# Colloidal Silver

## DESCRIPTION

Silver is a metallic element with atomic number 47 and atomic symbol Ag. It occurs in nature in ores and as a free metal and is also found in living matter. Ultratrace amounts of silver occur in the diet. The daily dietary intake of silver from food and water is approximately 300 micrograms. However, silver is not an essential nutrient for humans. Nor does it appear to be essential for any living organism.

Silver is highly toxic to most microbial cells and can be used as an antimicrobial agent. Silver-containing compounds, such as silver sulfadiazine, which has broad antimicrobial as well as antifungal activity, and silver nitrate, are used in medicine as topical agents. Colloidal silver is a suspension of extremely small silver particles and was used in medicine until the 1940s as both a topical and an internal antiseptic. Colloidal silver was also known as argentum colloidale, argentum credé and collargolum. Argentum is Latin for silver.

Colloidal silver no longer has a role in medicine but reappeared in the 1990s as a nutritional supplement. Neither colloidal silver nor any form of silver has any valid role in nutrition as a nutritional or dietary supplement.

## ACTIONS AND PHARMACOLOGY

### ACTIONS

There are no known actions of supplemental colloidal silver.

### PHARMACOKINETICS

There are no reported studies on the pharmacokinetics of colloidal silver.

## INDICATIONS AND USAGE

There are no indications for use of supplemental silver. In 1999, the Food and Drug Administration issued a final rule establishing that all over-the-counter products containing colloidal silver ingredients or silver salts for external or internal use are not generally recognized as safe and effective and are misbranded. These products are being marketed for numerous disease conditions, and the FDA states that it is "not aware of any substantial scientific evidence that supports the use of OTC colloidal silver ingredients or silver salts for these disease conditions."

## RESEARCH SUMMARY

Silver has long been used as a topical antiseptic. Doses that could have internal antiseptic effects are not considered safe. There are many documented cases of argyria, a condition in which the skin of the entire body assumes a grayish-blue pigmentation that is irreversible and permanent. It is often attended by permanent discoloration of hair, nails and oral and gingival mucosae. Not only quantity of silver intake but also individual sensitivity to silver and other factors, such as exposure to sunlight, contribute to the appearance of argyriasis.

A number of case studies shed light on the etiology of this disfiguring condition. A 34-year old woman, for example, developed it when she took colloidal silver for 25 months in an effort to treat intestinal dyspepsia with diarrheic episodes. Some others have developed it after treating themselves with silver nitrate eye drops or to treat oral ulcers. Cases have resulted from the use of silver acetate chewing gum used as a putative, unproved smoking deterrent. One schizophrenic patient developed argyria and convulsive seizures, which some researchers also associated with prolonged silver use.

Current research makes it clear that there are no safe uses for over-the-counter silver products.

## CONTRAINDICATIONS, PRECAUTIONS, ADVERSE REACTIONS

### CONTRAINDICATIONS

Supplemental colloidal silver is not advised for anyone.

### ADVERSE REACTIONS

Prolonged intake of colloidal silver can cause argyria, a condition in which the skin of the entire body assumes a blue-gray discoloration, particularly in areas exposed to light. Argyria is permanent and irreversible. Argyria also affects the lips, cheeks and gums.

## OVERDOSAGE

There are no reports of overdosage of colloidal silver.

## DOSAGE AND ADMINISTRATION

Supplemental colloidal silver is not recommended. Colloidal or liquid minerals often contain silver.

## LITERATURE

Anon. Over the-counter drug products containing colloidal silver ingredients or silver salts. Department of Health and Human Services (HHS), Public Health Service (PHS), Food and Drug Administration (FDA). Final rule. *Fed Regist.* 1999; 64:44653-44658.

Fung MC, Bowen DL. Silver products for medical indications: risk-benefit assessment. *J Toxicol Clin Toxicol.* 1996; 34:119-126.

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Ohbo Y, Fukuzako H, Takeuchi K, Takigawa M. Argyria and convulsive seizures caused by ingestion of silver in a patient with schizophrenia. *Psychiatry Clin Neurosci.* 1996; 50:89-90.

Pardo-Peret P, Sans-Sebrafen J, Boleda Relats M. [Argyriasis. Report of a case.] [Article in Spanish.] *Med Clin (Barc).* 1979; 73:386-389.

Russell AD, Hugo WB. Antimicrobial activity and action of silver. *Prog Med Chem.* 1994; 31:351-370.

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# Colosolic Acid

**DESCRIPTION**

Colosolic acid, sometimes called corosolic acid, is a triterpene compound extracted from the leaves of the plant *Lagerstroemia speciosa.* The leaves of *Lagerstroemia speciosa* are used in Southeast Asia as an herbal remedy for a number of disorders, including diabetes and obesity. In the Philippines, the plant is known by the Tagalog name of banaba.

Colosolic acid has been reported to activate glucose transport in cell cultures and to lower glucose in diabetic mice. There are a few reports that colosolic acid lowers blood glucose levels in type 2 diabetic subjects. However, none of these reports has appeared in peer-reviewed scientific literature.

Colosolic acid is also known as 2alpha-hydroxyursolic acid, corosolic acid and botanical insulin. A similar triterpene called corosolic acid has been isolated from the fruit of *Crataegus pinnatifida* var. pilosa, a member of the hawthorn family.

**ACTIONS AND PHARMACOLOGY**

ACTIONS

Supplemental colosolic acid is reputed to activate glucose transport, resulting in hypoglycemic activity.

MECHANISM OF ACTION

The mechanism of action of colosolic's putative hypoglycemic action is not known.

PHARMACOKINETICS

There are no reported pharmacokinetics on colosolic acid.

**INDICATIONS AND USAGE**

It is claimed that colosolic acid lowers blood glucose in type 2 diabetics, burns fat, lowers elevated blood pressure and boosts energy, among other things. Currently, there is no credible evidence to support any claim for the use of this substance in humans.

**RESEARCH SUMMARY**

Colosolic acid is reported to activate glucose transport in Ehrlich ascites tumor cells. Extracts from *Lagerstroemia speciosa.* Leaves have been reported to have hypoglycemic activity in genetically diabetic KK-AY mice. There are no credible reports that colosolic acid can lower blood glucose in type 2 diabetics, boost energy, burn fat or lower blood pressure in hypertensives.

**CONTRAINDICATIONS, PRECAUTIONS, ADVERSE REACTIONS**

CONTRAINDICATIONS

Known hypersensitivity to a colosolic acid-containing product.

PRECAUTIONS

Children, pregnant women and nursing mothers should avoid using products called colosolic acid or corosolic acid. Those with diabetes should be extremely cautious about using colosolic/corosolic acid. Those with hypoglycemia should avoid using colosolic/corosolic acid.

ADVERSE REACTIONS

None reported.

**INTERACTIONS**

If colosolic acid were to lower blood glucose, it could have additive effects with drugs used in the management of diabetes, and therefore blood glucose must be closely monitored.

**OVERDOSAGE**

None reported.

**DOSAGE AND ADMINISTRATION**

No recommended dose. Colosolic acid is marketed in stand-alone supplements and in combination products. Colosolic acid in these products is usually from extracts of *Lagerstroemia speciosa* leaves.

**LITERATURE**

Ahn KS, Hahm MS, Park EJ, et al. Corosolic acid isolated from the fruit of *Crataegus pinnatifida* var. pilosa is a protein kinase inhibitor a well as a cytotoxic agent. *Planta Med.* 1998; 64:468-470.

Kakuda T, Sakane I, Takhara T, et al. Hypoglycemic effect of extracts from *Lagerstroemia speciosa* L. leaves in genetically diabetic KK-AY mice. *Biosci Biotechnol Biochem.* 1996; 60:204-208.

Murakami C, Myoga K, Kasai R, et al. Screening of plant constituents for effect on glucose transport activity in Ehrlich ascites tumour cells. *Chem Pharm Bull.* 1993; 41:2129-2131.

# Conjugated Linoleic Acid (CLA)

**DESCRIPTION**

Conjugated linoleic acid or CLA refers to a group of positional and geometric octadecadienoic acid isomers of linoleic acid. CLA is not a single substance. In contrast to linoleic acid, all the CLA isomers have conjugated bonds. In an unsaturated organic compound, two double bonds separated by a single bond are said to be conjugated. CLA is represented by the following structural formulas: