

Wound Healing Spray using Neem and Silver Nano- Particles

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Abstract—The main objective of this paper is to make the healing process faster using Nanotechnology in medicine field. Azadirachtaindica (commonly known as neem) is a tree in the mahogany family Meliaceae. It is one of two species in the genus Azadirachta, and is native to the Indian subcontinents. Silver nitrate is an inorganic compound with chemical formula AgNO₃. This compound is a versatile precursor to many other silver compounds. These are the two compounds which we are going to handle to develop a wound healing medicine. So we report that, by extracting the nanoparticles of neem and silver nitrate, the medicine characteristics of these compounds get enhanced. We are using nano particles of these two compound mixtures for Wound healing process. We can get the nano particles of both elements by synthesis method and make it into a liquid form. The nanoparticle of the compounds gives antiseptic and antibiotic properties for the effective wound Healing. Finally we can get the output as the spray bottle model.

Keywords: Azadirachtaindica, Silver nitrate, Inorganic compound, Nanoparticles, Synthesis method, Antibiotic property.

INTRODUCTION

In today's busy world people want everything faster. At the same time they are facing many problems from their faster life. The technology is also developing in such a way that all our needs are solved in incident way. The major problem for them is unexpected accidents and unexpected wounds. The wounds do not create any struggle for our routine life. Our team comes with the idea of healing the injuries using in faster duration. Here we are introducing the Wound healing spray using neem and silver nano particles. Particularly neem and silver nanoparticles have antiseptic and antibiotic properties. So the Wound will get heal faster and safer. The currently available wound healing technologies cause more time and it leads to lot of side effects. In order to overcome the drawbacks of the current technologies and give society the better medicine for wound healing, we use the nanotechnology. Nanotechnology was initially invented in the year 1970 in

USA. The fundamental studies are undergone through the nanoparticles by granqvist in japan and it is called as ultrafine particles.

LITERATURE REVIEW

Chiara Rigo (2013) have discussed about the wound healing property of silver nano particles and these particles made by Ag salt. They clearly mentioned that the silver nano particles can be used for wound healing process. The methods for nano particle preparation and applications of silver nano particles in wound healing are studied^[1].

A. Tripathy (2018) have discussed about biometric synthesis of silver nano particles by neem extract. The various analysis techniques like UV spectroscopy, SEM and TEM, Microscopy are studied. The methods of synthesis processes and green synthesis of silver with neem extract are studied^[2].

Umme Thahira Khatoon (2013) chemical reduction method of silver nano particles is studied. They used AgNO₃ for this method. They have discussed about four types of the synthesis methods. The methodology and procedure are studied from this paper. They also analyzed their result by UV, SEM and TEM. Waste disposal methods for this process also studied^[3].

Branka Salopek Sondi (2018) have discussed about the antimicrobial property of silver nano particles is studied. They tested that by E-coli. They mentioned that silver nano particles damaged the bacteria by its antibacterial and anti microbial property. So, silver nano particles are acting as antimicrobial agent. Also they have proved this by the SEM and TEM analysis^[4].

Jun sung kim (2007) they mentioned about how the silver nano particles are used in medical applications. Medical applications and functions of silver nano particles are studied

from this paper. This paper tells that silver nano particles have the medical applications naturally^[5].

NANOMATERIAL

A nano material is which the single unit is get sized between 1 to 1000 nanometers. A Nano material is getting advanced in materials metrology and synthesis which have been developed in the contribution of micro fabrication researches. Nanomaterials include carbon black and titanium dioxide. It can incidentally produce a by product of mechanical and clinical processes; it is often referred as ultrafine particles. Biological system has a great dependence on the nanotechnology. The natural inorganic nanomaterials occur through the crystal growth with the diverse chemical condition of the earth.

NEEM

CLASSIFICATION	NAMES
Kingdom	Plantae
Clade	Angiosperms
Order	Eudicots
Family	Sapindales
Genus	Azardichta
Species	A.indica

Azardirachta indica is commonly known as neem. Neem is a tree in mahogany family meliaceae. It is one of the species in the genus Azardirachta and it belongs to Indian subcontinent. It typically grown in tropical and semi tropical region. Neem tree is populated for its drought resistance. Neem can be used as a medicine over many years. Neem products are believed to be siddha and ayurvedic practitioner to be anthelmintic. It is also considered as contraceptive and sedative. It is considered as a major component in siddha medicine unani medicine especially for skin disease.

Neem is also used for the development of hair growth and to improve the function of liver. Neem plays main role in treat the skin disease like eczema, psoriasis and even genetic skin diseases. The short term uses of neem are highly medical but in long term use it highly lead to the harm for kidney or liver. Neem also leads to the infertility low blood sugar and many more effects in the body. The oil extract of neem cause encephalopathy and ophthalmopathy if it consumed in long term.



Figure 1 Photograph of neem leaves

Neem is a key ingredient in non pesticide management providing a natural alternative to synthetic pesticides. The biopesticides produced by extraction from the tree seeds contains limuloids.

SILVER NITRATE

Silver nitrate is an inorganic compound with chemical formula AgNO_3 . This compound is a versatile presecure to many other silver compounds. It was called lunar caustic because the silver was called luna. Silver nitrate can be prepared by reacting silver, such a silver foil with nitric acid and it is highly reactive. It depends upon the reaction of the by product. It combined with the two set of the reactions which is distributed based on the chemical components. They are

Cold and Diluted:



Hot and Concentrated:



CLASSIFICATION	PROPERTIES
Chemical formula	AgNO_3
Molecular mass	169.87 mol ⁻¹
Appearance	colorless
Boiling point	440
Solubility	Acetone
Viscosity	3.77 cP

METHODOLOGY

The main methodology of the project is to extract the nano particle from the components used in the process. The major components which we are using in the procedure are silver nitrate and neem. The preparation of the spray is totally divided into two processes namely

- Neem Extraction
- Pelletizing process

This both the process will be the backbone for these procedures which will help for healing the wound. This method will help the composition for the better result.

Neem extraction

Initially we have collected the fresh and pure baby neem leaves. Then we have washed it thoroughly. Then we have started the initial process of preparation of neem extract. We collected baby neem leaves and put them into the distilled water. We allowed it to heat for few hours and leave it undisturbed. At the level of 100°C the neem leaves get mixed with the distilled water. The neem extract has been achieved. After we got neem extract. Then we initiate the preparation of the silver solution.



Figure 2 Neem extract

We take 20 ml distilled water and add 0.01gm of silver nitrate in the neem extract solution. The solutions get mixed evenly and the compound doesn't get the sedimentation. This denotes the solution has the maximum purity and leaves the solution untouched for 3 hours. Now the solution is get prepared

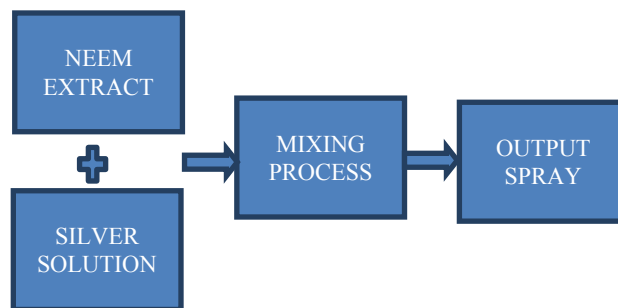
Pelletizing process

Pelletizing is the process of compressing the material into the shape of pellet. The wide range of different materials is get pelletized namely chemical compositions, iron core, etc. The process of pelletizing combines the raw material in forming the original output factor. Initially the silver nitrate solution is get pelletized. The nanoparticles of the silver are get mixed and the real state of the liquid get acquired. The pelletizing

process is undergone for 4 hrs and leaves it untouched for that duration.

After completion of the process we acquire the pure silver solution.

BLOCK DIAGRAM



BLOCK DIAGRAM DESCRIPTION

The neem extract which we have obtained by heating and further extracting the process and the silver solution which we acquired from the pelletizing process is get mixed together by the stirrer. The both the base component of the solution are mixed together. After the mixer process is completed we get the non sediment form of liquid which is our final output.

SCANNING ELECTRON MICROSCOPE

A scanning electron microscope is a type of electron microscope that produces the image of given sample by scanning the surface of the sample using the focused beam of electrons. The electrons interact with atoms present in a sample by producing various signals that provide information about the surface topography. The raster scan pattern is the electron beam which gets analyzed by scanning.



Figure 3: Photograph of Scanning electron microscope

Through the SEM result of the silver nitrate solution we can find the bonding of the silver nitrate nano-particles. It shows that the silver nano-particle have good binding property. It shows that the compound combination in the product is in the

exact ratio which will not cause any adverse reaction when it is used in the injured area of the skin.



Figure 4 Result of Scanning electron microscope

The scanning electron microscope result shows the exact combination of the silver nitrate nano particles and the neem which the combination will be highly help full in healing the wound. The output which we acquired is referred by the analysis process is to check its purity.

FOURIER TRANSFORM INFRARED SPECTROSCOPY

Fourier transform infrared spectroscopy is a technique which is used to obtain an infrared spectrum for absorption and emission of solids, liquid, gas. High spectral resolution data is simultaneously get collected in the Fourier transform infrared spectroscopy. The infrared which is used in FTIR is highly used to extract the actual optimistic data from the given sample. The scanning results in higher signal to noise ratio for the given scan time for observation. The monochromator has the entrance and exist the slit which restricts the amount of light pass through it. It has the effective function for scanning.



Figure 5 Photograph of Fourier transform infrared spectroscopy

FTIR result we can find two most peak values one is defined as 3325.28. It is nothing but alcohol. Normally alcohol used in various types of wound healing methods. After that another peak value is 1637.56 it is also nothing but imines (weak). Imines are common in nature so we need not worry about that ratio. The ratio which has arrived for alcohol level also perform as the part of wound healing.

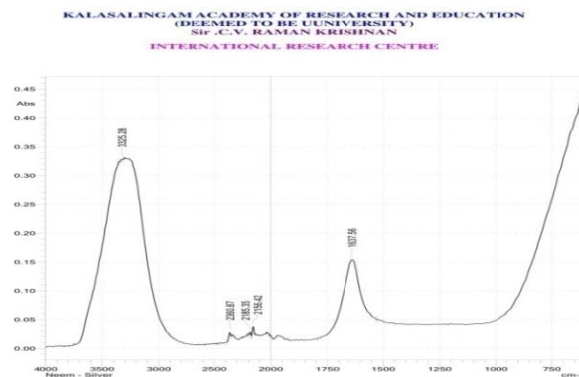


Figure 6 Result of Fourier transform infrared spectroscopy

The result peak clearly says that the alcoholic content which present is also feasible to heal the wound.

OUTPUT

Final we achieved the output as spray model using neem and silver nanoparticles. It heals the injury, wound, scratches, skin tear and even first degree burns in the fast manner. As we have used the neem as the base component, neem has the property of antibiotic. It will never allow the side effects. Silver is also the main components it highly has the property of healing the wound and it is highly reactive. It plays major role in healing the wound faster. Thus, our product will surely perform as a effective medicine in healing the wound.

The components which we have added into the spray solution can efficiently perform as the wound healing medicine without any of the side effects like itching, skin burning, etc.



Figure 7 Photograph of our final output

RESULTS AND CONCLUSION

In this paper, we have discussed about the wound healing spray using neem and silver nanoparticles. In this we used two components which have the property of antibiotic and it has the ability to heal the wound effectively. This product consists of neem extraction, Silver nitrate. Whenever we got injured or

skin tear happens we need to cure it earlier and to heal without any side effects. Hence our product will emerge as a innovative solution for wound healing using spray.

FUTURE WORK

As our team have discussed we have prepared the spray using neem and silver nanoparticles. The next stage of this work is to proceed our product for ethical clearance and develop its efficiency to heal the burn injuries and even the muscle injuries. Our idea is to make it as a product for commercial use which would be more effective. Since the disease and patients are increasing day by day our product will be highly use full for the society.

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