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Phytochemical characterization and Assessment for Copper and Magnesium nanoparticle synthesis with Macaranga tanarius leaf extract and Antibacterial activity

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Abstract:

Phytochemical with anti-bacterial properties have high scope in plant and human diseases. Phytochemical are distributed in different part of plant i.e. *Macarena tamaris leaf* was screened for potential to synthesis of nanoparticle of Copper and Magnesium with their presence of photochemical and antibacterial activities. The green advanced towards to develop metal oxide nanoparticle has having broad observation to the case preparation and environment affability to compared physical and chemical process. Extract was analyzed in UV-visible (UV-vis) Spectrometry.

Keywords: *Macarena tamaris* L. extracts; Phytochemical analysis; Copper and Magnesium nanoparticle synthesis; Antibacterial activity.

Introduction

Medicinal plant is rich source of active substances. Plant herbs can used in diverse applications including medicine, victuals, essence, dying repellents cosmetic [1]. Plant kingdom has proved to be the most useful in the treatment of many disease and they provide as source of all the pharmaceuticals in the world [4]. In today times the overall use of medicinal plant or herbal medicines as caring medicine to prevalent medicine has grown highly [3].Today, medicinal plant and their bioactive components are accepted as an spring of stand by therapy for the control and cure of various human troubles [7, 8].

Phytochemical are non-nutritive, chemical compounds that occur naturally on plant and having diverse protective properties. Most of phytochemicals have anti-microbial activities and serve as a source of agents against human pathogens [5]. Phytochemical scanning is

crusial to evaluate the possible medicinal utilities of plant and also to analyze the active concept in control for

the known biological activities revel by the plant [6].

Bioactive part in medicinal plant have great affinity towards lower oxidative stress and inflammatory action [9]. The extract of different part *Cucurbita pepo* has seen to express number of pharmacological work such as anti-inflammatory, antioxidants, anti bacterial, anti-viral [10, 11]. *Manihot esculenta* is extensively planted as yearly crop. Tuberous root a major origin of food carbohydrates in the area Cassava, the tubers from the plant, is major source food in developing area. The Plant *Manihot esculenta* aq. Leaf extract have been successfully adapt the magnesium nano particles. Metal nano particles have wide bio medicinal and pharmaceutical application as another antimicrobial agent. Bio molecules having in plant extract job as reducing and capping agents [2].

Materials and methodsMaterials

The *Macaranga tanarius leaf* used for the analysis were collected from the forest area ofNasik, Maharashtra, India $CuSo_4$, $MgSo_4$ were purchased from Loba chemicals.

Preparation of extract

The leaves of *Macaranga tanarius leaf* were washed with tap water and then rinsed with deionised water to free from dust and impurities. After that, they were sun dried and converted into fine powder to complete absorption. Then 15 gm of powder was mixed with 100 ml of deionised water in to 250 mL capacity conical flask.

The mixture was boiled for 3 hr at temp. 60-70 ^{0}c then extract was filtered through Whatsmanno. 1 filter paper. The clearly filtered light yellow extract was stored in refrigerator between 5and 10 ^{0}c.

Screening of phytochemical analysis as following

The qualitative phytochemical tests of crude whole plant aqueous extract of *Macarangatanarius leaf* was performed based on the following standard methods [9, 10].

Tests for Carbohydrates Iodine test:

To the test solution, 2 ml of iodine solution was added. A dark blue or purple color shows that carbohydrates were present.

Test for Tannins and Phenols Ferric Chloride Test:

To the test solution, 2 ml of 2% solution of $FeCl_3$ was mix. Blue-green or black color appers that phenols and tannins were present.

Tests for Flavonoids Alkaline reagent test:

To the test solution, 2 ml of 2% NaOH solution was mix; intensive yellow color formed, which then turned colorless upon addition two drops of diluted acid; this result having that flavonoids were present.

Test for Saponins Froth Test:

To the test solution, 5 ml of distilled water was added to a test tube and shake vigorously. The foam formation shows that saponins were present.

Test for Proteins Biuret Test:

To the test solution, 4% NaOH solution was added followed by drops of 1% CuSO4 solution; violet color appearance specify that proteins were present.

Test for Organic Acids Oxalic Acid:

To the test solution, few drops of KMnO4 and dilute H2SO4 were added. Color disappearance shows that Oxalic acid was present. Malic Acid: To the test solution, few drops of 40% of FeCl3 solution were added; the yellowish color indicated that Malic acid was present.

Test for Glycosides Salkowski's test:

To the test solution, about 2 ml of H2SO4 concentrated was added. A reddish-brown color formed appeared the entity of steroidal aglycone part of the glycoside. Keller Killiani Test (Cardiac glycosides): 0.4 ml of glacial acetic acid with a trace amount of ferric chloride was added to 0.5 g of the crude extract. Transferred into a small test tube; gently added a conc-sulphuric acid sideways of the test tube. The blue color in the acetic layer proved that cardiac glycosides were present.

Characterization

Anti-bacterial activity

The antibacterial activity of plant extract and biosynthesized Cu NPs and Mg NPs against gram positive bacteria species was carried by disk diffusion method. Experimental bacteria were Escherichia coli. Bacteria strains were spread over the Petri dishes which contained autoclaved Luria Bertani (LB) medium containing agar. Plant extract and biosynthesised Cu NPs and Mg NPs were separately placed on petri dishes containing LB media. Petri dishes were incubated at 37 ^{0}C. Observed zone of disk measured after 18 h.

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Result and Discussion Phytochemical screening

Table1. Result of phytochemical screening tests of *Macaranga tanarius leaf* extract.

Sr. No.	Phytonutrients	*Maccaranga Tenarius* L.
1	Carbohydrates	-
2	Tannins and Phenols	+
3	Flavonoids	+
4	Saponins	+
5	Proteins	-
6	Organic Acids	+
7	Glycosides	+

Legend (+) - Present (-) – Absent

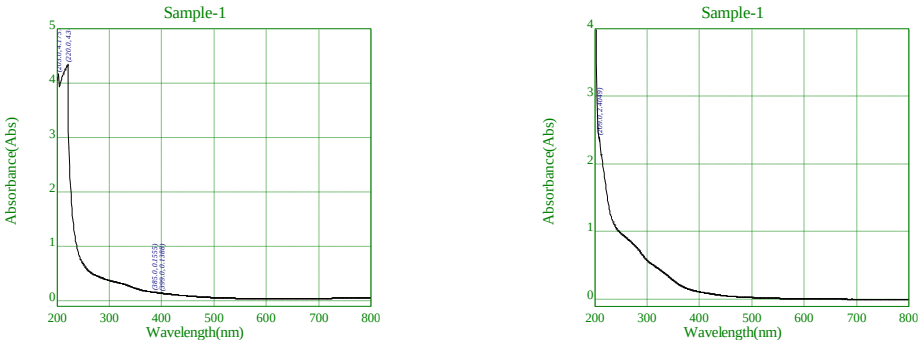

Figure1. UV-Vis absorption spectra of Cu NPs and Mg NPs

Plant Extract Mg NPs Cu NPs

Figure 2 Antibacterial Activity of Plant extract, synthesized Mg NPs and Cu NPs evaluated disk diffusion method

UV-Vis Analysis

UV-Vis absorption spectrum of Cu NPs and Mg NPs is shown in Fig.1 Spectrum curve was obtained from UV-Vis analysis shown a absorption band at 385 and 280 nm respectively Corresponds to lower intensity. The presence of polyphenol compounds affects the colour of solution. The maximum absorption of Cu NPs depending on particle is around 600nm of wavelength. Maximum absorption at 385 nm can cover localised surface Plasmon resonance from Cu NPs [13]. UV Spectrum is characterised by appearance of peak around 250-280 nm which confirms the formation of Mg NPs. UV peak is not showing sharp peak due to lower intensity of NPs [14]. The UV-Vis graph presents that reductive bio molecules in the *Macaranga tanarius leaf* extract were use to perform bio-reduction role leads to the formation of Cu NPs and Mg NPs.

Anti-bacterial activity

The screening the antibacterial activity of the plant extracts, biosynthesized Cu NPs and Mg NPs is shown in Fig.2 Distilled water was used as a control. The measured diameter for restriction area of the growth of bacteria in Escherichia coli.

Conclusions

The medicinal plant extracts is use in various cultures traditionally. The number of plant species having the disease curing capacity and shows the presence of phytochemical constituents. The analysis confirms the anti-bacterial. The plant extracts study gives zero side effects and low coast medicine to treatments on various diseases. Due to availability of phytochemicals can used in many medicinal application and in green synthesis of NPs.

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Conflicts of interest

The authors declare no conflict of interest.

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