



system

NANOSILVER PRODUCTS

WHAT IS NANOSILVER?

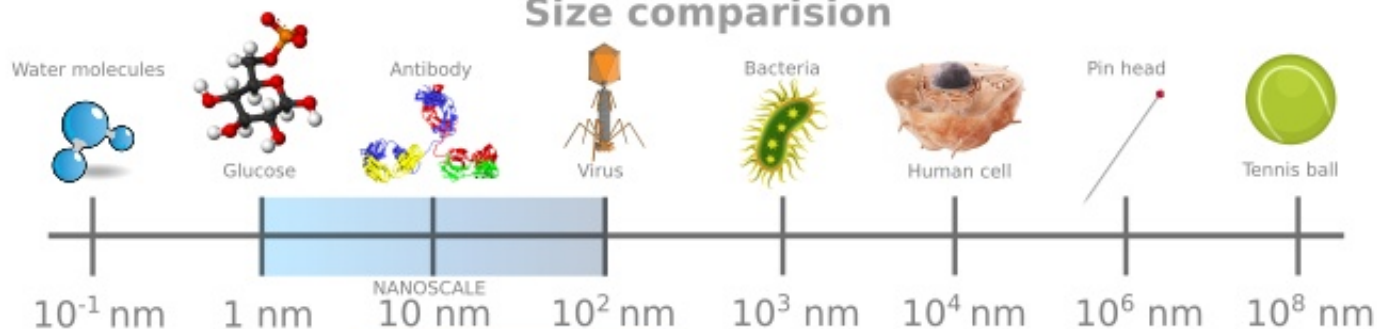
Nanosilver is a product exhibiting unique properties. Silver as a noble metal has a low reactivity and high stability. Product also exhibits strong antimicrobial properties against broad spectrum of microorganisms. Reduction of the silver dimension to nanoscale (nanometer is one-billionth part of a meter) causes a dramatic increase of the activity of metallic silver, which depends on the contact surface of the particles with the microorganisms. Reducing the silver dimension to nanoscale makes the each gram of product has a surface area equal to a football pitch. Nanotechnology in an innovative way allows to obtain unique properties of products with low cost.

EFFECTIVENESS

Depending on the content of silver in the finished product, we get different levels of microbiological protection (from protection against harmful microbial influence to product to biocidal activity). Nanosilver exhibit activity in extremely low concentration - 1-25 ppm. For lot of substances such amounts are traces concentration, but for nanosilver it is enough to show strong activity against 650 species of bacteria and lot of mildews, viruses and fungi.

The effectiveness of antibacterial properties of nanosilver products has been confirmed in the various tests. All tests we are making in ready-to-use products.

Size comparison





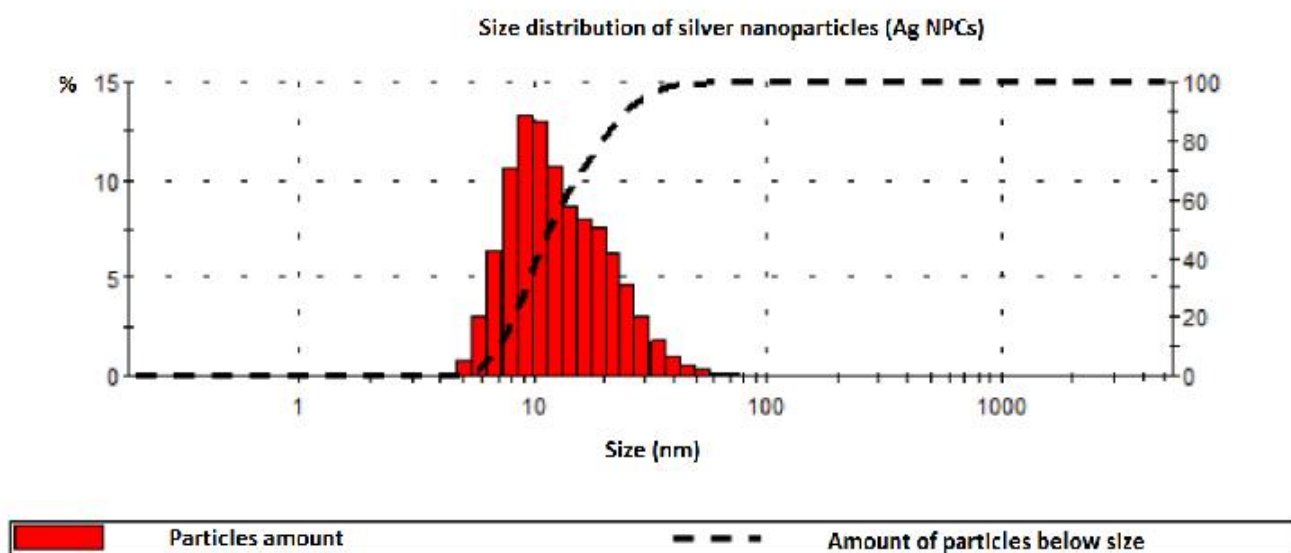
The advantage of active silver over chemicals is its permanent effects on the cells of microorganisms. Covering surfaces with active silver prevents from the growth of microorganisms and reduces the infection risk. Penetrating into body, they can cause many diseases, often with dangerous complications.

The sizes of silver nanoparticles were examined with Zetasizer Nano ZS. The dashed line in the diagrams shows the average particle size distribution: X nm/100%. The results are presented in the diagram below:

APPLICATION

ITP-System has broad experience in application of nanosilver to various types of products. For providing best quality and activity our laboratory has developed nanosilver in various forms. It provides high efficiency, stability, and compatibility with a lot of commercial products in different branches like plastic and rubber industry, cosmetics, household chemicals, ceramics, paints and lacquers or impregnates.

ITP-System provides also full R&D services of application and measurement of activity of nanosilver in ready-to-use products.



ITP-System's nanosilver area of application

- COSMETICS
- PLASTICS AND RUBBER INDUSTRY
- CERAMICS
- HOUSEHOLD CHEMICALS
- PAINTS AND LACQUERS
- SHIPBUILDING
- AUTOMOTIVE
- WATER FILTERS
- BUILDING MATERIALS
- IMPREGNATES
- COATINGS
- TEXTILES AND CLOTHING
- DAIRY PRODUCTS
- PAPER AND CARBOARDS
- WOOD INDUSTRY
- FOOD PACKAGING
- PLANT HARVESTING
- ANIMAL BREEDING
- HOUSEHOLD ELECTRONICS
- UPHOLSTERY
- FOOD STORAGE & TRANSPORTATION





NANO Ag

NANO Ag is waterborne colloid and it is efficient biocide against broad spectrum of bacterias, fungi, viruses and mildews. Product could prepared by using different carriers including oxides (silica, titanium dioxide), polymers , alcohols (PVA) and different solvents including glycols (PEG, PPG, MPG), glycerin and alcohols (ethanol, propanol butanol).

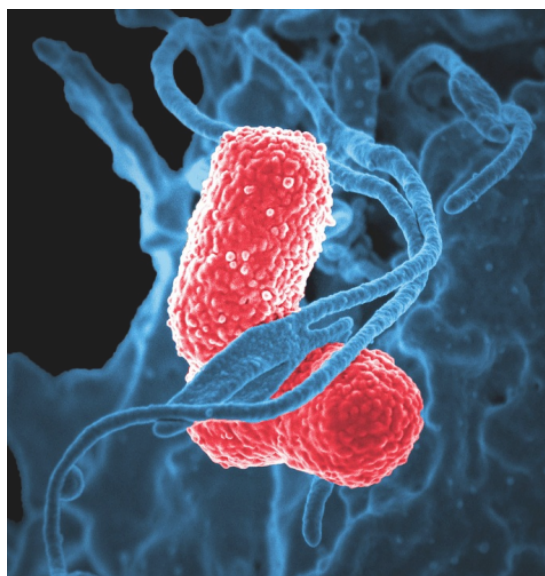
Particles are quasi-spheric and thin (5-15 nm). Those properties provide strong, fast and long lasting antibacterial activity, and broad spectrum of applications.

NANO Ag colloid is broadly used waterborne silver product in various applications. Product exhibit high concentration and could be prepared in different forms according to the requirements of clients.

Application:

Antimicrobial products (sprayers), paints, impregnates, household products, cosmetics, veterinary products, polymers additive, long lasting colorants.

Product code	NANO Ag
Appearance	yellow to brown liquid (depends to concentration)
Odor	odorless
Particles diameter (nm)	5 – 15
Silver concentration	1000 - 4000 ppm
Solvents	deionised water, MPG, PPG, PEG, glycerin, ethanol, propanol, butanol
Packaging	1, 5, 10, 20 L containers or other containers according to the requirements of clients
Shelf life	12 months in closed containers



NANO Ag ORG

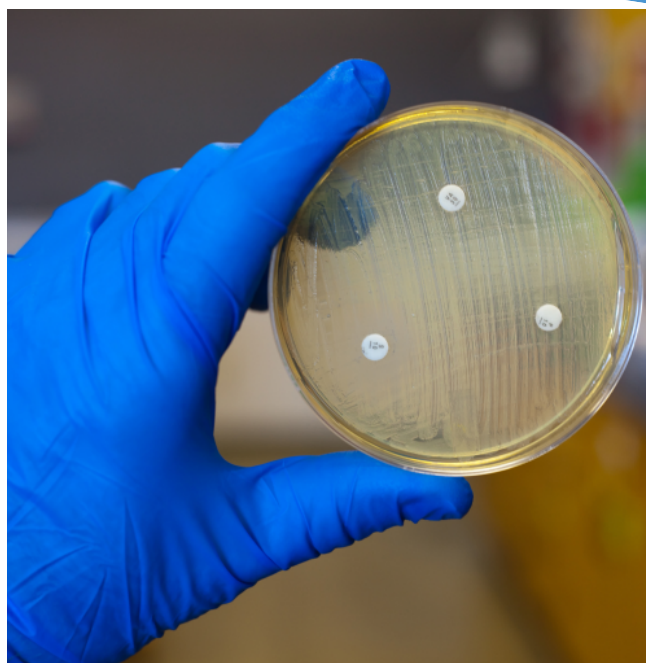
NANO Ag ORG is colloid in organic medium (toluene) and it is efficient biocide against broad spectrum of bacterias, fungi, viruses and mildews. Product could prepared by using hydrophobic stabiliser providing excellent stability in extremally high concnetrations.

Particles are quasi-spheric and thin (5-15 nm). Those properties provide strong, fast and long lasting antibacterial activity, and broad spectrum of applications.

NANO Ag ORG colloid is commonly used in hydrophobic liquid products like resins, lacquers, coatings and impregnates. Product exhibit high concentration and could be prepared in different forms according to the requirements of clients.

Application:

Lacquers, resins, paints, impregnates, fuel additives, polymers additives, long lasting colorants.



Product code	NANO Ag ORG
Appearance	yellow to brown liquid (depends to concentration)
Odor	toluene scent
Particles diameter (nm)	5 – 15
Silver concentration	1000 – 400 000 ppm
Solvents	toluene, mineral oils
Packaging	1, 5, 10, 20 L containers or other containers according to the requirements of clients
Shelf life	12 months in closed containers



NANOSILVER GUARD POWDER

Nano silver could be bounded with various carriers like nanosilica. It increases compatibility of product with different ingredients and provides novel properties, like solubility in organic solvents.

Nano silver over silica (NANOSILVER GUARD POWDER) has solid form (powder) and could be prepared in two forms: hydrophilic and hydrophobic. It's an excellent additive for paints, coatings, engineered stone, ceramics and enamels. Dry environment also enhances stability of product (decreases speed of agglomeration). Nano silver powder has extremely high concentrations (up to 200 000 ppm).

Nanosilver is an efficient biocide against a broad spectrum of bacteria, fungi, viruses and mildews. Diameter of particles is very low (5-15 nm). It provides strong, fast and long-lasting antibacterial activity. Product exhibits high concentration and could be prepared in various forms according to the requirements of clients.

Application:

Raw material additive, composites, ceramics, enamels, paints, rubbers, gels, cosmetics.

Product code	NANOSILVER GUARD POWDER
Appearance	yellow to brown powder (depends on concentration)
Odor	none
Particles diameter (nm)	5 – 15
Silver concentration	up to 200 000 ppm
Solvents	hydrophilic or hydrophobic solvents (depends on used carrier)
Packaging	1, 5, 10, 20 L containers or other containers according to the requirements of clients
Shelf life	24 months in closed containers



NANOSILVER GUARD GC

NANOSILVER GUARD GC is colloid developed especially for gelcoat products and polymeric resins. Colloid has liquid form, and is excellent compatible with gelcoat raw materials (resins). Nanosilver is efficient biocide against broad spectrum of bacteria, fungi, viruses and mildews. Final product exhibit self-cleaning and antifouling properties (microbes don't create biofilms). It increase durability of product and give excellent hygienic properties.

Product code	NANOSILVER GUARD GC
Appearance	brown liquid
Odor	characteristic
Particles diameter (nm)	5 – 15
Silver concentration	up to 8 000 ppm
Solvents	styrene monomere
Packaging	1, 5, 10, 20 L containers or other containers according to the requirements of clients
Shelf life	12 months in closed containers

Product code	NANOSILVER GUARD CERAMIC
Appearance	yellow to brown liquid (depends to concentration)
Odor	none
Particles diameter (nm)	5 – 15
Silver concentration	up to 20 000 ppm
Solvents	deionised water
Packaging	1, 5, 10, 20 L containers or other containers according to the requirements of clients
Shelf life	12 months in closed containers

NANOSILVER GUARD CERAMIC

NANOSILVER GUARD CERAMIC is waterborne colloid developed especially for ceramic products. Colloid has liquid form, and is excellent compatible with ceramics raw materials. Nanosilver is efficient biocide against broad spectrum of bacteria, fungi, viruses and mildews. Final product exhibit self-cleaning and antifouling properties (microbes don't create biofilms). It increase durability of product and give excellent hygienic properties for tiles and sanitary products like: baths, bathtubs, sinks, toilets etc.



NANOSILVER GUARD POLYMER

NANOSILVER GUARD POLYMER is innovative masterbatch for plastics and rubber industry. Product could be prepared in various substrates: PE, HDPE, LDPE, PP, PS, PC, PVC, ABS, PLA and other. We are preparing masterbatch using our customer raw material with low-temperature gentle method. It provide excellent compatibility and don't require any changes of production process. This process does not affect the physical or chemical properties of the raw material granules.

New quality while maintaining the existing values

This new solution does not affect the aesthetics of the products and their conditions of use. There are no visible (or hidden) changes in the quality or structure of the surface. Collections and designs used in production do not require any additional modifications resulting from adding the new feature

Effectiveness

Long term use of the products does not cause the deterioration of their properties. The natural process of abrasion of the subsequent layers of the product does not affect its effectiveness, as each next layer is saturated with particles of active silver distributed throughout the product structure.

Safety and health enhacement

It is an innovative and distinctive product with new properties, dedicated for customers who are sensitive in regards to safety and hygiene. The amount of conscious customers has been growing steadily, together with the growing level of public awareness of the microbiological protection.

Product code	NANOSILVER GUARD POLYMER
Appearance	yellow to brown granules (depends to concentration)
Odor	odorless
Size (nm)	5 – 15
Silver contents	Up to 50 000 ppm
Solvent	none
Package	containers according to the requirements of clients – drum or bag
Expiration date	24 in original, closed containers, protected from sunrays





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