components in *Amaranthus viridis* Linn. exhibit significant anti-inflammatory, antihepatotoxic, anti-ulcer, antiallergic, and antiviral properties. *A. viridis* is used in conventional medicine in India and Nepal to relieve work-related discomfort and serve as an antipyretic. The Negritos of the Philippines use the bruised leaves as a coordinated therapy for a variety of skin conditions, including rashes, eczema, and psoriasis. It has also been used as a vermifuge for venereal disarray, a medication for respiratory and visual disorders, a diuretic, an anti-rheumatic, an anti-ulcer, analgesic, antiemetic, purgative, craving enhancer, antileprotic, and anti-inflammatory for the urinary system.[20]

DNA Polymerase and Colon Cancer activities:

Contamination, both pathogenic and non-pathogenic, is one of the main issues affecting civilization today and in the past. Giving g the right amount of calories and medicine can help lower it and lower the risk of sickness. In this work, we examined several medicinal characteristics of green and pink *Amaranthus viridis* methanol extracts. The polymerase hindrance, antioxidant, antibacterial, and colon cancer cell multiplication exercises of *Amaranthus viridis* are examined. The results of the display suggest that all of the tested *Amaranthus viridis* extracts have the potential to be DPPH antioxidants, with A1 having the highest antioxidant content at 66.59%. When the methanol extract of *Amaranthus viridis* ethereal portions was tested for antimicrobial activity against various pathogens, such as *Micrococcus luteus*, it was shown that A1 had the strongest effect (78.96% inhibition) when compared to the other extricates. When compared to other extracts, B1 seems to have the highest polymerase activity. The colon cancer cell expansion ponder suggests that the inhibition of cell line A1 to B2 migration be reduced. [21]

Antihyperglycemic and Hypolipidemic Activities:

To investigate the antihyperglycemic and hypolipidemic effects of methanolic extract of *Amaranthus viridis* (MEAV) on normal and Streptozotocin (STZ) activated diabetic rats. The anti-hyperglycemic and hypolipidemic activity of methanolic extract of clears from *Amaranthus*



viridis was evaluated in normal and STZ-induced diabetic rats at doses of 200 mg/kg and 400 mg/kg by mouth every day for 21 days. Blood glucose levels and body weight were measured at regular intervals, and other biochemical markers, including serum cholesterol, serum triglyceride, and total thickness lipoprotein, low density lipoprotein, and particularly thickness lipoprotein, were also measured in the test animals. The pancreas was examined histologically. Measurable data showed a significant increase in body weight, a decrease in blood glucose, an increase in serum triglycerides and cholesterol, and a decrease in blood glucose levels following MEAV therapy. Extricate treatment resulted in a considerable increase in the level of high-density lipoprotein (HDL) cholesterol. Histologically, central corruption was observed in the pancreas of diabetic rodents; however, it was less obvious in the treated groups. The lipid profile of STZ-induced rats is improved by the MEAV, which also has positive effects on lowering elevated blood glucose levels and weight fluctuations. [22]

Antipyretic Activity:

The antipyretic properties of *Amaranth viridis* (Linn.) and *Amaranth spinosum* (Linn.) are supported by scientific data found in amaranth (Linn.). Mice with yeast infections were given dosages of 200 mg/kg and 400 mg/kg of these three plants' methanolic extracts to test their antibacterial qualities in order to lower fever. The treatment employed was oral paracetamol (150 mg/kg), whereas the control group received distilled water. The temperature of the rectum in every rat was measured using an Eliab's stick 19 hours before to the administration of the extract, vehicle, or paracetamol, and again for up to 24 hours. The results were recorded and compared at 1-hour intervals. The temperature of all three methanol solutions decreased ($P < 0.01$) at 400 mg/kg as compared to conventional paracetamol, and the lower dose again performed better than the greater dose ($P < 0.05$) at 200 mg/kg. The effects of our amaranth methanol extracts were compared with those of an excellent anti-paracetamol, and the findings demonstrated that they had a considerable antipyretic impact in regulating and lowering the increase in body temperature in rats caused by yeast. [23]

Antiuro lithiatic Activity:

The presence of uroliths/calculi (stones) in the urinary system is referred to as urolithiasis. Urinary calculi can be treated with *Amaranthus viridis* L. As a result, the current investigation was conducted to establish the scientific validity of *Amaranthus viridis* L.'s antiuro lithiatic action. Wistar rats were separated into four groups of six each and housed in metabolic cages for the length of the experiment. All animals had unlimited access to ordinary rat food and water. The first

group repeated their previous actions. The second group received ethylene glycol treatment for 30 days. After 15 days of ethylene glycol administration, cystone and amaranth juice extract were administered to groups III and IV. The animals were in a metabolic condition on the 30th day of the experiment, and 24-hour urine and blood samples were taken. Eventually, all of the animals were slaughtered. Urine and blood tests are used to evaluate biochemical markers including calcium, phosphorus, creatinine, and uric acid. Crystal deposition is induced by an increase in blood and a reduction in biochemical substances in the urine (such as creatinine and uric acid), as well as low calcium in the blood and an increase in calcium in the urine. The use of the aqueous extract increases excretion biochemical parameters while decreasing blood concentration. In conclusion, the findings show that amaranth has strong anti-urolytic action. [24]

Antimicrobial and Irritant Activities:

Testing was done on the hexane, chloroform, and ethanol extracts of *Maltasibiricum* and *Mallow floribunda* for their antibacterial, antifungal, and allergenic qualities. At the same time, the anti-inflammatory actions of hexane, chloroform, ethanol, water extracts, and polar amaranth solution were investigated. The antibacterial activity of extracts from *Maltaparviflora* L. and *Malvastrum coromandelianum* L. against *Escherichia coli* was identical, however it differed somewhat when it came to *Proteus vulgaris*, *Bacillus subtilis*, and *Staphylococcus aureus*. When compared to other extracts, chloroform extracts from both plants had notable antibacterial activity. All extracts have nearly same antibacterial activity against *Kojima oryzae* and *Kojima black*. The antibacterial effect of the ethanol extract of amaranth is more important than that of the water extract and its polar group. However, the hexane extract of the plant showed stronger antibacterial activity against Gram-positive and Gram-negative microorganisms than the chloroform extract. Hexane, chloroform and water extract of our plant were used in the corn cob.

It has been determined that male albino rabbit (*Oryctolagus cuniculus*) causes itching. [25]

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