

Research Article

Determination of Physicochemical Properties of Silver Life Colloidal Water

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Abstract: **Aim:** inorganic nanoparticles exhibit both physical, chemical and biological properties with much interest in a broad spectrum of applications including the area of pharmaceutical and non-pharmaceutical products. One such nanoparticle is colloidal silver water. But there are safety concerns of colloidal silver water. Most of the augments are diverted to the long term usage. The aim of this research article is to examine the physical and chemical properties of Silver Life colloidal water to be used as homeopathic antibiotic in Ghana manufactured by Edigaf Services. **Method:** Six (6) Samples of the said product was sent for analysis at Kwame Nkrumah University of Science and Technology (KNUST), Ashanti region, Ghana to the Departments of Theoretical & Applied Biology/Environmental Science and Chemistry for the physicochemical analysis. The sample was compared to Raw Water for assessment. **Result:** It was found, that the examined sample of colloidal silver water and Raw Water both meet the physicochemical quality requirements for drinking water based on the WHO and Ghana Standards GS 175-1:2009 for drinking water quality parameters. **Conclusion:** The sample Silver Life Colloidal water is therefore safe to be used as homeopathic antibiotic product in Ghana and also free from heavy metals.

Keywords: Homeopathic, Antibiotic, Colloidal silver, Silver Life Water, Raw Water.

INTRODUCTION

The most significant myth about silver is that it is neither safe nor effective for public consumption. The research on colloidal silver water safety is mixed with FDA issuing several warnings against products with silver. According to Gnat Ignatov and Oleg Mosin (2015) Silver (Ag) –is a metal with an atomic mass of 107. 87 a.u.e. related to the sub-group of the first group of the periodic system of D.I. Mendeleev, has a pronounced physiological effect on the body, and is resistant to atmospheric oxygen at room temperature.

Hans Laroo (2013) also postulates that Colloidal silver consists of loose silver atoms forced by the tensions of the water to adhere into clusters in suspension. Accordingly, to refer to nano sized colloidal silver clusters as being metallic, is incorrect.

The heavy metal contents of colloidal silver has been a major subject of the toxicity studies. The big

question is whether silver is a heavy metal, what is the right dosage and will product of such nature have a long term effect on humans? This current paper examines the physicochemical constituents of colloidal silver life water as homeopathic antibiotic and immune care in Ghana.

METHODOLOGY

Six (6) samples of the Colloidal Silver Water in an 750ml Brown Plastic Bottle were sent to the Kwame Nkrumah University of Science and Technology, KNUST, Ashanti region, Ghana to the Departments of Theoretical & Applied Biology/Environmental Science and Chemistry for analysis. This is in line with the FDA in Ghana requirement of product registration. The product, Colloidal Silver Water was compared to Raw Water in the lab and results shown below:

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PHYSICOCHEMICAL ANALYSIS

Table 1 Physicochemical property of SILVER LIFE COLLOIDAL SILVER Water and Raw Water samples

	Colloidal Silver Water	Raw Water	Ghana Water Standards GS 175-1:2009
pH	8.50	7.23	6.5-8.5
Total Dissolved Solids (TDS) mg I ⁻¹	0.05	0.10	1000
Carbonate Hardness (mg I ⁻¹)	100.00	26.00	200
Total Hardness (mg I ⁻¹)	8.20	13.03	500
Magnesium Hardness (mg I ⁻¹)	2.20	4.28	N/A
Aluminum Hardness (mg I ⁻¹)	0.01	0.19	0.2
Colour (HV)	1.00	1.23	15 TCU
Turbidity (NTU)	0.10	0.14	5 NTU
Calcium (mg I ⁻¹)	0.06	0.15	40
Magnesium (mg I ⁻¹)	0.02	0.08	N/A
Sodium (mg I ⁻¹)	1.08	4.87	200
Potassium (mg I ⁻¹)	0.44	0.53	N/A
Chloride (mg I ⁻¹)	28.40	28.69	250
Sulphate (mg I ⁻¹)	7.00	10.00	250
Bicarbonate (mg I ⁻¹)	122.00	36.44	
Phosphate (PO ₄) (mg I ⁻¹)	0.01	0.07	N/A
Alkalinity (mg I ⁻¹)	100.00	26.00	200
Antimony (mg I ⁻¹)	Nil	Nil	0.02
Arsenic (mg I ⁻¹)	Nil	Nil	0.01
Barium (mg I ⁻¹)	Nil	Nil	0.70
Borate as Boron (mg I ⁻¹)	Nil	Nil	0.50
Cadmium (mg I ⁻¹)	Nil	Nil	0.003
Chromium (mg I ⁻¹)	Nil	Nil	0.05
Cyanide (mg I ⁻¹)	Nil	Nil	0.07
Sulphide (mg I ⁻¹)	Nil	Nil	N/A
Fluoride (mg I ⁻¹)	0.05	0.14	1.50
Lead (mg I ⁻¹)	Nil	Nil	0.01
Manganese (mg I ⁻¹)	0.004	0.008	0.40
Mercury (mg I ⁻¹)	Nil	Nil	0.006
Nickel (mg I ⁻¹)	Nil	Nil	0.07
Total Iron (mg I ⁻¹)	0.09	0.26	1.00
Nitrate (mg I ⁻¹)	0.06	0.10	50.00
Nitrite (mg I ⁻¹)	0.03	0.06	3.00
Residual Free Chlorine (mg I ⁻¹)	0.02	0.09	0.50
Selenium (mg I ⁻¹)	Nil	Nil	0.01
Suspended Solids (SS) (mg I ⁻¹)	Nil	Nil	N/A

RESULT

The Raw water and SILVER LIFE COLLOIDAL SILVER Water samples both meet the physicochemical quality requirements for drinking water based on the WHO and Ghana Standards GS 175-1:2009 for drinking quality parameters.

DISCUSSION

In one article (Safety and Toxicity of Colloidal Silver), the EPA has, for health purposes, established a daily oral reference dose (RfD) for silver over a 70-year study performed on adults of an average 70 kg in weight. This RfD is 350 micrograms of silver per day. Based on this guidance, any silver over 50 ppm would

put consumers above the established RfD taken once a day, and only a 10 ppm can be taken up to 7 times a day, but still be below the RfD:

The total of all forms of silver exposure is used when determining any potential safety risks. For example, if you drink, on a daily basis, 350 micrograms of shavings from a metal cup, it is just "as safe" as drinking 350 micrograms of inactive colloidal silver, or 350 micrograms of ionic silver, or 350 micrograms of silver hydrosol. While the safety profile is the same in each of these cases, the efficacy is drastically different between the four (Safety and Toxicity of Colloidal Silver). However, it is to be stated that, too much of

everything is also bad, but the effectivity of the product should not be overlooked.

Heavy metal is not clearly defined. On the other hand, they are referred to metals that are well-thought-out toxic to humans, even in low doses (e.g., mercury). Theoretically, silver (Ag) is recorded as a “transition metal” on the periodic table. There are other metals also listed as transition metals which includes nutritional minerals such as chromium, copper, zinc and iron. They are theoretically nutrients well-thought-out vital to human wellbeing, in the proper form and dose. Form and dose are key!

The PH of the colloidal silver water is also high 8.50 compared to the neutrality of Raw water at 7.23(Tab 1) in the lab. In the lab, it is also evident that the colloidal silver life water has very high alkalinity content 100.0 (mgL-1) compared to Raw Water at 26.0 (mgL-1). This represents about four times the alkaline nature of Raw Water. It is also evident that heavy metals such as : Antimony, Barium, Borate as Boron, Chromium, Cadmium, Cyanide, Sulphide, Lead, Mercury, Nickel and other suspended soiled are free from the Colloidal Silver Life Water manufactured by Edigalf compared to the Raw Water in the lab(Tab 1). All other essential minerals in the Colloidal Silver Life Water by Edigalf as compared to the Raw water in the Lab are of very low value compared to the Raw Water (Tab 1).

CONCLUSION:

The Product Colloidal silver life is very safe and meet both WHO and Ghana Standard for drinking water. The dose of 10ppm is within the acceptable level

of silver products based on the Environmental Protection Agency Report and is also free from heavy metals. The author of this research paper therefore recommends Colloidal Silver Water by Edigalf with concentration of 10ppm which falls within the safe grade of the EPA to be taken 2teaspoonful(10ml) three times (3x) daily which gives a power dose of 300mcg less than the 350mcg by the report.

Conflict of Interest

The author of this paper reports no conflict of interest

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