



# Milk Thistle (*Silybum marianum* L.) Plant Stem Cell Extract

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## Milk Thistle an Ancient Liver Protectant Plant

Milk thistle (*Silybum marianum* L.), also called blessed milk thistle or chardon Marie, is native to the Mediterranean region, but is now found throughout the world. The plant has long stems that branch at the top, wide leaves with white blotches or veins. Milk thistle gets its name from the milky white sap that comes from the leaves when they are crushed.

Humans have used milk thistle for centuries against disorders in the liver, kidney and gallbladder<sup>1</sup>. The plant was described by the Romans and Greeks, i.e. by Dioscorides during the 1st century AD. The plant is also used as a cell protectant and has been implicated to protect the telomeres (chromosome ends). It is also used for wound healing<sup>2,3</sup>, treatment against acne and roseace<sup>4</sup> and to increase moisture<sup>6</sup>. Furthermore, it has antioxidant<sup>2,3</sup>, anti-inflammatory<sup>2</sup>, anti-ageing<sup>6</sup> and antiphotodamaging properties<sup>6,7</sup>.

## New Production of Extract

*In vitro* Plant-tech is producing plant extracts by sustainable bioreactor based cultivation of plant cells. This production method does not deplete the natural populations and uses less water than field cultivation. Furthermore, bioreactor based cultivation enables production of uniform, high quality plant material, free from pests, hazardous chemicals and unwanted plant species.

\* DPPH assay, is a spectrophotometric analysis method based on reduction of the colorimetric 2,2'-diphenyl-1-picrylhydrazyl (DPPH) reagent.

\*\* Scavenging activity of the extract is correlated with the antioxidant activity and is quantified as EC50. EC50 value refers to how many mg extract that is required for a 50% decrease in absorbance of a DPPH solution.

\*\*\* HPLC (high performance liquid chromatography) is a powerful analysis methods allowing separation, characterisation and quantification of organic molecules and ions.

## Plant Stem Cell Extracts

Our extracts are derived from plant stem cells. A plant stem cell is an undifferentiated precursor cell (callus cell), which has not yet started to differentiate. Our plant stem cells are produced in bioreactors under controlled laboratory conditions, resulting in high quality products. The extracts originating from plant stem cells are becoming increasingly popular to use as an active ingredient, especially within cosmetics. An active ingredient has a biological beneficial effect. The substances produced will vary between plant species and within different organs of the plant. By selecting plant stem cell extracts and materials from plants which have a traditional beneficial use within wound healing, skin care and/or as health supplements, we believe that the beneficial effect of the plant stem cell technology can be even greater.

## Antioxidant Properties

We are confirming the antioxidant activity of our plant stem cell extracts using the DPPH\* assay. Through this method the free radical scavenging ability of a given substance is determined. We standardize our extracts to the total phenolic content and scavenging activity\*\*.

The metabolic profile of our extract is verified by HPLC\*\*\* to assure the highest quality and reproducible composition of our products.



*In vitro* cultivated *Silybum marianum*

## PRODUCT SPECIFICATION\*

INCI: Silybum marianum Callus Extract

**Botanical name:** *Silybum marianum* L.

**Description:** Extract obtained from *in vitro* produced Milk thistle plant stem cells

**Plant part used:** Plant stem cell (undifferentiated cell)

**Extraction solvent:** Ethanol/water

**Composition:** 10% dried natural extract in glycerol OR maltodextrin

**Appearance:** viscous liquid OR powder

**Country of origin:** Sweden

## CONTACT INFORMATION\*

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<sup>1</sup> Rasul et al. (2011) African J Pharm Pharmacol, 5, 2306-2309.

<sup>2</sup> Sharifi et al. (2013) Pharm. Biol., 51, 298-303.

<sup>3</sup> Aliabadi (2011) J Animal and Vet Sci., 10, 3287-3292

<sup>4</sup> Niels and Ippersiel (2002) Cosm Derm.

<sup>5</sup> Hirsch et al (2008) Aesthetic rejuv., a reg. appr.

<sup>6</sup> Rasul and Ahktar, (2012) African Journal of Biotech, 11, 1509-1515.

<sup>7</sup> Katyar et al (2011) PLoS ONE, 6, 2011.