

SULFODYNE®

The active form rather than its precursor

The only active and natural form of sulforaphane on the international nutraceuticals market
GUARANTEERING STABILITY AND BIOAVAILABILITY!

Sulfodyne® is the guarantee to get the real sulforaphane, and nothing less.

In nutraceuticals, it is important that sulforaphane is provided by a titrated and stable extract (which does not oxidize), without having to be transformed via an endogenous or added enzyme.

This is an important criteria to ensure the right quantity of sulforaphane in your product.

BIOAVAILABILITY STUDY on Sulfodyne® and its related cost per dose



BROCCOLI

- European origin
- Made in France

380g
of raw broccoli

=

200mg
of Sulfodyne®

=

10mg
of stabilised Sulforaphane

Focus of international scientific research for **20 years**

Broccoli seed dry extract **18/1**
Contains **5%** stabilised sulforaphane

The active form rather than its precursor

Cruciferous vegetables are well known for their health benefits, also thanks to their high content in sulphur compounds, namely glucosinolates what includes the glucoraphanin, and, more specifically, their hydrolysis products - isothiocyanates - including sulforaphane. Today, nearly 2,500 articles referenced in Pubmed relate to sulforaphane, including 500 articles for the past two years.

But all products do not lead to the same bioavailability in sulforaphane.

What is Sulforaphane ?

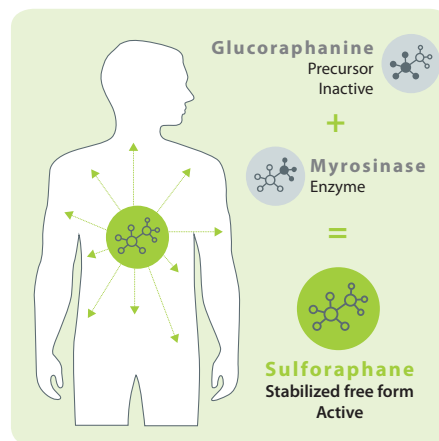
Sulforaphane (sometimes sulphoraphane) is a compound within the isothiocyanate group of organosulfur compounds. It is obtained from cruciferous vegetables such as broccoli, Brussels sprouts, and cabbages. It is produced when the enzyme myrosinase transforms glucoraphanin, one of the glucosinolates, into sulforaphane.

Sulforaphane is the active, and Sulfo-dyne® contains this active, with an excellent bio-availability.

Glucosinolate, Glucoraphanin or sulforaphane ?

Glucoraphanin is biologically inactive and must be hydrolyzed by the action of an endogenous enzyme, myrosinase, released by crushing or chewing vegetables, to turn into sulforaphane, the active molecule. However, eating broccoli does not guarantee an efficient and constant supply of sulforaphane to the body, since the amount ingested depends on:

- The quality of the broccoli,
- Storage conditions for broccoli,
- The preparation method (cooking or not),
- Enzymatic hydrolysis via myrosinase which is released by chewing or is present in the intestinal flora in a person dependent dose.



Thanks to a patented extraction process and its unique stabilization, Sulfo-dyne® makes possible to provide sulforaphane in its active form, which can be directly assimilated by the body: 200 mg of Sulfo-dyne® provides 10 mg of sulforaphane, i.e. the equivalent of 380 g of raw broccoli.

A bioavailability study (Fahey et al., 2017) shows different level of bioavailable sulforaphane depending on its sourcing:

- Glucosinolates leads to 4% of sulforaphane
- When Glucoraphanin has a bio-availability of 10% in sulforaphane
- Glucoraphanin + myrosinase leads to 20% to 40% of sulforaphane (may vary depending on each individual).
- Sulfo-dyne® leads to a bioavailability of 70% in sulforaphane.

Sulfo-dyne is the first and only extract of broccoli seeds with a standardized concentration of 5%, stabilized and with bioavailable sulforaphane.



5mg to 20mg Sulforaphane
100mg to 400mg Sulfo-dyne®
Formulation with Vitamins, minerals or other plants for claims

Detoxification

Sulforaphane has a detoxifying action on the body, in addition to its direct antioxidant activity: it can indeed help eliminate xenobiotics from the body by inhibiting the expression of phase I enzymes responsible for the activation of certain toxic substances, and it induces the expression of phase II enzymes involved in the process of detoxification and elimination of these toxic substances.⁽¹⁾

Anti-inflammatory & Joint health

Sulforaphane inhibits markers of inflammation and reduces cartilage degradation in models of osteoarthritis, gout and rheumatoid arthritis. These actions of sulforaphane are mediated by its effect on the activation and migration of leukocytes in the joints, on IL-17, TNF-alpha, prostaglandins PGE2 and the production of nitric oxide.⁽²⁾

Immunity

Sulforaphane increases the activity of NK cells and phagocytosis of macrophages involved in the innate immune system. It also increases the acquired immune response by improving circulation and antibody production, and also modifying the autoimmune response via T cells.

Studies have thus shown the value of sulforaphane in increasing the response of the immune system against the influenza virus. Numerous studies also show the interest of sulforaphane in *Helicobacter pylori* infection (reduction of bacterial infection and protection of the stomach mucosa).⁽³⁾

Glucose regulation

Sulforaphane causes the dissociation of the Keap1-Nrf2 complex thus allowing the activation of the expression of Nrf2, and the associated mechanisms such as the increase in anti-oxidant capacities, the decrease in inflammation, the increase in the regulation of glucose in liver cells and prevention of pancreatic beta cell death. Via this action, in particular on hepatic and pancreatic cells, sulforaphane is involved in the regulation of hyperglycemia.⁽⁴⁾

Women health

Sulforaphane exerts anti-inflammatory activity in inflammatory diseases such as endometriosis (EM). In an animal model of endometriosis, sulforaphane dose-dependently reduces endometriotic lesions and adhesions. Sulforaphane alleviated pain of sciatic endometriosis as evidenced by the increase in paw withdrawal threshold and paw withdrawal latency and also inhibited ectopic endometrial tissue growth. Sulforaphane is thought to act on the PI3K-Akt pathway, a cell signaling pathway which plays a major role in cell growth and proliferation (also known in the field of cancerology).⁽⁵⁾

Chemoprevention

Sulforaphane may play a role in cancer mechanisms, through chemopreventive activity in the initiation of carcinogenesis. Sulforaphane is believed to have the ability to inhibit the malignant transformation of different cell types (prostate, lung, breast, colon, bladder, liver, etc.) and limit cancer progression following exposure to carcinogens. More than a thousand studies on Pubmed refer to this action, including nearly 150 for the prostate.⁽⁶⁾

Others

Sulforaphane supplementation could be of interest for brain health by having a neuroprotective effect (Jisung et al., 2017) on brain and by improving behavior and social responsiveness in autism (Singh K et al., 2014, Bent S et al., 2018) or in mood disorder like depression, and such more....

1. S. Barcelo, et al., 1996 ; K. Mahéo et al., 1997 ; Kensler et al., 2005 ; Riedl et al., 2009 ; Boddupalli et al., 2012 ; Kensler et al., 2012 ; Herber et al., 2014
2. Kong et al., 2010 ; Fragoulis et al., 2012 ; Davidson et al., 2017 ; Rodrigues et al., 2018 ; Yang et al., 2018
3. Nourooz et al., 2016 ; Geisel et al., 2018 ; Wu et al., 2017 ; Suganuma et al., 2011 ; Johansson et al., 2008 ; Ou et al., 2015 ; Müller et al., 2016 ; Kesic et al., 2011 ; Wu et al., 201
4. Van Belle et al., 2011 ; Rosmalen et al., 2012 ; Jiménez-Osorio et al., 2015 ; Tabak et al., 2012 ; Allende-Vigo, 2015 ; Uustupa & Schwab, 2013
5. Zhou A et al. 2019 ; Barra Fet al, 2018 ; Liu et al, 2020
6. Tortorella et al., 2015 ; Jeong et al., 2017 ; Liu et al., 2017 ; Wang et al., 2017 ; Burnett et al., 2017 ; Fisher et al., 2017 ; Zhu et al., 2017.