



# LITHOVIT



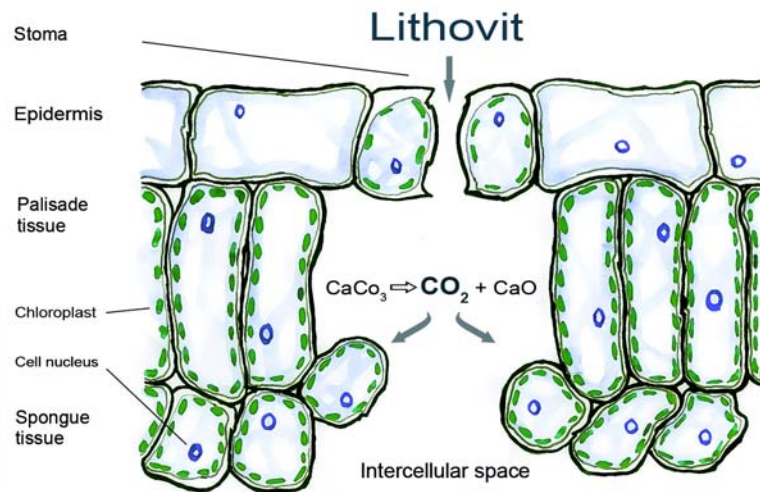
AGRO  
**LITHOVIT**

Made in Germany

# Lithovit – a direct effect

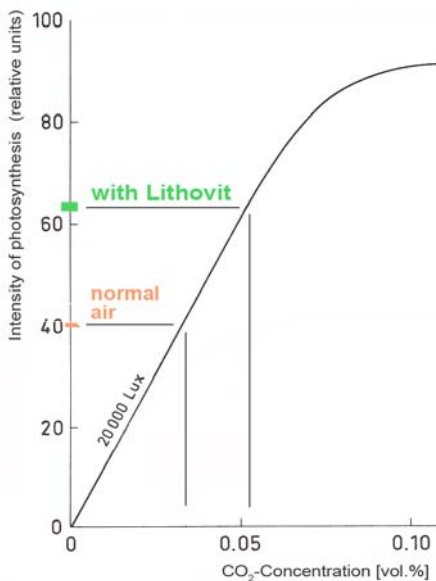
Lithovit is the first CO<sub>2</sub> foliar fertilizer that can be used successfully outdoors as well as under glass. It consists of calcium carbonate supplemented by numerous important micro-nutrients.

Most Lithovit particles are so small (< 10 μm) that they can be absorbed directly through the stomata of the plant's foliage. Inside the leaves, the Lithovit particles break down and release CO<sub>2</sub> in particular, but also other substances as well.



Diagrammatic representation of how Lithovit works

The low CO<sub>2</sub> content of normal air (0.03 vol.%) means that most cultivated plants fail to achieve an optimum level of photosynthesis. Assuming that temperature conditions are favourable and there is a sufficient supply of nutrients and water, the maximum level of photosynthesis is achieved at around 0.1 vol.% CO<sub>2</sub>.



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The use of the Lithovit CO<sub>2</sub> outdoor fertilizer can thus improve the photosynthesis performance. In addition, the effect is further enhanced by the micro-nutrients contained in Lithovit.

The effect of Lithovit on the intensity of photosynthesis

# Lithovit – helps plants to grow

It has long been known that CO<sub>2</sub> acts like a fertilizer on crops cultivated under glass, and it is being used successfully in that way with convincing results.

## Effects of improved CO<sub>2</sub> supply

Parameter	Direct effect of doubling CO <sub>2</sub>
Photosynthesis rate	Substantial in the case of C3 plants; C4 plants show hardly any improvement
Stomatal opening	Reduced with C3 and C4 plants
Water use efficiency	Increased with C3 and C4 plants
Leaf surface	Increased more with C3 plants than with C4 plants
Leaf weight	Increased with C3 and C4 plants
Flowering	Accelerated with C3 and C4 plants
Maturity of plant	Earlier flowering of C3 and C4 plants
Dry mass production & yield	Substantially increased with C3 plants (up to 30% and more); C4 plants show hardly any improvement
Differences in plant reactions	Clear differences between C3 and C4 plants Differences between varieties possible
Drought stress	Plants less susceptible to water stress

From: KRUPA, S.V. UND KICKERT, R.N. (1993) The Greenhouse Effect – The Impacts of Carbon Dioxide (CO<sub>2</sub>), Ultraviolet-B (UV-B) Radiation and Ozone (O<sub>3</sub>) on Vegetation (Crops). Vegetatio 104: 223-238

### C3 plants

Typical representatives of this category are cultivated plants of the temperate zones such as wheat, barley, rice, soya, potatoes, lettuce, vegetables and fruit-trees. With this type of metabolism the natural CO<sub>2</sub> concentration is too low for optimum photosynthesis. In addition, the process called photorespiration interferes with photosynthesis. Lithovit can thus exert its full effect.

### C4 plants

Typical representatives of this category are plants cultivated in the sub-tropical or tropical zones such as millet, maize or sugarcane. All plants with this type of metabolism can photosynthesize effectively even when the CO<sub>2</sub> concentration is low.

The other ingredients contained in Lithovit are required for essential biochemical functions in plant metabolism (calcium: important in metabolism and for cell walls; magnesium: an important component of chlorophyll; manganese: cofactor of enzymes and participation in oxygen development in photosystem II; zinc: cofactor of enzymes; copper: component of enzymes and a redox catalyst; cobalt: cofactor in the symbiotic fixation of molecular nitrogen).

Lithovit brings about a clear enhancement of performance of many plants, which is demonstrated in particular by more rapid growth, higher yields, and in many cases also by a lower water requirement and improved general vitality.

Particularly remarkable in addition is the reduction that has repeatedly been observed in the susceptibility of plants strengthened with Lithovit to fungal diseases (leaf rust, mildew, false mildew, fruit rot, leaf rot etc.).

## Lithovit – product data

Lithovit natural CO<sub>2</sub> foliar fertilizer for outdoor use is a top-quality nanotechnological product created by tribodynamic activation and microzation. Highly energized Lithovit particles, sprayed finely onto the leaf surface, are taken up directly through the stomata and converted into carbon dioxide. In this way Lithovit can considerably increase the photosynthesis rate, since the essential factor limiting photosynthesis outdoors is the natural CO<sub>2</sub> content of the air. This leads to yield increases (up to 50% and more), accompanied by a reduced water requirement (by up to 75%), since with Lithovit the plants are able to keep the stomata closed longer in case of water stress. In addition, the micro-nutrients also contained in the product and the trace elements that influence plant physiology, such as manganese, copper, zinc etc., increase the resistance, growth, vitality and general quality of the crop.



- Improves crop yields, quality and storage properties
- Accelerates growth and intensifies green coloration
- Increases resistance, growth and vitality
- Increases plant stability, frost and drought tolerance and pest resistance
- Enhances the supply of essential trace elements to the plants
- Reduces the water requirement (by up to 75%)
- Not suitable for plants preferring an acid soil (rhododendrons, azaleas, heathers and heaths etc.)

# Lithovit – instructions for use

There are basically three different times at which Lithovit can be applied:

- at the beginning of foliation,
- at the time of flowering and
- during the period when the fruit is growing and ripening.

Lithovit may be used once or several times, at most every 10-15 days, separately or in combination with a plant protection agent. Dosage: 1.5-2.0 kg/ha as a 0.5% solution (500 g of Lithovit per 100 l of water). It can be applied using any commercially available pesticide sprayer.

Examples of recommended application:

## **Sugar beet**

Between the 4th and 6th leaf and again 2 and 4 weeks later.

## **Grain**

Winter grains: once in the autumn, when 2-3 tillers have appeared. Winter and summer grains: once after appearance of the last leaf.

## **Maize**

Between the 4th and 6th leaf and at the 10-leaf stage.

## **Oil-seed rape**

Winter rape at the two-leaf stage in the autumn, winter and summer rape between the 6th and the 8th leaf and before flowering.

## **Potatoes**

15 days after first foliation and again after a further 15 days.

## **Salat crops & vegetables**

First application with the bedding out, thereafter twice more at 15 day intervals.

## **Vine**

At flowering, when the first fruits appear, and upon development of the first bunch of grapes.

## **Tomatoes**

3 to 5 applications at intervals of 15 days, commencing with the second leaf or the bedding out.

## **Strawberries & small berries**

During flowering, upon formation of the first fruits and after a further 15 days.

## **Fruit farming / Ornamental woody plants**

3-5 applications at intervals of 15 days, commencing approx. 10 days after the first foliation.

## **Ornamental herbaceous perennials**

2-4 applications at intervals of (15 to) 20 days, commencing with the third leaf.

Lithovit CO<sub>2</sub> foliar fertilizer for outdoor use; calcium carbonate 83 from natural mineral limestone deposits, with micro-nutrients, easily assimilable

79,19 % calcium carbonate

11,41 % silica

4,62 % magnesium carbonate

1,31 % iron

0,97 % alumina

0,55 % sodium oxide

0,33 % sulphate

0,21 % potassium oxide

0,06 % nitrogen

0,01 % phosphate

0,014 % manganese

0,005 % zinc

0,002 % copper

Harmless to humans and animals, not hazardous to water.

Suitable for use in organic farming according to Council Regulation (EEC) No. 2092/91 – European Community

Available

1 kg, 10 kg, 25 kg

# Lithovit – observations of use



Potatoes growing in a garden on the left without, on the right with application of Lithovit, approx. 4 weeks after the first application.



Barley grown in pots on the left without, on the right with application of Lithovit; the substantial improvement in plant stability is particularly noticeable.



Maize cobs from field cultivation on the left without, on the right with application of Lithovit.



A comparison of leaves from deciduous woody plants, in each case on the left with and on the right without the application of Lithovit. Left-hand pair of leaves: hornbeam (*Carpinus betulus*); right-hand pair of leaves forsythia (*Forsythia intermedia* 'Lynwood').

# Lithovit – a good investment

The main factor recommending Lithovit for professional use, apart from its fundamental effectiveness, is the economic benefit of using it in current operations.

On the basis of the latest data from the German Bavarian State Office for Agriculture (LfL) (as of 15 July 2006; [www.lfl.bayern.de/internet/stmlf/lfl/ilb/db/14249/index.php](http://www.lfl.bayern.de/internet/stmlf/lfl/ilb/db/14249/index.php)) the effect on profitability that can be achieved with various crops is typically as follows:

Conventional	Winter wheat	Kernel maize	Sugar beet	Potatoes	Celeriac
yield (per ha)	7 tons	8.9 tons	64.5 tons	37.5 tons	52.0 tons
Cross price (per tons)	132.00 €	117.80 €	42.10 €	78.40 €	123.90 €
Market proceeds (per ha)	924 €	1,048 €	2,715 €	2,940 €	6,443 €
Variable costs (per ha)	665 €	1,040 €	1,125 €	2,137 €	4,940 €
<b>Contribution (per ha)</b>	<b>259 €</b>	<b>8 €</b>	<b>1,590 €</b>	<b>803 €</b>	<b>1,503 €</b>
Addit. Yield with Lithovit	Winter wheat	Kernel maize	Sugar beet	Potatoes	Celeriac
expected addit. yield (av.)	10%	10%	8%	11%	9%
Addit. yield (av. per ha)	0.7 tons	0.9 tons	5.2 tons	4.1 tons	4.7 tons
Cross addit. proceeds (av. per ha)	92 €	105 €	217 €	323 €	580 €
Costs of Lithovit (per ha)	33 €	66 €	66 €	66 €	132 €
<b>Addit. contributions (per ha)</b>	<b>59 €</b>	<b>39 €</b>	<b>151 €</b>	<b>257 €</b>	<b>448 €</b>
<b>Increase of contributions</b>	<b>23%</b>	<b>461%</b>	<b>10%</b>	<b>32%</b>	<b>30%</b>

The average values may vary according to region, situation, soil quality, weather conditions, market prices, production processes and production year. But in every case, an economically worthwhile boost to contribution can be achieved with Lithovit; it may even be far more than that shown in the examples, especially if possible savings on conventional fertilizers, plant protection agents and irrigation are taken into account.

Lithovit has been proved to be a good investment, not only with agricultural products but also in forestry, tree nurseries, horticultural businesses etc.

In other parts of the world, Lithovit has already been used with convincing results on numerous tropical and subtropical crops such as bananas, cotton, lentils, millet, palms, rice or soya.

## Lithovit – you can profit from it!



# ZEOVITA GmbH

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Zeovita, a company with international operations that is based in Berlin, Germany, develops and markets new types of tribodynamically activated products and the technologies with which they are manufactured.

Zeovita has made it its corporate objective to pursue the optimum utilization of natural raw materials and their active ingredients by means of tribodynamic activation (TDA), to the benefit of humans, animals and plants.

In TDA process technology, solid materials are accelerated to a speed of more than 20,000 revolutions per minute, i.e. several times the speed of sound, in a unique type of tribodynamic micromill equipped with a number of concentric rings of impact elements. This leads to the particles colliding with each other in rapid succession, and thereby repeatedly shattering each other until they are broken down to a very small size. Due to the high levels of energy involved, these collisions also lead to significant changes in the shape and form of the particles, breaking open the crystal lattices on the surfaces of the grains and modifying the lattice structures of the layers of material immediately below them.

After having been micronized down to nano sizes in this way, and at the same time activated and electrostatically charged, the substances demonstrate new and surprising properties that cannot be achieved by traditional milling processes, e.g. an enhancement of their reactivity and ion-exchange capacity. These and other specific effects open up a multitude of new possible applications in agriculture, in the food, beverage and tobacco industries and in the fields of cosmetics, health and medicine.

The latest innovation in the field of TDA, the Lithovit series of products here presented (utility model registered with the German Patent and Trade Mark Office), is the first natural CO<sub>2</sub> foliar fertilizer for outdoor use in the world that can be applied in agriculture and forestry, in fruit-growing and vegetable cultivation, in the garden and in the home.



Tribodynamic activation (TDA) changes particle surfaces in a highly effective manner:  
1: Result from classic milling; 2: result from an opposed jet mill; 3: Result from TDA