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Synthesis of Nanogold and Stability Test of This Colloidal as Essential Material in Drug, Supplement and Cosmetics

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Abstract: ***Nanogold has been used in cosmetics material as anti-aging and sunscreen. Nanogoldwasan activity to reduction free radical. Nanogold reduced wrinkles and aging, support tissue connecting, increase cell proliferation and increase collagen biosynthesis. Nanogold used essential drug material at degenerate deses for example cancer, diabetes mellitus, tumor and ect. This research purposedto synthesis of nanogoldand analysis of stability nanogold colloidal. Nanogold synthesis used glycerin as matrix. The value of stability thenanogold colloidal to be analysis at 6 weeks with 5, 10, 15, 20, 25 and 30 ppm of concentration. The results of the research, the stability ofnanogold colloidal occur after 5 weeks at 5, 10, 15, 20 and 25 ppm. Nanogold colloidal at 30 ppm of concentration was not stabile,becausethere aggregation. Conclude that nanogold colloidal with 5, 10, 15, 20 and 25 ppm of concentration are recommended as support material in drug, supplement, and cosmetics.***

Keywords: nanogold, synthesis, stability, drug, supplement, cosmetics.

1. Introduction

Nanogold is a small object composed of gold and, which has one, two or three dimensions on the nanoscale, i.e., a sheet, a rod, or a particle. Nanogold refers to the gold moiety alone, while nano-construct infers a moiety that consists of a core of nanogold to which has been adsorbed or covalently bound a biomolecule or xenobiotic (drug, therapeutic, analytic), forming a more or less defined overall structure. A nanogold construct formulation defines the character and often the propertions of bound entities to the nanoscale gold core. Whether biomolecules or drugs were build bound physically or chemically to the gold surface (1). Modern medicine has begun evaluating the use of nanogold in medicine and many specific functional studies of nanogold (2).

Potential activity of nanogold are cellular trafficking (3), drug delivery (4) and optimization in building multi-component nano-construct, their efficacy for gene regulation (5). Once nanogold is exposed to any protein-containing biological fluids, that protein readily adsorb or may covalently bind to surface gold atom via sulfur-gold bonds (6). The simple application of nanogold in therapies as adducts in photo-thermal method to cancer therapies (7).

There have been many investigations of interaction both nanogold and biomolecule substituent. These interactions have largely for two reasons. Firstly, non-specific binding of biomolecules (over-binding) will mask any directing peptides or antibodies that have been specifically bound in order to direct the nano-construct for in vitro or in vivo targeting, and interfere with specificity of that targeting. Secondly, non-conjugated nanogold appears to be unstable and will readily aggregate. Thus, specific capping of nanogold using bio-molecules improves both nanoconstructstability and retains at least partially, the capacity for targeting (1).

Nanogold has been used in cosmetics material as anti-aging because nanogold has activity to reduction free radical (8).Free radical destruct tissue connecting, cell and collagen. This activity caused wrinkles and aging, degenerate deses for example cancer, diabetes mellitus, tumor and ect. The in-vitro test used artificial free radical diphinylphikrylhidracyl (DPPH) results that nanogold 5, 10, 15, 20, 25, 30, 35 and 40 ppm reduction DPPH 47.66%, 52.02%, 56.14%, 56.85%, 66.27%, 52.34%, 47.11% and 35.15% (8).The pre-clinical test used mice (*MusMuscullus)*, nanogold increased cell proliferation and biosynthesis of collagen (9).These test are support the using of nanogold as medicines, cosmetics and food supplement.

Nanogold has high activity as catalyst inmany chemical reaction and mechanism (10). Nanogold acts upon the pituitary gland, inducing an increase in hormonal production, and is thus a rejuvenating agent. Nanogoldhas reduced inflammation in rheumatic arthritic deses (11). These acts caused that nanogold recommended for drug and medicinal purposes. The other acts nanogold strengthens the heart, enhances the production of red blood cells in the bone marrow and increases the production of semen. Nanogold-peptide nanoconjugates are a useful platform for intracellular delivery of therapeutics (6).

Nanogold helps to develop keen insight and psychic abilities that this acts support using of nanogold as supplement or Food Additives. Nanogold can serve as colorings for cakes, candies, coats of chocolate and alcohol. It can be added into alcohol to make new wine mellow and reduce aldehyde quantity, thus decreasing the human body's absorption of toxic ethanol and thereby avoiding hangovers. It can also reduce the spiciness in alcohol, making it soft and mellow. Gold nanoparticle is the non-toxic form of Gold. It also occurs naturally in volcanic soils, seawater and in minute amounts in the purple or violet skins of fruits and vegetables

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and some medicinal plants such as red grapes, eggplant and violets. Nanogold had catalysis activity in many biologicals process and biochemistry in the living (12). In recent years, Nanogold was known and used in the Pharmacopoeia of Western Medieval Alchemy. Standard Therapeutic Dosage recommendation for adults: one tea cup 5.0 oz. (150 mL) of 10 ppm Colloidal nanogold morning and / or evening to be administered sublingually (hold each sip under the tongue for one to two minutes before swallowing) for treatment of serious health conditions until symptoms disappear. This can be taken for a few weeks at a time as directed by your health care provider. As a nutritional supplement one to two tablespoons morning / bedtime for prolonged periods of time. Nanogoldwas increases body stamina, increases and balances the production of hormones, thus being useful for the purpose of rejuvenation (13).

Cellular uptake mechanism of nanogold supported with anionic or hydrophobic substituent in cells traffic nano-construct system. Including substituent in the system cell is glutathione which as endogenous antioxidant. Nanogold constructed glutathione to working together and building synergies effect (14). These effects cause antioxidant activity increase in the long time. The other hand the body or cells have higher endurance system to survive from many deses. Nanogold is helpful in the treatment of Parkinson's disease and many other brain degradation conditions. Reduced tremors and increased face expressiveness are among the most frequent victories against this unforgiving health problem. Nanogold can also be used to relieve pain in patients with Rheumatoid Arthritis and Huntington's and type 2 diabetes. It cures serious types of fever, particularly chronic fever, nervous disorders, heart disease, tuberculosis, afflictions of voice, schizophrenia, epilepsy, hysteria, bronchitis, asthma, chronic diarrhea, serious types of anemia and cancer (15).

It is necessary to know about stability of nanogold colloidal. Nanogold used as safety cosmetics pigment in many cosmetics product (16). Nanogold used in cosmetics as anti-aging materials. Nanogoldcan be support the cell proliferation and collagen biosynthesis in tissue of skin. Nanogoldwas support sunscreen activity of cynnamate derivate in cosmetics formulation (17).

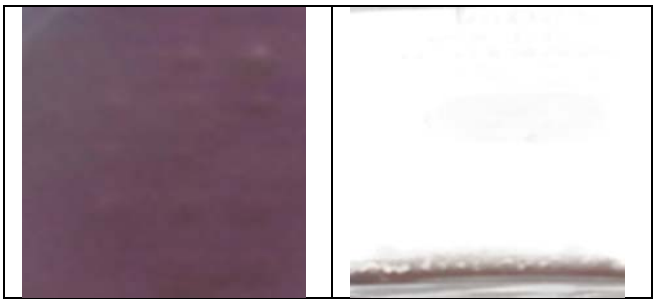


Figure 1: The differents stabil and un-stabil kolloidal gold.

Nanogold had synthesized in wool matrix as safety colorants in cosmetics, textile and many products (18).This research purposed to synthesis of nanogold and analysis of stability nanogold colloidal. It is important to measure value of nanogold stability, because the character of nanogold colloidal is very unstabile. The phenomena can see at Figure1 that different condition of stabile nanogold and un-stabile nanogold. This research was to be done for prepare the materials to be able as material product in industry. Nanogold synthesis used glycerin as matrix. The function of glycerin is support colloidal stability. The stability of nanogold colloidal was to be analysis at 6 weeks with 5, 10, 15, 20, 25 and 30 ppm of concentration.

2. Material and Method

Base Materials is $HAuCl_4$ Solution 1000 ppm concentration are colored yellow. Sodium citrate is reducing agent and glycerin as matrix. The reaction to be done in aqua base, with boiled process in temperature 100°C. Starting prepare glass instruments backer glass 300 ml. (100-x) ml of distilled water is heated up to boiling. Added x ml $HAuCl_4$ Solution 1000 ppm concentration (x= 0.5, 1.0, 1.5, 2.0, 2.5 and 3.0 ml) to get colloidal gold 5, 10, 15, 20, 25 and 30 ppm. Add Sodium Citrate in every solution, than coloring change happen was Yellow, no color, blue, red, red of grape. The solution was change to be colloidal or colloid in the synthesis process.

3. Result and Discussion

The results of this research or synthesis is colloidal gold with color is red of grape series. The analysis of colloidal gold color used UV-Vis instrument with resulted dates are λ maximum absorption and Absorbance value.The measurement repeat every week for 6 weeks. The stability of colloidal gold showed that Absorbance value and λ maximum absorption are constant. Absorbance value is expression of nanogold concentration in the colloidal system. The Absorbance high if the concentration is increase. λ maximum absorption is expression of cluster diameter. If the cluster diameter bigger, the λ maximum absorption move to big value.

Table 1: The Relationship of λ Maximum and concentration of nanogold at different week

Concentration of nanogold	*λ (nm) at Week*					
	1	*2*	*3*	*4*	*5*	*6*
5 ppm	524.20	524.00	525.80	524.80	525.80	525.80
10 ppm	521.60	522.80	523.00	525.40	523.60	525.80
15 ppm	524.40	524.20	526.80	528.20	530.60	528.60
20 ppm	523.60	524.40	526.80	527.20	530.00	528.20
25 ppm	520.20	523.20	525.80	525.60	529.00	526.00
30 ppm	526.00	527.20	527.40	528.60	530.40	531.20

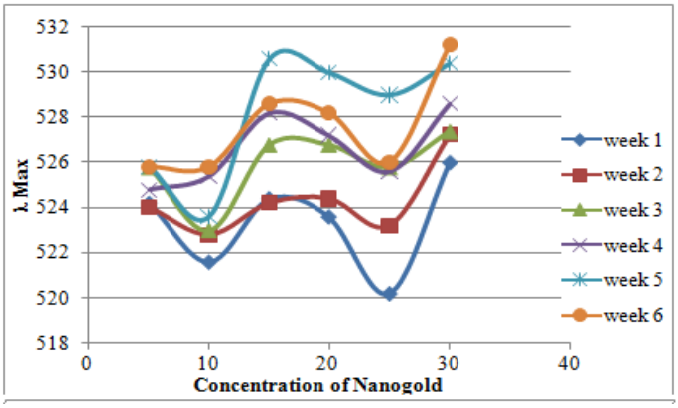


Figure 2: The Graphic of λ Maximum versus concentration of nanogold at different week

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Figure2. Show thatthe clusters diameters are smaller at 1 week than 2 weeks. The big cluster absorption the light with big wave length (λ) too. On the other hand at 3 weeks the clusters diameters bigger than the clusters diameters at 2 weeks. In common, the clusters diameters are bigger at long time, except at the 5 weeks. These are acts that cluster forming occur a long time. After 5 weeks the clusters diameters stop aggregation. These phenomena were mind that cluster forming equilibrium to be coming. Next, suggest that nanogold colloidal used after 5 weeks as essential material in the formulation of drug, supplement and cosmetics.

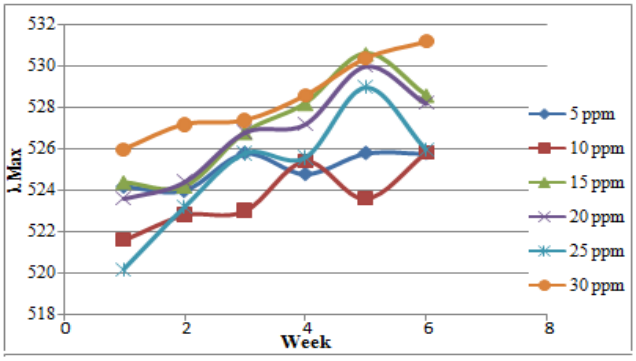


Figure 3: The Graphic of λ maximum absorption of nanogold versus week at variance concentrate

In detailed, nanogoldat every concentrate has different character showed in the Figure3. Nanogold at 5 ppm stabile at 3 weeks, the aggregation of cluster was stopped. Nanogold 10 ppm stabile at 4 weeks, than nanogold 15 ppm stabile after 5 weeks. On the other hand nanogold 20 and 25 ppm stabile at 5 weeks too.Nanogold 30 ppm was not stabile at 6 weeks. The diameter of cluster nanogold 30 ppm was continuous aggregation. The clusters diameters of nanogold 30 ppm were bigger and bigger at a long time. Than not suggested that nanogold 30 ppm used in formulation of drug, supplement and cosmetics.

Table 2: The Relationship of Absorbtion and Concentration at different week

Concentration of nanogold	*Absorption (A) at Week*					
	1	*2*	*3*	*4*	*5*	*6*
5 ppm	0.111	0.109	0.118	0.100	0.082	0.084
10 ppm	0.240	0.237	0.227	0.193	0.202	0.184
15 ppm	0.341	0.394	0.355	0.325	0.332	0.291
20 ppm	0.408	0.365	0.291	0.271	0.266	0.254
25 ppm	0.452	0.407	0.330	0.303	0.311	0.306
30 ppm	0.554	0.470	0.404	0.341	0.305	0.294

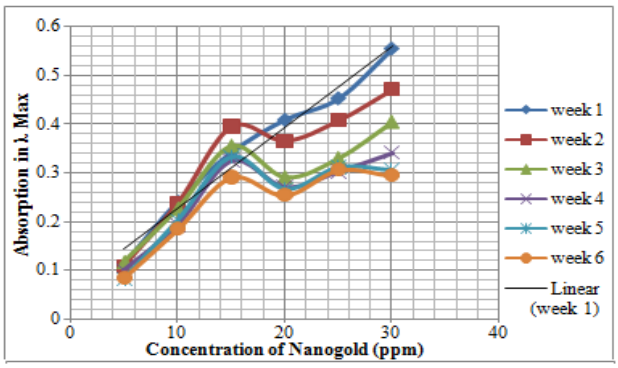


Figure 4: The Graphic of Absorption versus concentration of nanogold every week.

The concentration of nanogold in colloidal system was decrease for 6 weeks showed in Figure4. Decreasing the nanogold concentration was show by decreasing of absorbance value. These phenomena were support that the aggregation process was continuous for a long time. The aggregation process cause the nanogold clusters get out colloidal system and falling down in base of system. In other hand the concentration of nanogoldin the colloidal system continuous decrease. The characteristic of colloidal system showedby differences the graph in Figure4. Theinformation get from Figure4 was concentration change processcontinuous at 1-4 weeks. These phenomena show that the stability of colloidal was not yet occur. The aggregation process was continuous occur for 4 weeks. After 5 weeks these phenomena stopped, the clusters diameters not were bigger and bigger. The characteristic of graph at 5 weeks and 6 weeks were not increase again but were decrease. The Equilibrium of concentration nanogold in the colloidal system was come at 5 weeks. This information is match with information showed on Figure1that colloidal system of nanogold stabile at 5 weeks and recommended to form the formulation of drug, supplement and cosmetics.

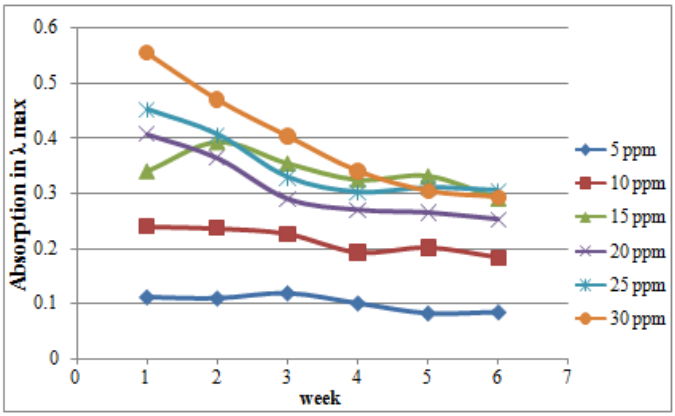


Figure 5: The Graphic of λ Max Absorption versus week at variance concentrate

Actually, nanogold at every concentratehave an stability by different character. Nanogold 5 ppm and 10 ppm have stabile faster with absorbance value change was a little for a long time. It was showed by relative flat-graph.The more high concentrationhad graph-pole with sharp decreasing. It was showed that colloidal was not stabile. These were happen at nanogold 15, 20 and 25 ppm. Sharpest decreasing was happen at 30 ppm of nanogold. This graph show that nanogold at 30 ppm very not stabile and not recommended used in commercial formulation.

4. Conclusion

Nanogold had been synthesized with glycerin as matrix. The function of glycerin is increase colloidal stability. The stability of nanogold colloidal synthesized with glycerin occur on 5 weeks. The nanogold colloidal 5, 10, 15, 20 and 25 ppm of concentration have high stability. These parameters of nanogold suggest as essential material in product. Nanogold colloidal at 30 ppm of concentration is not stabile and form aggregation. It is not recommended as essential material. Conclude that nanogold colloidal with 5, 10, 15, 20 and 25 ppm of concentration are recommended as

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support material in drug, supplement, and cosmetics after 5 weeks.

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