Product catalog

Gold nanoparticles made from green chemistry,
and combined with ethical gold

TORSKAL
NANOSCIENCE

Pioneer of green nanotechnology

www.torskal.com

Our company

TORSKAL is the pioneer of green nanotechnology in the world. We have developed gold nanoparticles by means of a patented and environmentally friendly process using medicinal plant extracts from the Indian Ocean to treat cancer. Our Nanotheranostics Project - NT1, a treatment for skin cancer using near-infrared (IR) radiation-induced plasmonic phototherapy consisting of these gold nanoparticles will undergo human clinical trials later in 2021.

We are committed to expanding France's influence in Asia through a joint venture from preclinical trials. The research & production of our nanoparticles are being carried out in China, Reunion Island, France, and Germany.

TORSKAL is the winner of 2021 "10000 Startups Pour Changer Le Monde" contest in the overseas category

TORSKAL is the winner of 2020 "Let's Go France" in the France abroad category

Meet our directors

Anne-Laure Morel
Founder & President

She graduated with a Ph.D. degree and worked in the valorization of research in a tax consulting firm in Paris, then in a business incubator in La Réunion. She holds a Ph.D. in Physical Chemistry from Pierre & Marie Curie University and a Master's Degree in Structural Biochemistry from the University of Bordeaux II. She completed her career with an Executive Masters from ESCP.

Virginie Simon
General Director

She trained as an engineer in biotechnology at the Technological University of Compiègne (UTC), France. In parallel, she completed BA in philosophy from the University of Nanterre. She then received her doctorate in nanotechnology for cancer therapy from the University Pierre and Marie Curie (UPMC). She has over 3 years of professional experience in a nanomedicine start-up.

Christophe Dugué
General Director - Administrative & Legal Affairs

He is responsible for regulatory affairs and holds a Ph.D. in biology. He is also graduated from CEIPI for patents and holds a master's degree in business law. Participating in the company's scientific orientations, he is responsible for the valuation of TORSKAL's intangible assets and negotiates the research contracts with the various partners.

Contents

Why TORSKAL's products?

Ethical Gold from Fairmined: We use gold sourced from Fairmined, a responsible mining community to develop our gold nanoparticles. Fairmined supports artisanal and small-scale mining organizations that practice responsible mining of gold.

Eco-designed: We use a green chemistry approach to synthesize our nanoparticles using plants endemic to Reunion Island. Our main determination is to reduce the destructive influences of synthetic processes and their associated chemicals.

More stability & purity: Our gold nanoparticles are more stable than Turkevich in a saline environment, over time, and after centrifugation. They are also of high purity with the absence of aggregation - monodispersed.

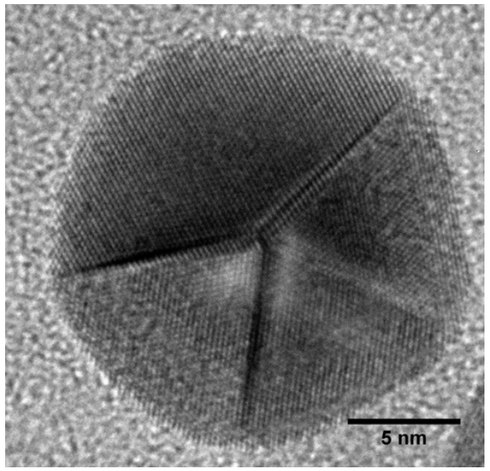
1. Spherical Gold Nanoparticles (SAuNPs) - 15nm

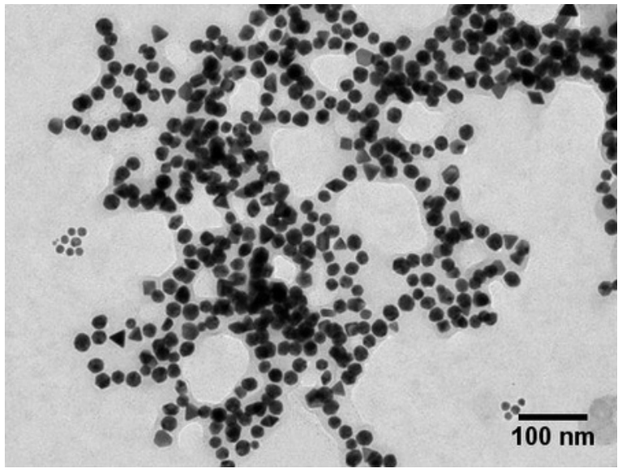
Price: From €32 - €995

(Depending on the volume and concentration)

For sterilization, additional €50 per product

Price in (€)	OD : 1	OD : 10	OD : 50
1 ml	*	55	230
5 ml	32	230	790
25 ml	85	410	*
50 ml	150	790	*
100 ml	230	995	*





Our gold nanoparticles

Product description

TORSKAL has a propriety process of gold nanoparticles using crude and/or purified extracts from plants. This eco-friendly formulation leads to nanoparticles with a high level of reproducibility of size, dispersion, and shape without hazardous reducing agents. Plants extracts have the double action of reducing the metal and stabilizing the formed nanoparticles. Obtained gold nanoparticles are purified by several washes to remove residual products. For highly concentrated formulations, gold nanoparticles remain suspended in solution and can be dispersed in other solvents or buffer even at high salt concentrations without inducing aggregation.

Each batch of gold nanoparticles is extensively characterized using techniques including transmission electron microscopy (TEM), dynamic light scattering (DLS), zeta potential, and UV-Visible spectroscopy.

Applications

- Photothermal Therapy, Photodynamic Therapy
- Diagnostics, Drug Delivery, Lateral Flow Analysis
- Light Microscopy, Darkfield Microscopy
- Electron Microscopy (TEM/SEM)
- Surface-Enhanced Fluorescence
- Surface Enhanced Raman Spectroscopy (SERS)
- Biosensors, Biomarkers, Plasmonic, Catalysis
- Nanocoating, Electronics

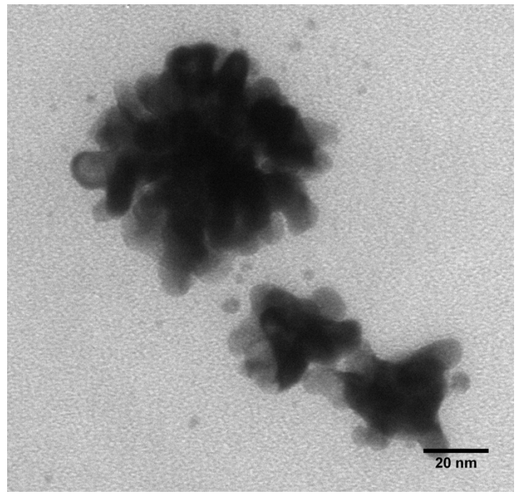
2. Gold Nanoflowers (FAuNPs) - 50nm

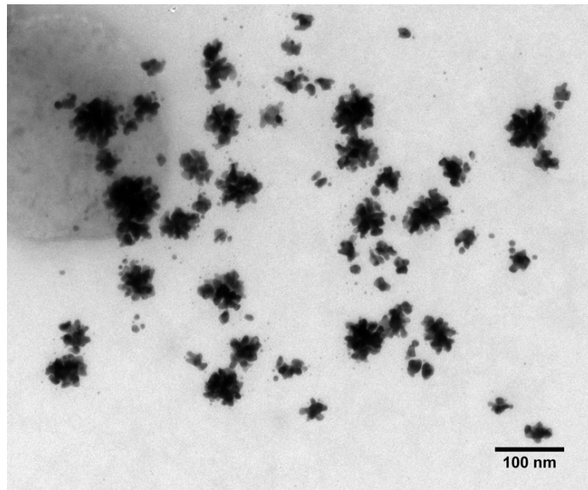
Price: From €32 - €995

(Depending on the volume and concentration)

For sterilization, additional €50 per product

Price in (€)	OD : 1	OD : 10	OD : 50
1 ml	*	55	230
5 ml	32	230	790
25 ml	85	410	*
50 ml	150	790	*
100 ml	230	995	*





Our gold nanoflowers

Product description

Gold nanoflowers are synthesized following a process patented by TORSKAL using crude and/or purified extracts from plants. This green, reproducible synthesis leads to very stable gold nanoflowers without hazardous chemicals. Plant extracts have a role in both the synthesis and stability of the gold nanoflowers. Thoroughly washed nanoflowers are suspended in water or can be dispersed in other solvents or buffers.

Each batch of gold nanoflowers is extremely characterized using techniques including transmission electron microscopy (TEM), dynamic light scattering (DLS), zeta potential, and UV-Visible spectroscopy.

Applications

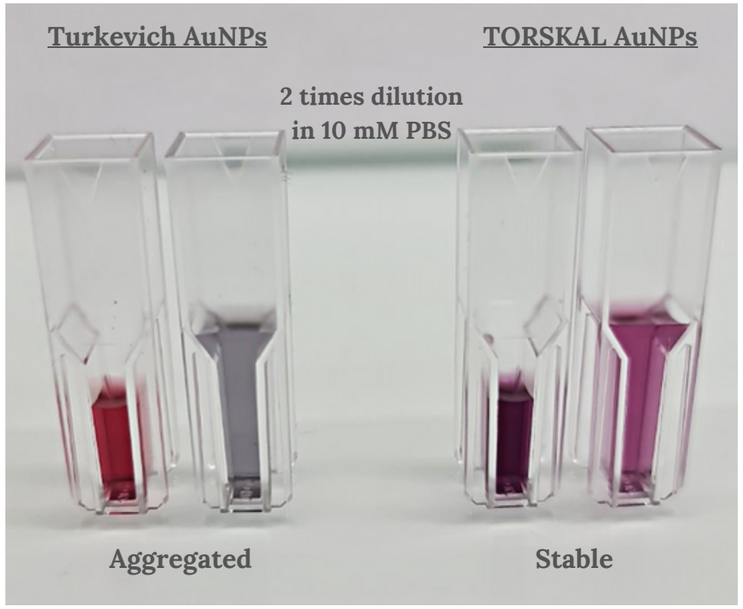
- Photothermal Therapy, Photodynamic Therapy
- Diagnostics, Drug Delivery, Lateral Flow Analysis
- Light Microscopy, Darkfield Microscopy
- Electron Microscopy (TEM/SEM)
- Surface-Enhanced Fluorescence
- Surface-Enhanced Raman Spectroscopy (SERS)
- Biosensors, Biomarkers, Plasmonic
- Catalysis, Cosmetics
- Nanocoating, Electronics

The unique properties of TORSKAL's AuNPs

- **Conformity:** We employ an eco-friendly technique for the production of well-characterized nanoparticles.
- **High stability:** For at least 3 months saving you time and wastage.
- **Salt resistance:** Stable over 0.4 M NaCl, which is 5 times higher than nanoparticles synthesized by the citrate reducing method.
- **Scalability:** Our process is very straightforward to scale up with a lower risk of contamination.
- **Biocompatibility:** Our synthesis process does not require toxic chemicals, which makes our products suitable for biomedical applications.
- **More stability & purity:** Our gold nanoparticles are more stable than Turkevich in a saline environment, over time, and after centrifugation. They are also of high purity with the absence of aggregation - monodispersed.

TORSKAL's AuNPs

Turkevich vs TORSKAL's AuNPs



Turkevich vs TORSKAL's AuNPs

The result

Since colloidal suspensions are thermodynamically unstable and tend to flocculate, the control of the aggregation of AuNPs is important to modulate their applications. For biomedical applications, poor stability can lead to a total or partial loss of their nanoscale properties, alters their cellular uptake, and modifies their bioavailability and toxicity.

Colloidal stability is a result of attractive van der Waals and repulsive electrostatic forces between particles preventing them from aggregation. The sum of these opposing forces results in a total interaction potential depending on the distance between two particles whereby the maximum is referred to as the aggregation barrier. These interactions can be influenced by environmental parameters such as pH, temperature, ionic strength, and the presence of ligands.

This experiment illustrates the high sensitivity of the coloration to compare AuNPs stability: individual AuNPs appear red/red-purple; however, when the particles aggregate together, the plasmon resonances shift, and the color changes to blue. Upon addition of PBS to Turkevich nanoparticles, the initially red color of the AuNP solution turn to blue. Salts in PBS screen the repulsive electrostatic forces caused by the citrate layer: indeed, the positive charges of the electrolyte associate with the negative charges on the surfaces of the nanoparticles. However, TORSKAL's nanoparticles showed remarkable stability in the same condition

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For bulk orders: To make any bulk orders and/or to change the concentration (OD) of the products offered, please submit your request here.

We also offer research services: To functionalize the nanoparticles or to design other nanomaterials, please submit your request here.