Product catalog

- Green gold nanoparticles designed from green chemistry
- Standard gold nanoparticles

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 2022.

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.

Content

The 2 ranges of gold nanoparticles offered by TORSKAL

- **Green gold nanoparticles – Synthesized using green chemistry**
- **Standard / Turkevich gold nanoparticles**

Green synthesized gold nanoparticles - TORSKAL has a propriety process of designing 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.

Green Gold Nanoparticles Range

Synthesized using green chemistry

Green synthesized

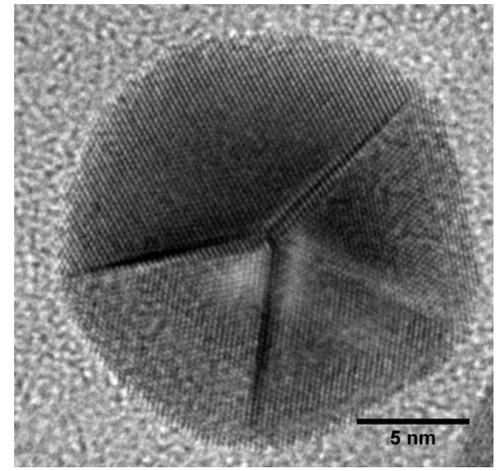
1. Spherical Gold Nanoparticles (GS-SAuNPs) - 15nm

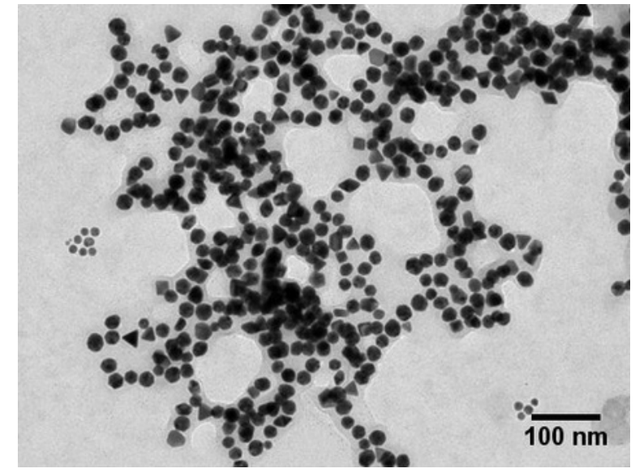
Price: From €38 - €995

FREE shipping for orders above €199 (Excluding VAT)*

For sterlization, €10 (1 & 5ml). €25 (25 & 50ml), €40 (100ml)

Price in (€)	OD : 1	OD : 10	OD : 50
1 ml	*	55	230
5 ml	38	230	790
25 ml	85	410	*
50 ml	150	790	*
100 ml	230	995	*





Spherical green gold nanoparticles (GS-SAuNPs) - 15nm

Product Specification

Parameters	OD : 1	OD : 10	OD : 50
Diameter (TEM) (nm)	14.83	Same	Same
Size disparity (+/- nm)	2.84	Same	Same
Diameter deviation	15%	Same	Same
SPR Peak	537 – 540	Same	Same
Particle concentration (NP/mL)	1.27E + 12	1.27E + 13	6.35E + 13
Mass concentration (mg/mL)	4.17E – 2	4.17E – 1	2.09E + 00
Particle molar concentration	2.19E – 9	2.19E – 8	1.05E – 07
Zeta potential (mV)	-26.2	Same	Same
Zeta potential deviation	10%	Same	Same
Particle volume (nm3)	1.71E + 3	Same	Same
Particle surface (nm2)	6.31E + 02	Same	Same
Surface/Volume Ratio	0.404	Same	Same
Solvent	Water	Same	Same
Stability	3 months	Same	Same

Green synthesized

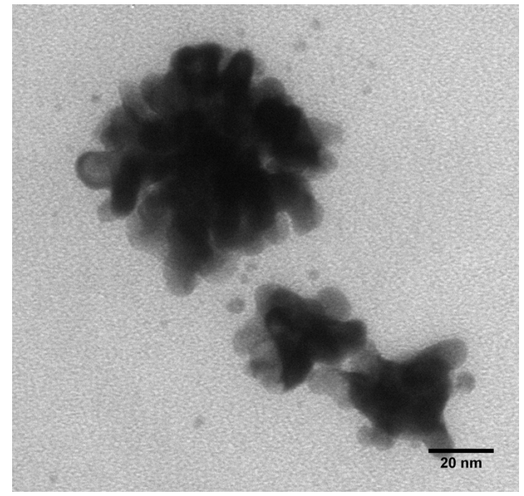
2. Gold Nanoflowers (GS-FAuNPs) - 15nm

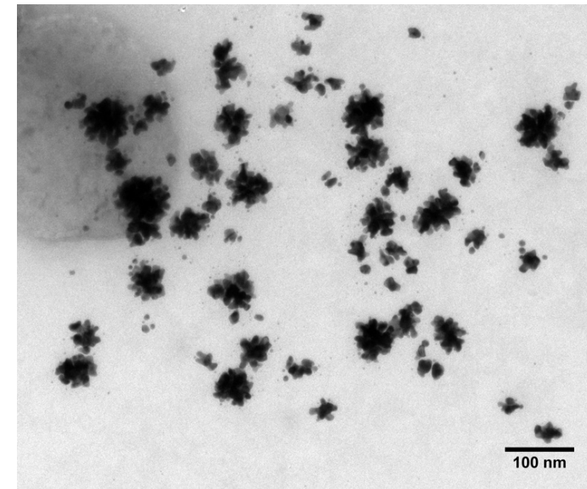
Price: From €38 - €995

FREE shipping for orders above €199 (Excluding VAT)*

For sterlization, €10 (1 & 5ml). €25 (25 & 50ml), €40 (100ml)

Price in (€)	OD : 1	OD : 10	OD : 50
1 ml	*	55	230
5 ml	38	230	790
25 ml	85	410	*
50 ml	150	790	*
100 ml	230	995	*





Green gold nanoflowers

Product Specification

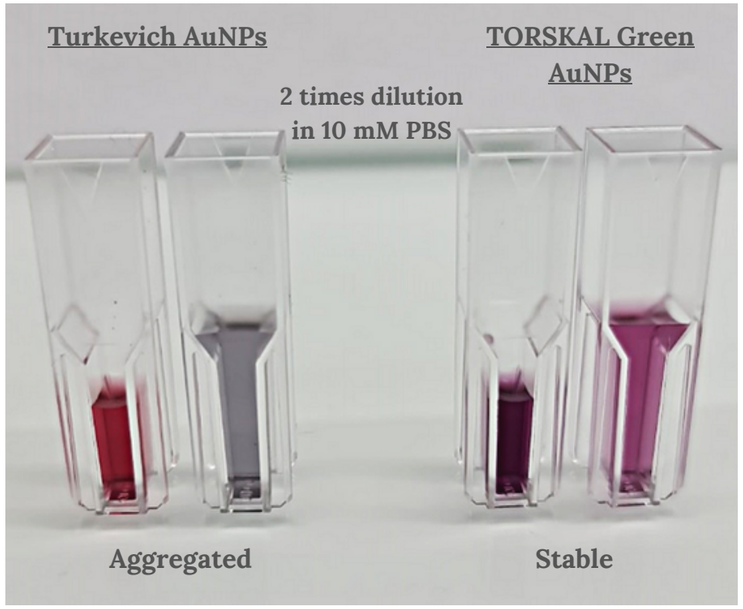
Parameters	OD : 1	OD : 10	OD : 50
Diameter (TEM) (nm)	49.57	Same	Same
Size disparity (+/- nm)	9.41	Same	Same
Diameter deviation	15%	Same	Same
SPR Peak	550 – 555	Same	Same
Particle concentration (NP/ml)	3.4E + 12	3.4E + 13	1.7E + 14
Mass concentration (mg/ml)	4.13E – 2	4.19E – 1	2.10E + 00
Particle molar concentration	5.65E – 11	5.65E – 10	2.825E – 09
Zeta potential (mV)	-33.8	Same	Same
Zeta potential deviation	10%	Same	Same
Particle volume (nm3)	6.37E + 04	Same	Same
Particle surface (nm2)	7.72E + 03	Same	Same
Surface/Volume ratio	0.121	Same	Same
Solvent	DIH = 18MEG DI Water	Same	Same
Stability	3 months	Same	Same

The unique properties of TORSKAL's green gold nanoparticles

- **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 green synthesized AuNPs

Turkevich vs TORSKAL's Green AuNPs



Turkevich vs TORSKAL's green synthesized 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, alter their cellular uptake, & modify their bioavailability & 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 green nanoparticles showed remarkable stability in the same condition**

TORSKAL NANOSCIENCE

Standard Gold Nanoparticles Range

(7 Different Sizes To Choose From)

Synthesized using Turkevich Method

**Limited Time Offer - On your entire order of standard gold nanoparticles, you get 1ml, OD:1 of our green synthesized gold nanoparticles for FREE*

Standard Gold Nanoparticles

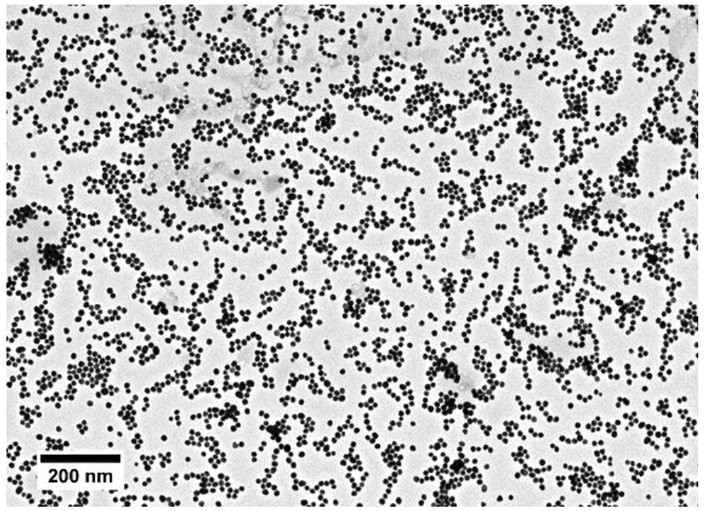
1. Gold Nanoparticles (TS-SAuNPs) 12nm

Price: From €22 - €95

*- FREE 1ml, OD:1 of our green gold nanoparticles**
- FREE shipping for orders above €199 (Excluding VAT)*

For sterlization, €10 (1 & 5ml). €25 (25 & 50ml), €40 (100ml)

Price in (€)	OD : 1
1 ml	22
5 ml	33
25 ml	44
50 ml	58
100 ml	95



Standard Spherical Gold Nanoparticles (TS-SAuNPs) - 12nm

Product Specification

Parameters	OD : 1
Diameter (TEM) (nm)	12.26
Size disparity (+/- nm)	0.48
Diameter deviation	<10%
SPR Peak	517
Particle concentration (NP/mL)	3.94E + 12
Mass concentration (mg/mL)	6.89E – 02
Particle molar concentration	6.54E – 09
Particle volume (nm3)	9.04E + 02
Particle surface (nm2)	4.52E + 02
Surface/Volume Ratio	0.5
Solvent	DIH = 18MEG DI Water

Standard Gold Nanoparticles

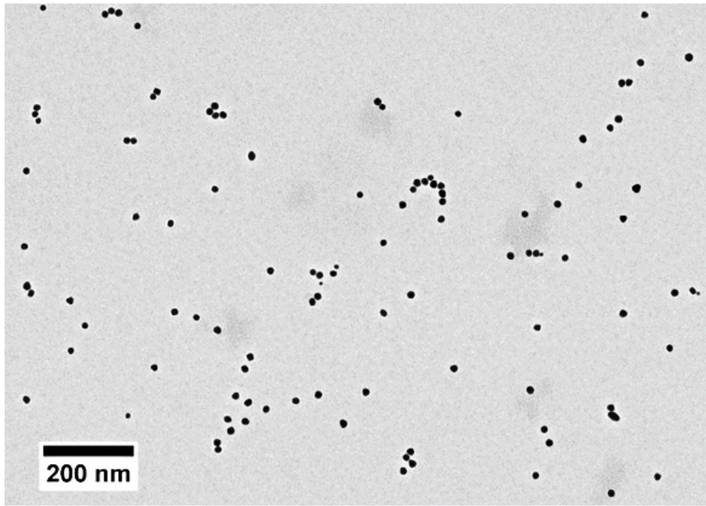
2. Gold Nanoparticles (TS-SAuNPs) 15nm

Price: From €22 - €95

*- FREE 1ml, OD:1 of our green gold nanoparticles**
- FREE shipping for orders above €199 (Excluding VAT)*

For sterlization, €10 (1 & 5ml). €25 (25 & 50ml), €40 (100ml)

Price in (€)	OD : 1
1 ml	22
5 ml	33
25 ml	44
50 ml	58
100 ml	95



Standard Spherical Gold Nanoparticles (TS-SAuNPs) - 15nm

Product Specification

Parameters	OD : 1
Diameter (TEM) (nm)	14.94
Size disparity (+/- nm)	0.66
Diameter deviation	<10%
SPR Peak	520
Particle concentration (NP/mL)	1.87E + 12
Mass concentration (mg/mL)	6.38E – 02
Particle molar concentration	3.10E – 09
Particle volume (nm3)	1.77E + 03
Particle surface (nm2)	7.07E + 02
Surface/Volume Ratio	0.40
Solvent	DIH = 18MEG DI Water

Standard Gold Nanoparticles

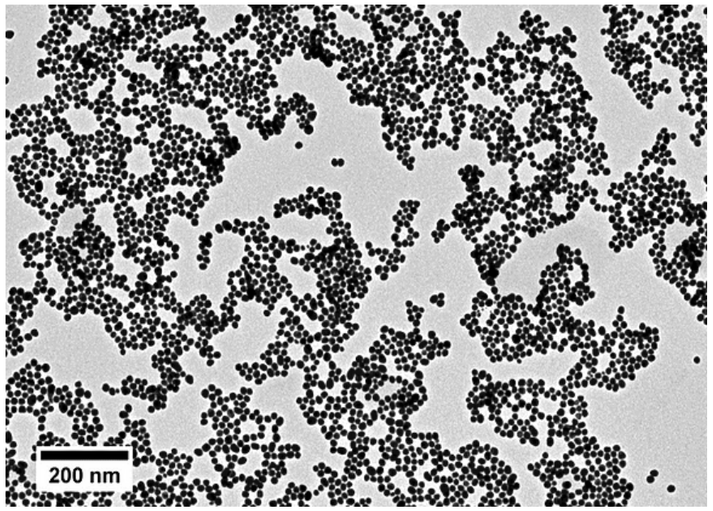
3. Gold Nanoparticles (TS-SAuNPs) 16nm

Price: From €22 - €95

*- FREE 1ml, OD:1 of our green gold nanoparticles**
- FREE shipping for orders above €199 (Excluding VAT)*

For sterlization, €10 (1 & 5ml). €25 (25 & 50ml), €40 (100ml)

Price in (€)	OD : 1
1 ml	22
5 ml	33
25 ml	44
50 ml	58
100 ml	95



Standard Spherical Gold Nanoparticles (TS-SAuNPs) - 16nm

Product Specification

Parameters	OD : 1
Diameter (TEM) (nm)	15.46
Size disparity (+/- nm)	0.75
Diameter deviation	<10%
SPR Peak	521
Particle concentration (NP/mL)	1.56E + 12
Mass concentration (mg/mL)	6.46E – 02
Particle molar concentration	2.59E – 09
Particle volume (nm3)	2.14E + 03
Particle surface (nm2)	8.04E + 02
Surface/Volume Ratio	0.38
Solvent	DIH = 18MEG DI Water

Standard Gold Nanoparticles

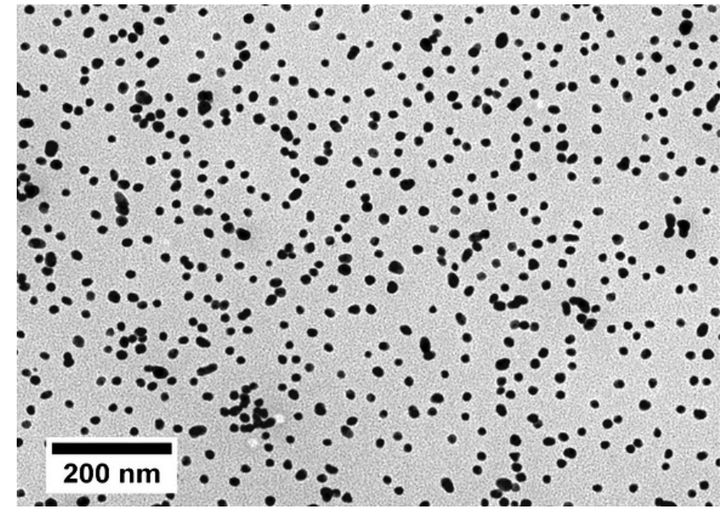
4. Gold Nanoparticles (TS-SAuNPs) 17nm

Price: From €22 - €95

*- FREE 1ml, OD:1 of our green gold nanoparticles**
- FREE shipping for orders above €199 (Excluding VAT)*

For sterlization, €10 (1 & 5ml). €25 (25 & 50ml), €40 (100ml)

Price in (€)	OD : 1
1 ml	22
5 ml	33
25 ml	44
50 ml	58
100 ml	95



Standard Spherical Gold Nanoparticles (TS-SAuNPs) - 17nm

Product Specification

Parameters	OD : 1
Diameter (TEM) (nm)	16.8
Size disparity (+/- nm)	0.78
Diameter deviation	<10%
SPR Peak	522
Particle concentration (NP/mL)	1.24E + 12
Mass concentration (mg/mL)	6.17E – 02
Particle molar concentration	2.09E – 09
Particle volume (nm3)	2.57E + 03
Particle surface (nm2)	9.07E + 02
Surface/Volume Ratio	0.35
Solvent	DIH = 18MEG DI Water

Standard Gold Nanoparticles

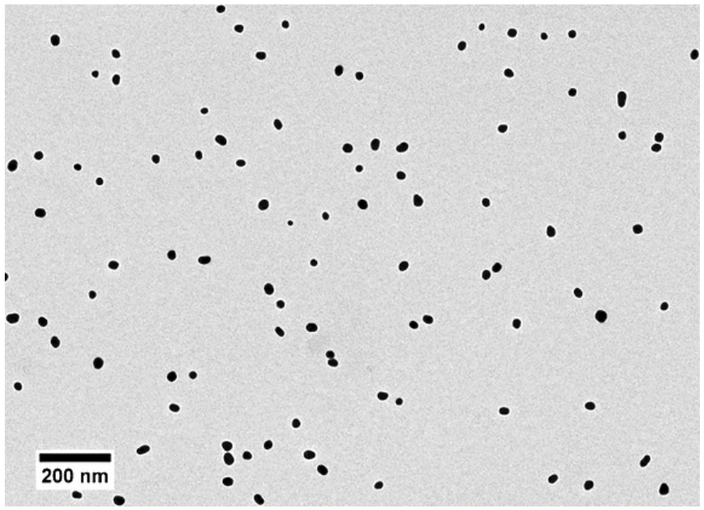
5. Gold Nanoparticles (TS-SAuNPs) 25nm

Price: From €22 - €95

*- FREE 1ml, OD:1 of our green gold nanoparticles**
- FREE shipping for orders above €199 (Excluding VAT)*

For sterlization, €10 (1 & 5ml). €25 (25 & 50ml), €40 (100ml)

Price in (€)	OD : 1
1 ml	22
5 ml	33
25 ml	44
50 ml	58
100 ml	95



Standard Spherical Gold Nanoparticles (TS-SAuNPs) - 25nm

Product Specification

Parameters	OD : 1
Diameter (TEM) (nm)	24.82
Size disparity (+/- nm)	1.53
Diameter deviation	<10%
SPR Peak	525
Particle concentration (NP/mL)	3.19E + 11
Mass concentration (mg/mL)	5.03E – 02
Particle molar concentration	5.29E – 10
Particle volume (nm3)	8.18E + 03
Particle surface (nm2)	1.96E + 03
Surface/Volume Ratio	0.24
Solvent	DIH = 18MEG DI Water

Standard Gold Nanoparticles

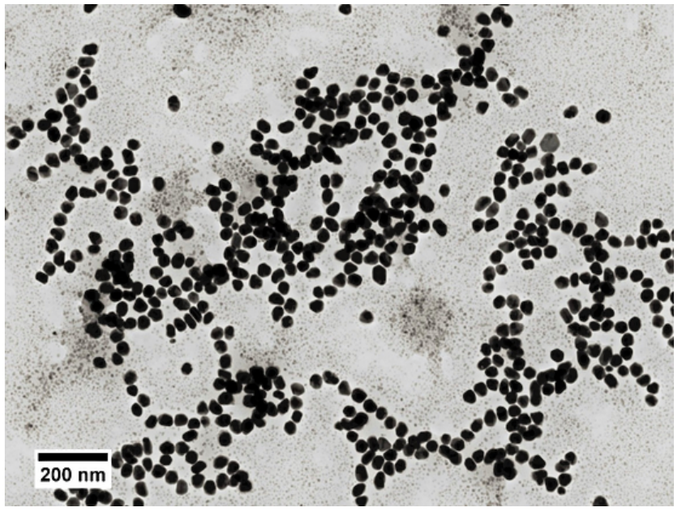
6. Gold Nanoparticles (TS-SAuNPs) 35nm

Price: From €22 - €95

*- FREE 1ml, OD:1 of our green gold nanoparticles**
- FREE shipping for orders above €199 (Excluding VAT)*

For sterlization, €10 (1 & 5ml). €25 (25 & 50ml), €40 (100ml)

Price in (€)	OD : 1
1 ml	22
5 ml	33
25 ml	44
50 ml	58
100 ml	95



Standard Spherical Gold Nanoparticles (TS-SAuNPs) - 35nm

Product Specification

Parameters	OD : 1
Diameter (TEM) (nm)	35.46
Size disparity (+/- nm)	1.28
Diameter deviation	<10%
SPR Peak	530
Particle concentration (NP/mL)	1.05E + 11
Mass concentration (mg/mL)	4.55E – 02
Particle molar concentration	1.74E – 10
Particle volume (nm3)	2.24E + 04
Particle surface (nm2)	3.85E + 03
Surface/Volume Ratio	0.17
Solvent	DIH = 18MEG DI Water

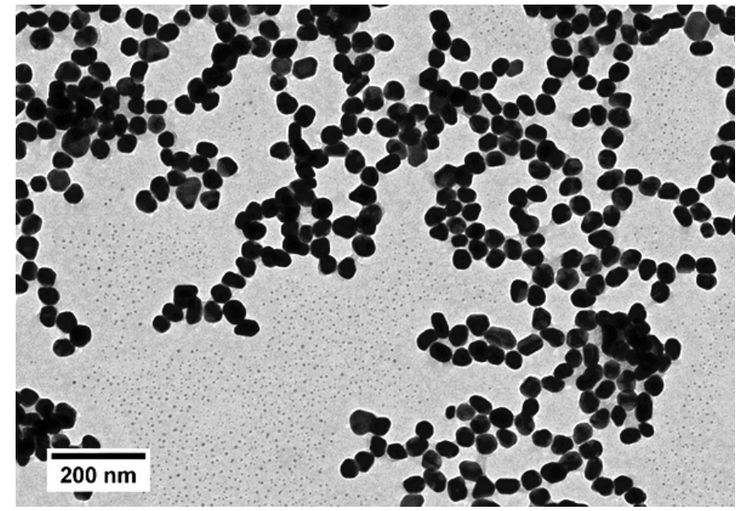
7. Gold Nanoparticles (TS-SAuNPs) 40nm

Price: From €22 - €95

*- FREE 1ml, OD:1 of our green gold nanoparticles**
- FREE shipping for orders above €199 (Excluding VAT)*

For sterlization, €10 (1 & 5ml). €25 (25 & 50ml), €40 (100ml)

Price in (€)	OD : 1
1 ml	22
5 ml	33
25 ml	44
50 ml	58
100 ml	95



Standard Spherical Gold Nanoparticles (TS-SAuNPs) - 40nm

Product Specification

Parameters	OD : 1
Diameter (TEM) (nm)	40.58
Size disparity (+/- nm)	2.42
Diameter deviation	<10%
SPR Peak	537
Particle concentration (NP/mL)	7.33E + 10
Mass concentration (mg/mL)	4.74E – 02
Particle molar concentration	1.22E – 10
Particle volume (nm3)	3.35E + 04
Particle surface (nm2)	5.02E + 03
Surface/Volume Ratio	0.15
Solvent	DIH = 18MEG DI Water

Combo Packs - Gold Nanoparticles

(4 Different Combo Packs To Choose From)

Combo Pack 1

Green Synthesized & Turkevich Synthesized Gold Nanoparticles - 15nm

GS - SAuNPs 15nm TS - SAuNPs 15nm

Price: From €55 - €109

- FREE shipping for orders above €199 (Excluding VAT)*

For sterlization, €10 (1 & 5ml). €25 (25 & 50ml)

Price in (€)	OD : 1
5 ml	55
25 ml	109

- 15nm of TORSKAL's green synthesized gold nanoparticles and Turkevich synthesized gold nanoparticles are combined in a convenient pack for testing suitability, and stability during your protocol development.

Combo Pack 2

Standard Gold Nanoparticles Introduction Pack - 12nm, 17nm, 25nm, 40nm

12nm 17nm 25nm 40nm

Price: From €75 - €149

*- FREE 1ml, OD:1 of our green gold nanoparticles**
- FREE shipping for orders above €199 (Excluding VAT)*

For sterlization, €10 (1 & 5ml). €25 (25 & 50ml)

Price in (€)	OD : 1
1 ml	75
5 ml	112
25 ml	149

Combo Pack 3

Standard Gold Nanoparticles (Small-range size) - 12nm, 15nm, 17nm

Price: From €56 - €112

*- FREE 1ml, OD:1 of our green gold nanoparticles**
- FREE shipping for orders above €199 (Excluding VAT)*

For sterlization, €10 (1 & 5ml). €25 (25 & 50ml)

Price in (€)	OD : 1
1 ml	56
5 ml	84
25 ml	112

Combo Pack 4

Standard Gold Nanoparticles (Medium-range size) - 25nm, 35nm, 40nm

Price: From €56 - €112

*- FREE 1ml, OD:1 of our green gold nanoparticles**
- FREE shipping for orders above €199 (Excluding VAT)*

For sterlization, €10 (1 & 5ml). €25 (25 & 50ml)

Price in (€)	OD : 1
1 ml	56
5 ml	84
25 ml	112

Contact us

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For general queries: contact@torskal.com

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.