INKA DRAGO is a unique Natural Ingredient, preservative free, organic certifiable, obtained from the resin of the Croton Lechleri tree, used by the Amazonian natives since ancestral times for its great healing power. At present, it is used in the cosmetic industry because it has very good immunomodulatory, anti-inflammatory and antioxidant effects, which fight the effects caused by the free radicals.

**INCI Name:** Propanediol (and) Water (and) Croton Lechleri Sap Extract

**Description**

**Family:** Euphorbiaceae  
**Genus:** Croton  
**Species:** Lechleri.  
**Common names:** Sangre de Drago (Dragon’s Blood), Palo de Drago  
**Botanical name:** Croton lechleri Muelle. Arg.

The *Croton lechleri* is a tree of wide, global and rounded crown, with dotted grayish-whitish bark, that exudates a latex of red wine color. Although it is tall, the trunk generally has less than 30 cm of diameter. It has shiny green leaves, shaped like a heart and big greenish flowers. The local people call it Sangre de Drago (Dragon's Blood) because when the trunk is cut, a dark red liquid appears giving the sensation that the tree is bleeding.

The Croton family is rich in active alkaloids and several species are well known medicinal plants.

**Habitat**

It grows in the tropics and in the regions of the high and low Amazon Rainforest of Peru. The Croton genus is very large, with 750 species of trees and shrubs distributed in the tropical and subtropical regions of both hemispheres.

**Traditional uses**

The Sangre de Drago (Dragon’s Blood) has been used since immemorial time in traditional medicine. The earliest references date to the year 1600 when the Spanish naturalist and explorer P. Bernabe Cobo assured the sap had a healing effect over the external wounds. He explained how the indigenous Jivaros applied it on top of the skin to stop bleeding, accelerate healing, and to seal and protect the skin from possible infections. The sap dries quickly and forms a barrier similar to a second skin.
The resin is collected in the same way as the rubber, making incisions in the bark with a machete and then receiving the liquid in a container.

Sangre de drago resin and bark are used in traditional medicine in South America today in much the same manner as indigenous ones. In Peruvian herbal medicine it is recommended for hemorrhaging, as an antiseptic vaginal douche and, topically, for healing wounds. It is also used internally for ulcers in the mouth, throat, intestines and stomach; as an antiviral for upper respiratory viruses, stomach viruses and HIV; internally and externally for cancer and, topically, for such skin disorders as eczema, as well as insect bites and stings. In Brazilian traditional medicine the sap is currently used for wounds, hemorrhaging, diarrhea, mouth ulcers, and as a general tonic.

**Sustainable development – Support to local communities**

3QP aims to the research and sustainable exploitation of natural resources of Peru for their application in the cosmetic industry. Peru counts with a very rich biodiversity. It is estimated that 20,000 species or 8% of the total number of plants existing in the world grow in its soil.

Therefore, we have the commitment to provide highest priority to indigenous botanical ingredients aimed to support the economic development of the local communities under the principles of fair-trade.

**Phytochemicals**

**FLAVONOIDS**

**Proanthocyanidins**

The major components (more than 90% of dry weight according to some authors) isolated from the Sangre de Drago (Dragon’s Blood) of *Croton Lechleri* are procyanidines, which include both catechins (monomers of flavan-3-ols) and proanthocyanidinic oligomers (catechic tannins) of up to 20 units. These compounds have antioxidant properties and help to protect and strengthen the collagen fibers.
PROANTHOCYANIDINS
(MONOMERS AND DIMERS)

2,4,4-Dihydroxy-phenyl-chromen-3,5,7-triol
(rutin, flavan-3-ol)

(2R,3S)-2-(3,4,5-trihydroxyphenyl)chroman-3,5,7-triol
(gallocatechin, flavan-3-ol)

PROANTHOCYANIDINS
(trimers)
ALKALOIDS

The latex of *Croton lechleri* contains Taspine which was the first compound that was related to the pharmacological activity. The amount of Taspine in the latex varies widely in the range from 1.3% to 20.4% with regard to dry weight, with a mean of 9%. From the genus Croton, 30 alkaloids have been isolated, 22 with known structure, wherein the main ones are Solutaridine, taspine, sinoacutine, sparciflorine.

In vivo experiments in mouse show that taspine contains a healing effect. Taspine promotes the early stages of healing of a wound and its mechanism of action could be related to the stimulation of the chemotaxis of fibroblasts.

Lignans and other minor compounds

Among the minor compounds we can also find a lignan called 3,4-O-dimethylcedrusine, diterpenes and unsaturated fatty acids. These also include benzoic acid, pigments, flavonoids, etc.

COSMETIC BENEFITS

**INKA DRAGO** has several benefits that can be used at cosmetic formulations: the most documented are the anti-inflammatory and wound-healing effect, thanks to its high content in Taspine, 3'-4-O dimethylcedrusine and the polyphenols (catequins and proanthocyanidins). All the mentioned phytochemicals play an important role in the cosmetic activity of this extract. It seems that there is a synergic participation between all the compounds, to have a better final effect.

**INKA DRAGO** could be used to support skin repair and regeneration, and fight the effects of aging. Moreover, improves the barrier function, acting as a "second skin". Applied to the skin, forms a long-standing barrier, probably due to its ability to co-precipitate with proteins or other matrix elements.

The cosmetic effects of the **INKA DRAGO** are: Healing, Immunomodulatory, Anti-inflammatory and Antioxidant facilitating the elimination of the free radicals responsible for cellular aging.

1. **Filler of wrinkles and healing action**

Collagen fibers are structural proteins located in the Dermis that together with elastin, form a network conferring to the skin firmness and elasticity that Enrique Delucchi # 80. Barranco. Lima. Perú

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characterizes it in young skins. As we age, the ability of the skin to renew these collagen fibers decreases and the skin starts losing its firmness, and the wrinkles begin to appear.

The proanthocyanidins have the unique capacity to bind the collagen fibers, since they help to reconstruct their binding and to reverse part of the damage suffered by the attack of free radicals.

Furthermore, the proanthocyanidins inhibit those enzymes proper of the body, which break the collagen in a natural way. Such wonderful substances thus help to recover the flexibility and firmness of the skin, filling the wrinkles formed after the rupture of the collagen fibers.

Bindings between the collagen fibers of the skin are established; the tannins and the macromolecules are combined thanks to the phenolic groups of the first forming hydrogen bridges. At the same time, covalent bonds are established; these are the ones that ensure that the binding will last over time.

The Sangre de Drago (Dragon’s Blood) is mainly used for its healing action. In vitro, it stimulates the contraction of the wound, helps in the formation of the scar and regenerates the skin faster by the stimulation of production of collagen and the migration of fibroblasts.

The Sangre de Drago (INKA DRAGO) stimulates in vitro the contraction of the wound. It helps in the formation of the scar and regenerates the skin quickly, stimulating the formation of collagen. When a wound is treated with the resin of this tree, this protects it forming a second skin. This action is performed by the taspine\(^1\) together with the dimethylcedrusine and the polyphenols. It has been proven that the total latex is four times more active than its isolated components. There is a synergic effect between them.

The taspine helps in the early stages of wound healing, promoting the formation of the fibroblasts.\(^2\) The dimethylcedrusine also intervenes in the mechanism of healing and the polyphenols play an important role by having a scavenging action of free radicals. The proanthocyanidins stimulate the contraction of the wound.

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2. Strong Activity anti-free radicals (ROS Y RNS)

Sangre de Drago (Dragon’s Blood) reduces the concentration of the radical DPPH (1,1-diphenyl-2-picrylhydrazyl)\(^3\), this activity is similar to the one of the quercetin (control substance), of the catechin and of the epicatechin. Furthermore, the resin of the Sangre de Drago (Dragon’s Blood) reduces the intracellular formation of ROS (Reactive oxygen species) radicals, wherein the catechins and proanthocyanidins are responsible for this antioxidant activity.

The free radicals are chemical agents provided with a potent oxidant capacity. They may have an exogenous origin (pollution, tobacco, etc.) as well as endogenous (stress, cellular respiration, etc.).

Under normal conditions, the skin is able to maintain a balance between the free radicals that are generated or that infiltrate from the outside, and the systems that neutralize them. An imbalance produces oxidative stress, which attacks the tissues and the skin cells, causing an accelerated aging.

Free radicals attack the cell membranes especially, causing its destruction. These membranes are the delicate support of the genetic map of our cells, which nucleus contains the DNA. The integrity of this membrane protects the DNA and the life of our cells.

INKA DRAGO acts improving the natural defense system of the body, against the harmful effects of modern life. Nobody can deny the fact of this environmental attack that we suffer every day. From the moment we wake up, we are exposed to bacteria, virus, and environmental pollution and occasionally, to microorganisms produced by man.

Antioxidants are nutritive substances that can stop or delay the oxidative process of the free radicals. Among the antioxidants, the proanthocyanidins are very effective, yet they are still not well known. Several studies have demonstrated that the proanthocyanidins have an important counteracting action to the damage received by free-radicals, and they can have a very important role at delaying the aging of the skin. The proanthocyanidins are one of the most efficient free-radical killers known. In-vitro test have demonstrated that, as anti-oxidants, they are 50 times more efficient than vitamin E, and 20 times more than vitamin C. The oligomeric Proanthocyanidins are structured in such a way, that they can give an electron freely, without altering its valence. This means that they can estabilize free-radicals without turning dangerous. In fact they can continue giving up electrons until they finish with all of them. For this reason, one molecule can neutralize several free-radicals.

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Condensate tannins, (oligomeric proanthocyanidins) and, in general the phenolic acids, polyphenols and flavonoids have anti-oxidant activity thanks to capacity of chelating free radicals.

The proanthocyanidins (see chemical composition) have a higher chelating capacity because they have more places to sequestrate the free-radicals.

3. Immunomodulatory action

Dragon’s Blood shows immunomodulatory activity in vitro. It presents a strong activity inhibiting the proliferation of the activated T-cells⁴. Probably, the catechins and proanthocyanidins are responsible for this activity⁵.

4. Anti-inflammatory action

The anti-inflammatory activity of the Sangre de Drago (Dragon’s Blood) has been proven by three different pharmacological models, wherein the taspine is responsible for this activity⁶.

Efficacy Test

EVALUATION OF ANTIOXIDANT ACTIVITY
DPPH Assay

The general free radical scavenger activity of the INKA DRAGO was evaluated by its interaction with DPPH (2,2-diphenyl-1-picrylhydrazyl) in solution. DPPH is a stable free radical that can accept an electron or hydrogen radical to become a stable diamagnetic molecule. Because of its odd electron, the methanolic solution shows a strong absorption band at 517 nm (Blois, 1958), which decreases in the presence of free radical scavengers. DPPH scavenging activity has been largely used as a quick and reliable parameter to assess the in vitro general antioxidant activity of plant extracts, which has been assigned to phenolic compounds namely, phenolic acids and flavonoids.

INKA DRAGO has shown an important scavenging activity, with an EC50 of 6.85±2.28 µg/mL (n=3), superior than the one of Vitamin E (16.35±2.71µg/mL) and a little low than the one of Vitamin C (4.56±1.03 µg/mL).

CONCLUSION

INKA DRAGO is extraordinary innovative natural ingredient with Traditional Knowledge of use that can be employed to protect the skin against UV exposure and the Oxidative Stress produce as a result. INKA DRAGO promotes the formation of new collagen acting as a second skin.

INKA DRAGO is indicated for face and body treatments as:
- Anti-Aging treatments.
- Formulations with Anti Free-Radicals activity. Premature aging prevention.
- After sun or sensitive skins formulations. Protective treatments
- Treatments for pregnancy and after-birth products
- Products to increase skin elasticity
- Anti-Wrinkle formulations

Dose of use – Solubility – Preparation

INKA DRAGO is a NON GENETICALLY MODIFIED ingredient

DOSE OF USE: From 3 to 5%.

SOLUBILITY: Water-soluble.

PREPARATION: INKA DRAGO is compatible with most of the raw materials commonly used in the cosmetic industry. However, the formulator will have the responsibility to ensure the stability of the formulation by performing the necessary tests.
Preferably, it will be incorporated into the cosmetic preparations at the end of the preparation below 40°C.

**Analytical Information (preliminary)**

**ASPECT:** Liquid with dark reddish color and characteristic odour

**Density (at 20 ºC):** 1.030 – 1.050

**pH:** 4.00 – 6.00

**PRESERVATIVES:** None

**MICROBIOLOGY:**

- **Total germs:** ≤ 1000 cfu/gr
- **Fungi and yeasts:** ≤ 100 cfu/gr
- **Pathogens:** Absence

**TOLERANCE:** Excellent. Tested under dermatological control

**PRESERVATION:** Store in a clean place, protected from light, moisture and oxygen and at temperatures between 15°C and 25°C. If the original container is opened, it should be handled with special care in order to avoid a secondary microbiological contamination.

**REFERENCES:**