

Synthesis, Stability, Anti-Microbial, Anti-Oxidant Property Pronusdulcis Gum

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Aim: To synthesis silver nanoparticles from pronusdulcis gum and to check its stability (with & without capping agent) and to check its anti-oxidant and antimicrobial activity.

Abstract: The almond pronusdulcis is a species of tree native to Mediterranean climate region like india and turkey it belongs to family rosaceace. The extraction of pronusdulcis gum was prepared. Then the silver nano particles were synthesized from the almond gum. The peak absorbance value of the silver nanoparticles with & without capping agent was noted. Capping agent are frequently used in colloidal synthesis to inhibit nanoparticles overgrowth and aggregation as well as in control the structural characteristic of nano paticles in a precise manner. Here Dextrose, the dexirorotary form of glucose was used as a capping agent. Then the stability of the silver nanoparticles (with & without capping agent was checked for 5 days continuously. The anti-oxidant property of the silver nanoparticles were checked by Ferrous Reducing anti-oxidant power (FRAP) assay. The anti- microbial property was also checked for different pathogen. In overall observation, the silver nanoparticles without the capping agent is more stable and has high biosensing activity than with capping agent. The silver nano particles synthesized from almond gum has low anti-oxidant property. Anti – microbial property remained average.

Keywords: Pronusdulcis gum, dextrose, biosensing activity, anti-oxidant property, bio-nano technology

I. INTRODUCTION

Silver nanoparticles are nanoparticles of silver between 1nm to and 100nm in size. While describing as being silver some are composed of large percentage of silver oxide due to their large ratio of bulk sliver atom. Numerous shapes of nano particles can be constructed depending on the application at hand. Commonly used are spherical silver nano particles. But diamond, octagonal and thin sheets are popular.

The extremely large surface area from it permits the coordination of a vast number of ligands. The property of silver nano particles applicable to human treatment are under investigation in laboratory and animal studies.

II. MATERIALS AND METHODS

PREPARATION OF EXTRACT

Extract is prepared by making the *pronusdulcis gum* to powdered form and 1g is take and it is diluted to 100 ml and it is centrifuged at 10,000rpm for 5 minutes and the supernatant is used for further analysis.

SYNTHESIS OF SILVER NANO PARTICLES

Silver nitrate stock solution of 0.1 molar was prepared. Taken 10 ml of stock and made upto 100 ml .working standard 20ml was taken and kept in magnetic stirrer at 40-50c.Added 20-100ul of gum extract to silver nitrate solution .

ANTI-MICROBIAL PROPERTY

It is important to use a growth medium that is as close as possible to a natural environment. Nutrient broth with agar is called nutrient agar. The overall purpose of the agar is to customize the media for specific bacteria. Nutrient agar continues to be a widely used general purpose medium for growing nonfastidious microorganism. The nitrogen, carbon vitamin, aminoacid in the nutrient agar are provided by enzymatic digest of gelatine and beef extract .Agar is a solidifying agent.

ANTI-OXIDANT PROPERTY

It is an simple, automated test measuring the ferric reducing ability of plasma, it is an method of assessing anti-oxidant power. Ferric ion reduction at low pH causes a coloured ferrous complex to form. The absorbance are viewed at uv spectrometer.

UV SPECTROMETER ANALYSIS OF SILVER NANOPARTICLES

The synthesized silver nanoparticles are checked for stability at different wavelength ranging from 360-400 nm. The stability of the particles were found (with & without) capping agent.

III. RESULT

Pronusdulcis gum

Silver nanoparticles are synthesized from *pronusdulcis* gum

SYNTHESIZED SILVER NANO PARTICLES

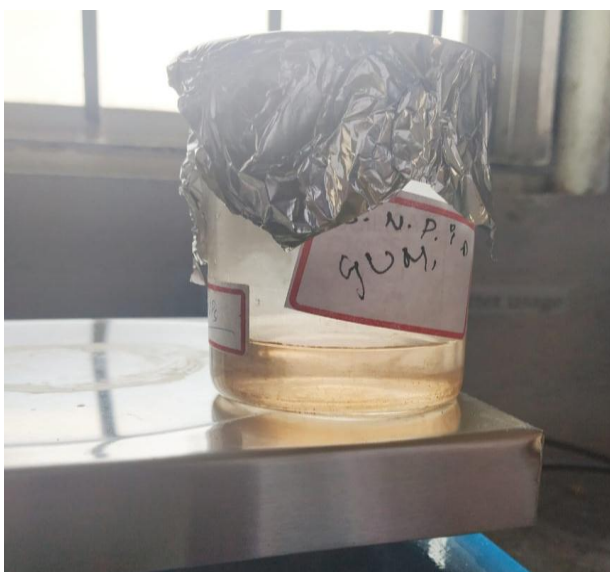


Figure 1

SILVER NANO PARTICLES ARE SYNTHESIZED FROM THE PRONUSDULCIS GUM

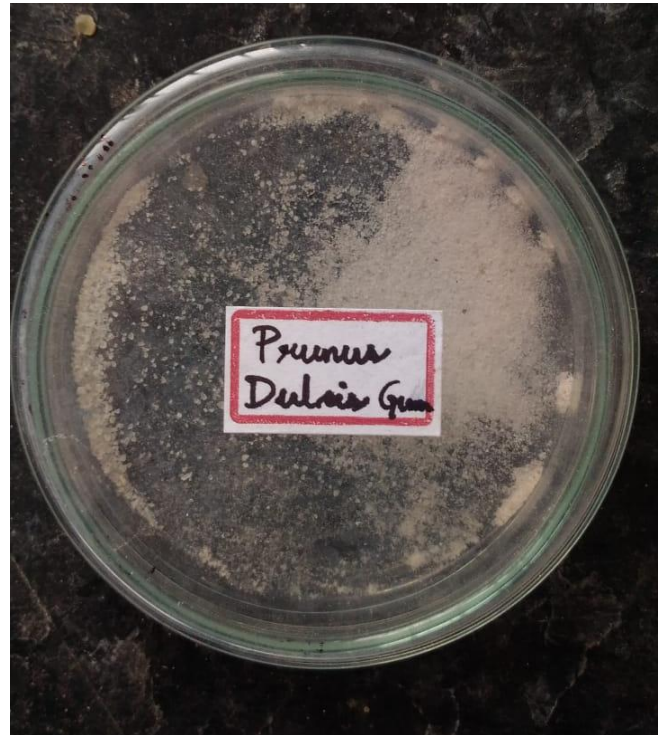


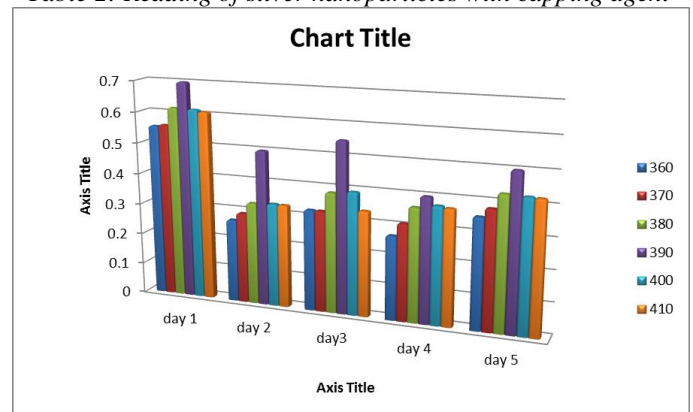
Figure 2

Wavelength(nm)	DAY 1	DAY2	DAY3	DAY4	DAY5
360NM	0.555	0.268	0.325	0.296	0.353
370NM	0.560	0.293	0.352	0.310	0.301
380NM	0.617	0.329	0.386	0.364	0.418
390NM	0.624	0.335	0.396	0.377	0.433
400NM	0.615	0.333	0.394	0.375	0.425

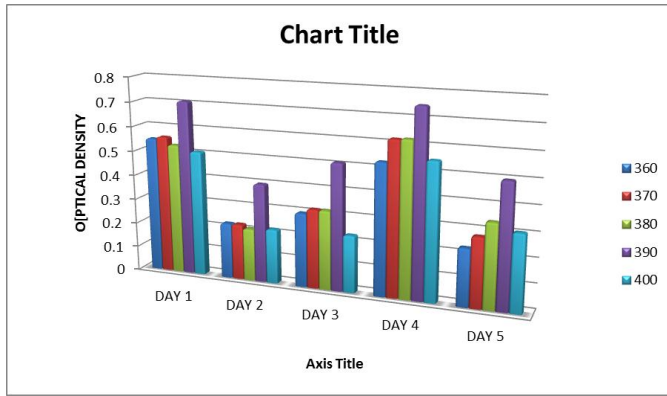
Table 1: Reading of silver nanoparticles without capping agent

Wavelength(nm)	DAY1	DAY2	DAY3	DAY4	DAY5
360 NM	0.555	0.226	0.302	0.531	0.231
370NM	0.560	0.227	0.323	0.621	0.281
380NM	0.530	0.213	0.323	0.623	0.345
390NM	0.710	0.401	0.513	0.750	0.500
400NM	0.510	0.221	0.231	0.551	0.310

Table 2: Reading of silver nanoparticles with capping agent



Graph 1: Reading of silver nano particles without capping agent



Graph 2: Reading of silver nano particles with capping agent.
 The silver nanoparticles are stable

FRAP ASSAY (ferrous reducing anti- oxidant power)



The yellow colour in the tube turned as light green when potassium acetate was added to the tube.

ANTIMICROBIAL PROPERTY

The silver nano particles were checked for the antimicrobial property for different pathogen.

E. COLI

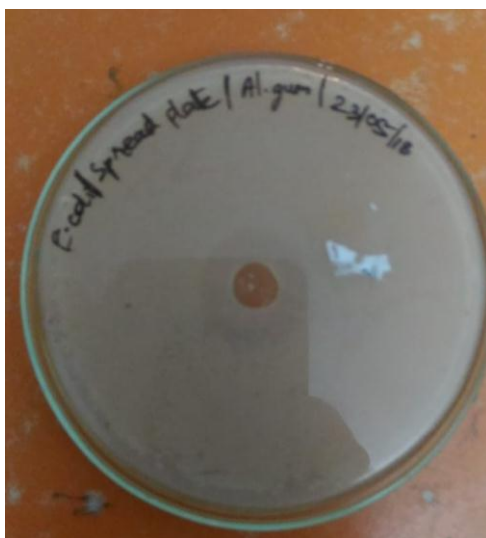


Figure 3

S.AUREUS

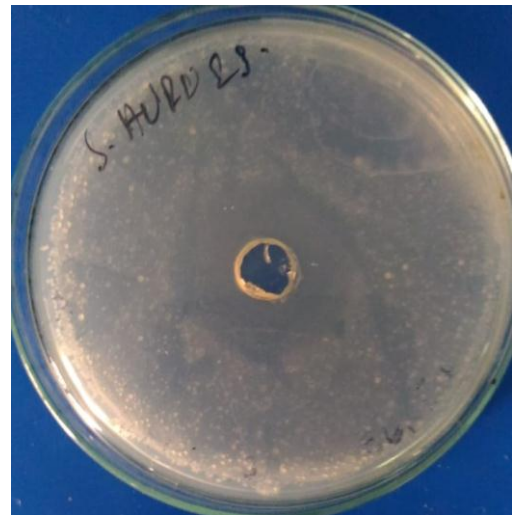


Figure 4

PSUEDOMONAS



Figure 5

PROTEASE



Figure 6

ANTI- MICROBIAL ACTIVITY OF ALMOND GUM

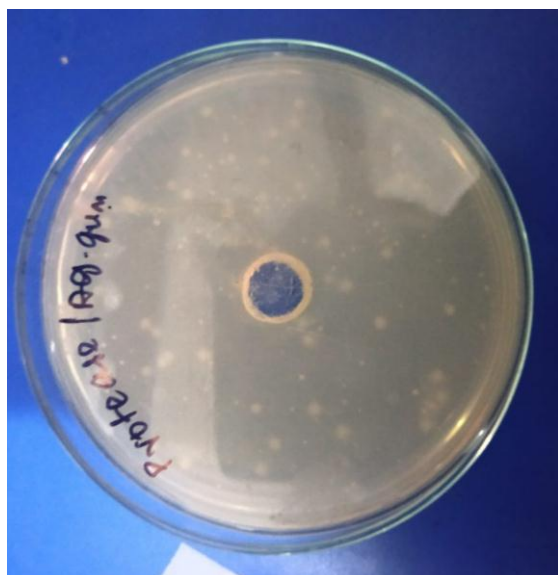


Figure 7

IV. DISCUSSION

STABILITY OF SILVER NANO PARTICLES (WITHOUT CAPPING AGENT)

The silver nano particles were prepared from pronusdulcis gum and it remained stable at a specific wavelength. The highest peak obtained at 390nm and it remained in a stable manner.

STABILITY OF SILVER NANO PARTICLES (WITH CAPPING AGENT)

The capping agent dextrose was added to the silver nanoparticles which was prepared from the pronusdulcis gum and it remained in a stable at specific wavelength 380nm which is the highest peak obtained and in a stable manner.

ANTI- OXIDANT PROPERTY

The silver nanoparticles were checked for the anti-oxidant power assay which is (FRAP ASSAY). It is found that the silver nanoparticles which is present in the pronusdulcis gum has low anti- oxidant property and the colure changed from yellow to light green which indicates the low anti-oxidant property

At 700nm wavelength it remained as = 0.410. Which indicates it has the low anti -oxidant power.

ANTI-MICROBIAL PROPERTY

The silver nanoparticles were tested for antimicrobial activity, after overnight incubation the zone of inhibition was observed for different pathogen. The antimicrobial property

below 8mm is low, 12mm remains as average and above 16 remains as high anti- microbial property.

Organisms	Zone of inhibition
<u>E.COLI</u>	13MM
<u>S.AUREUS</u>	13MM
<u>PSUEDOMONAS</u>	13MM
<u>PROTEASE</u>	18MM

Table 3

The zone of inhibition remained in a average when 2g of agar was added to all the nutrient agar medium. It remained average in case of E. COLI, S.AUREUS, PSUEDOMONAS, after overnight incubation.

In case of PROTEASE after overnight incubation it has a zone of incubation of 18mm which resolves as the higher reactivity of the silver nanoparticles.

ANTI-MICROBIAL ACTIVITY OF PRONUSDULCIS GUM

The pronusdulcis gum is checked for the anti- microbial property and it is found that the silver nano particles are responsible for the anti – microbial property. No zone of incubation was formed when the pronusdulcis gum was plated and kept for the overnight incubation. Hence silver nanoparticles are responsible for the anti- microbial activity.

V. CONCLUSION

The silver nanoparticles were synthesized the reduction of the metal ion through extract leading to the formation of the silver nanoparticles. The Anti-oxidant property remained low. Anti-microbial property was tested against various pathogen and they remained in a average state. No natural resolvance such as phenol etc. is responsible for the Anti-microbial activity. The silver nanoparticles were responsible for the anti-microbial activity in the *pronusdulcis* gum.

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