

PRODUCT PORFOLIO

Gold Nano Coating (“GNC”)

GNC is a technology of coating various surfaces with a thin layer containing gold nanoparticles. **Objects coated with GNC gain antibacterial properties, while being harmless to human cells.**

GNC coating has many different fields of application. The process of coating is simple and adjustable, producing very stable and durable final product. This is why GNC can be used in various sectors, like medicine, textiles, packaging, cosmetology, household goods, filtration, etc.

- **GNC** is antibacterial and non-toxic for human cells
- **GNC** is chemically stable
- **Simple and efficient** production process

GNC can cover wide range of surfaces, and therefore can be applied to many different products (medical, textiles, packaging, cosmetology, household goods, filtration etc.) granting them protection against harmful bacteria, viruses and fungi.

The main product opportunities are:

- Textiles
- Containers for pharmaceuticals and/ or cosmetics
- Filters
- Medical devices

TEXTILES

GNC applicability justification:

GNC Venture has the prototype samples of cotton fabric and cotton and wool threads modified with GNC. We confirmed their antibacterial properties against both Gram-positive and Gram – negative bacteria strains. Investigations on textiles containing nano-silver suggest, that textile products lose up to 35% of silver after the first wash. The silver ions of nano-silver are hazardous for aquatic organisms and micro-organisms in the soil. The great advantage of introducing GNC in textile industry comes from the fact, that our coating is much more durable and non-toxic for eukaryotic (human) cells.

GNC may be used as an antibacterial additive to dust mask, shoe inserts, threads or generally applied to sportswear, household goods or healthcare textile.

Unique Selling Point:

GNC coating on textile is durable and non-toxic in contact with human skin. Both features are a huge advantage in comparison to textiles with silver or copper oxide nanoparticles.

GNC performance:

Cotton and wool fibers modified with GNC were found to effectively kill viruses, fungi and both Gram –positive and Gram –negative bacteria strains by contact-kill mechanism. Our studies confirmed its antimicrobial properties against:

- Gram-positive: (*S. aureus* and *S. epidermidis*)
- Gram-negative: (*E. coli* and *P. aeruginosa*)
- and fungi such as: *Candida albicans* and *Aspergillus brasiliensis*.
- bacteriophages: *MS2* and *T4*

CONTAINERS FOR PHARMACEUTICALS AND/OR COSMETICS

GNC applicability justification:

We see a huge potential in introducing the GNC technology in the global packaging market of liquid products. A thin layer of GNC coating inside the container will prevent and/or eliminate bacteria and fungi introduced while using the product. It also limits the amount of added preservatives, which very often are the main cause of user's allergic or irritation reactions. GNC is excellent for protecting and preserving a variety of liquids in pharmaceutical and/or cosmetic sector (e.g. eye drops, natural tonics).

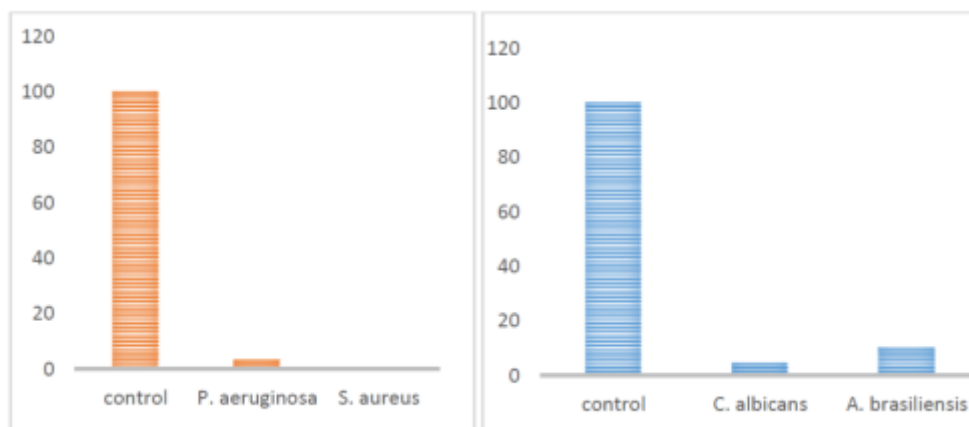
Applying GNC to the packaging used by cosmetic industry will create a new value. Packaging plays an essential role in the cosmetics market, and is regarded as the 'secret salesman'. Apart from keeping a product well protected, cosmetic packaging must follow current trends to attract beauty consumers.

Unique Selling Point:

GNC coating is durable – any toxic substance is leached from the coating in the deposition process, so there is no thread of allergic or irritation reaction and product poses excellent biocompatibility to human tissue and cells.

GNC performance:

Our prototype plastic containers covered with GNC have proven to effectively reduce bacteria and fungi level. The number of *Staphylococcus aureus* and *Pseudomonas aeruginosa* bacteria cells was reduced by 99,8 % and 96,7 % respectively within 6 hours of incubation in GNC modified plastic containers. The reduction of *Candida albicans*, a causal agent of opportunistic oral and genital infections in humans, was achieved at the level of 95% and in case of *Aspergillus brasiliensis* –fungi, which may cause lung disease – the reduction was by 89.6 %. The tests were performed at the GNC concentration of only 20% of maximal possible coverage, so there is still a lot of space for adjustment for particular needs.



Bernstein Sp. z o.o.

Website: www.bernsteinventure.com

+48 602-278-878 (Rafał Pindral – Managing Partner)

MEDICAL DEVICES

GNC applicability justification:

GNC can dramatically reduce the threat of people losing their life because of “superbugs” infections in hospitals. Only in the USA, around 100,000 patients die because of the nosocomial infections every year. Modification of critical surfaces in hospitals with GNC could significantly decrease this value. The application might be related directly with medical devices (*e.g.* stiches, catheters, implants) as well as spots often touched by the patients, *e.g.* (bedding, curtains)

Unique Selling Point:

The GNC coating is non-toxic for humans. GNC is biocompatible so it can be used for biomedical applications such as: implants, catheters or wound dressings. As GNC is not based on silver, there is no threat that its biocidal potential will be drained upon dissolution and release of free ions. The biggest advantage over the other existing solutions is that our coating acts by “contact kill” mechanism - it is a brand new kind of weapon against bacteria, that reduces the probability of bacterium gaining a secondary resistance towards it.

GNC performance:

GNC has proved its antimicrobial properties against both main types of bacteria:

- Gram-positive: (*S. aureus* and *S. epidermidis*)
- Gram-negative: (*E. coli* and *P. aeruginosa*)
- and fungi such as: *Candida albicans* and *Aspergillus brasiliensis*.

It was also well proved (by LDH test) that GNC is non-toxic for human cells listed below:

- stromal vascular fraction stem cells (SVF)
- islet of Langerhans cells (BCT6)
- human brain cells (glioblastoma, LN18)
- human liver cells (HEPG2)
- keratinocyte
- fibroblast
- chondrocyte

The possible applications in the biomedical sector may be the formation of coatings for devices that have direct contact (both short-term and prolonged) with living tissue of the patient.

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FILTER FILLERS

GNC applicability justification:

The combination of both antibacterial and antifungal properties of GNC can preferably be used in the production of cellulose (or other) filter fillers. Possibility of embedding GNC on surfaces of various supporting materials, make our technology adjustable to the parameters in accordance to the needs of the end customer. GNC filters may be used in cars, hospitals, public buildings, private houses.

Unique Selling Point:

Non-toxicity of GNC has great performance in water filtration. Simple and effective process of GNC application to various supporting materials improves the final product's environmental impact (eg. low carbon footprint).

GNC performance:

Cotton pads modified with GNC were found to effectively kill viruses, fungi and both Gram – positive and Gram –negative bacteria strains.

We kindly invite to cooperate with us

Rafał Pindral
Managing Partner

Mobile: +48 602 278 878
E-mail: pindral@bernsteinventure.com

LinkedIn:
<https://pl.linkedin.com/in/rafalpindral>

Robert Panasiuk
Managing Partner

Mobile: +48 506 472 995
E-mail: panasiuk@bernsteinventure.com

LinkedIn:
<https://linkedin.com/in/robertpanasiuk>

Bernstein Sp. z o.o.

Website: www.bernsteinventure.com

ul.Ordynacka 13/26, 00-364 Warsaw, Poland
NIP (tax numer): 525-268-45-61, KRS (court registry numer): 0000647561

Bernstein Sp. z o.o.

Website: www.bernsteinventure.com
+48 602-278-878 (Rafał Pindral – Managing Partner)