

SYNTHESIS AND ANTIBACTERIAL APPLICATIONS OF SILVER BASED NANOPARTICAL POLYMER

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ABSTRACT :-

Silver have maximum antimicrobial ability which fights against different bacteria, fungi and yeast. The various substances has increases the new invention of silver as antimicrobial product which seen to be continuously rising with the fore fronted in the improvement of antimicrobial system. The antimicrobial application of silver is newly introduced in the system of health care. today the public had awareness about sterility and safety demanding antimicrobials which does not show any harm full effect on the environment so in both the point of view i.e. the by the medical and consumer need Supplied on the huge potential market which provide the fast improvement of new technical methods which depends on the materials of antimicrobial agent.

Thus the antibacterial impact of Silver had been used in different financially Substances and in Medicinal appliances from many years. The application of Silver Polymer nanoparticles for the Medicinal & sanitary purposes were studied deeply which seen to be increased today.

In the current research the Synthesis techniques of Silver based nanoparticle polymer are studied and its antimicrobial applications.

KEY WORDS :-

Nanoparticles, antimicrobial agent, Silver polymer, Synthesis & Silver.

INTRODUCTION :-

Today there is a drastic awareness of different antimicrobial inorganic products. Like Silver, Zinc oxide, and others which was famous for its antimicrobial activity against different micro organisms. Among all above

antimicrobial products Silver is well known for its activity.

Silver us introduced about 7000 years ago for the different used like for the making of Jewelry, Currency and other religious Purposes. But the main feature of Silver is that is its application in antimicrobial products acc. to Hippocrates Silver has many beneficially and prophylactic effect. It is also one of the biomedical compounds which were highly used in large hospitals also it is used for closing many surgical wounds.

It is also used in World War I for preventing infections. The wide distributions of Silver are in the field of fashion with the overall look and the distribution & newly Synthesized antibiotics. And, hence with the invention of newly antibiotics. Many strains are develops which have capacity to resist against these antibiotics. Therefore in this field the Silver get special attention as a antimicrobial agent. The Silver sulfadiazine creams have Special application for the curing of burn skin and also for regeneration of tissues.

The dressing including Silver hydrocolloids are widely used in the treatment of diabetic foot ulcers because of their ability & regeneration for reducing the increasing growth of Post-traumatic granulomous the solution of Silver nitrate has been used in large extent. Thus the Silver based nanoparticle polymer have large spectrum of antimicrobial features. This enhances its uses in the biomedical

applications the Silver nanoparticle polymer with an antibacterial Property get attracted towards the many researchers. And the technologists within the last some years and its uses are increased and today Silver is build small materials which was highly used for the purpose of customer material. The nanoparticles containing metallic character are said to be more promising because they contain large extended of antibacterial properties it also have maximum surface area which give Special interest for researchers to the increasing resistivity of microbes againrtions of metal, different antibiotics and the improvement of resistant strains the nanoparticles include Silver are on special product in the field of nanotechnology which get unlimited fond of it due to its extraordinary properties. Including constancy of Chemicals better ability of conduction the different catalytic activity including antibacterial activity, antiviral, anti-inflammatory, antifungal which can be formed into legal corporation with fibers, various materials having low temperature, beauty products, food industries and the components of electricity.

Also the Synthesis of Silver nanoparticles Polymer by different Chemical method including various reducing factors which after become responsible for different biological hazards because of their general intensity & toxins.

SYNTHESIS OF SILVER NANOPARTICLE POLYMER :

The Silver nanoparticle polymer can be synthesized by different way including some chemicals method and Plant extract Method.

In the chemical method we can Synthesized the Silver nanoparticle polymer by two method i.e. in-situ and ex-situ. In the first method i.e. in situ method by the process of decomposition the Silver

nanoparticles are produce into the matrix of polymer instead of decomposition process the reduction of metallic fore runner through different Chemicals.

But in case of ex-situ technique Silver nanoparticles are generated by way of applying soft Chemical factors. After that they were distributed inside a matrix of polymer.

Currently in-situ view are apply for obtaining Silver nanoparticle polymer by this method different metal polymer nanoparticles are generated have large size with specific material morphology and giving some other features.

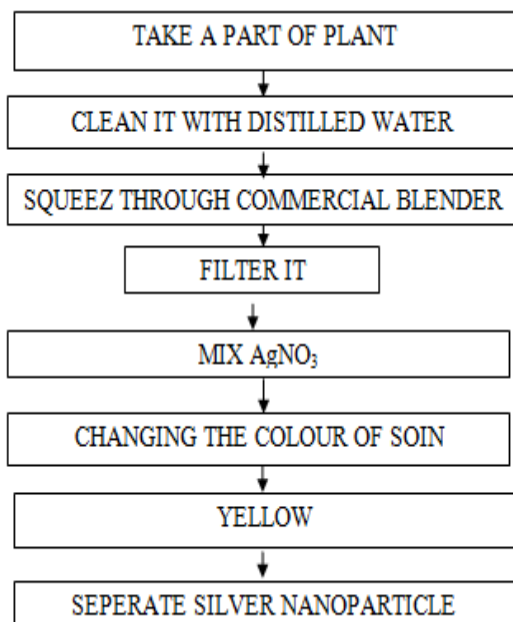
INTER MATRIX SYNTHESIS :-

It is the new method of Synthesis of Silver nanoparticle polymer. In these techniques there was a fixation of ionic prerecourser with the main group present in the matrix which shows the first Step of Synthesis of Silver nanoparticles.

In the second step of procedure the constant ion experiences a Chemical reaction including reduction. Oxidation or a precipitation which producing single nanoparticles.

This method is also called dual function method of the polymeric matrix which shows the fixation of Silver based nanoparticle polymer which was useful for avoiding the growth which was uncontrollable, also prevent its loosing and the groups while supplying a way of Synthesis.

PLANT EXTRACT METHOD :-



Chemical reduction method is also one of the technique of Synthesis of Silver nanoparticles.

CHEMICAL REDUCTION :-

Chemical reduction method is also one of the technique of Synthesis of Silver nanoparticle. In this method have ability to synthesized major amount of nanoparticles by requiring short time period. In this method many toxic substances which is non-eco-friendly but the Synthesis of Silver nanoparticle Polymer through green routs which does not produce toxic Substance which was eco friendly.

EVAPORATION CONDENSATION:-

It is also general method of Synthesis in this method tube furnace at atmospheric pressure and the required material is kept in a furnace. Which was then vaporized into a carrier of gas which carries different metal and the

nanoparticles polymer are generated but this method have many limitations that it required much space and required high amount of Energy and it is imperfect on surface structure.

PLANT EXTRACT METHOD :-

It is convenient method among all the method of Synthesis of Silver nanoparticle Polymer. It is eco-friendly non-pathogenic and efficient method which enhances the single step method of the biosynthetic procedure in this method there is a reduction and Fixation of Silver ions by the combination of bio-molecules including proteins amino acids, enzymes and polysaccharides, alkaloids tannins, other phenolic compounds and vitamins which are generated through extract of different plant.

- i) The first step of this method is that the collection of the plant part which was taken for extraction.
- ii) After that it was clean through tap water for removing the waste material on that plant part.
- iii) Then the extracted plant part dried for 5 to 15 days then make in the form of powder by assigned home blender.
- iv) The next step is that for making the liquid solⁿ of this powder take 5-10 gm of this blended powder which was boiled in 100 ml of distilled water which was boiled in 100ml of distilled water which was demonized condition.
- v) Then the Solⁿ which get through this Solution are filtered which separated the insoluble material.
- vi) The obtained filter material are AgNO₃ Solⁿ Which was obtained by adding ions of Silver in the filtered plant extract material

At last the obtained Silver nanoparticle are obtained which measured through UV-visible Spectra.

In this method we can use various plants which can be taken for extraction. The method includes the following-

		Size & Silver Nanoparticle	Plant Part
1	Alternanthera dentata aqueous extract	50-100nm	Leaves
2	Boerhaavia diffusa	25 nm	Whole plant
3	F.Branchiophilumin	5-18nm	Leaves
4	Tea extract	15-19	Leaves
5	Abutilon indicum	May-19	Leaves
6	Acalypha indica	0.1-0.5	Leaves
7	Calotropis procera	18-47	Whole Plant
8	Centella asiatica	26-50	Leaves
9	Brassica rapa	12.5-16.5	Leaves
10	Vitex negundo	05-Oct	Leaves
11	Portulaca oleracea	50-50	Leaves
12	Trachyspermum ammi	85-98	Leaves
13	Moringa Oleifera	55-57	Leaves
14	Nelumbo Nucifera	22-85	Leaves
15	Acalypha indica	18-32	Leaves
16	Allium Sativum	Apr-20	Leaves
17	Aloe Vera	40-360	Leaves
18	Citrus Sinensis	15-35	Peel Part
19	Eucalyptus hybrid	55-150	Peel Part
20	Nelumbo nucifera	20-85	Leaves
21	Datura metel	15-42	Leaves
22	Carica Papaya	22-52	Leaves
23	Vitis Vinifera	28-45	Fruit

ii) It is used in the field of nanotechnology for expanding its field for expanding its field for appearing customer

ANTI MICROBIAL APPLICATIONS OF SILVER NANOPARTICULAR POLYMER :

The antimicrobial properties of Silver nanoparticles were drastically introduced in the domestic and medicinal purposes. The applications are as follows.

i) The Burning infections are prevented by the creams of Silver sulfadiazine.

products containing different Baby products acne creams and the keyboards of Computer.

iii) The different Catalytic activities are shown by Silver nanoparticles which

was useful for elimination and reduction of dyes.

iv) The Silver nanoparticle Polymer are introduced as the antimicrobial agent by growing E. Coli Bacteria and the agar plate in liquefied LB medium.

v) Its applications are also useful for investigation of transport membrane in the cells of living microbes.

vi) It is also fabricated through nano sphere lithography up to sensitive functions and selective nano-scale biosensors affinity.

vii) It is useful for powerful antioxidant characteristics in vitro antioxidant assay.

viii) The Silver nanoparticle are acts against HIV-1 disease by showing its antiviral activity.

ix) It is also act as a therapeutic agent in different diseases.

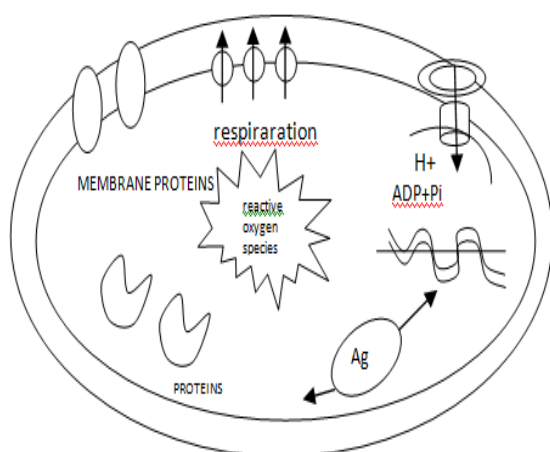
x) During childbirth some drops of aqueous Silver nitrate is recommended for eyes of new born baby for the Prevention of transmission of Neisseria Gonorrhoea.

xi) It also shows inhibitory effect in different respiratory syncytial Virus.

The maximum requirements of Silver nanoparticle Polymer for medicinal uses by giving antimicrobial properties and high economical effect of these factors enhances research attention in this Sense. Also rising awareness in the direction of natural way for the Synthesis of Silver nanoparticle lead to desire to improve eco-friendly techniques the important beneficiary effect of Synthesis of Silver nanoparticle is use of different plant extract because it is seen to be economically effective energy efficient, prize effective which enhances healthier work places and communities be Preserve human health.

There is a need for commercially available, economic and eco-friendly method to find capacity of natural reducing constituent to form Silver nanoparticle which has not yet deeply studied.

ANTIMICROBIAL ACTIVITY OF SILVER NANOPARTICLES



CONCLUSION :-

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