

SOD B[®] NATURAL & BIOACTIVE SOD



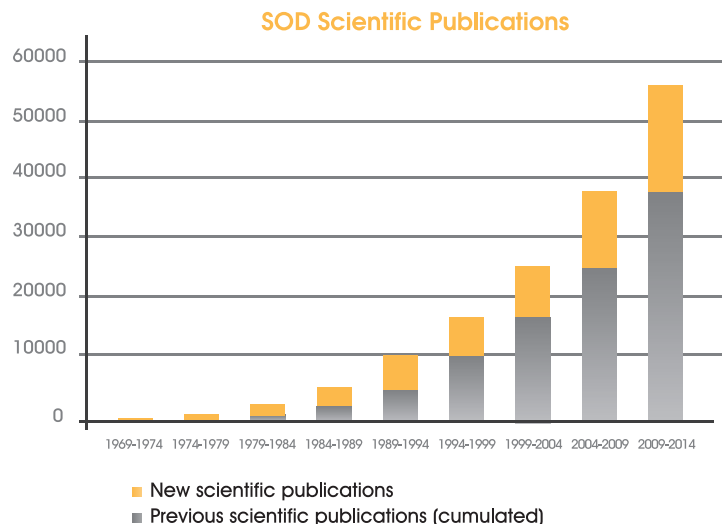
Origins of SOD B[®]

The story of Bionov and the SuperOxide Dismutase (SOD) begins by a discovery. In 1989, some French melon producers were surprised by a new variety of Cantaloup melon (*Cucumis melo* L.) having an impressively long life, compared to classical ones. Several years of research on this particular variety, driven by Bionov people, brought evidence of its exceptionally high content in SOD, one of the most powerful antioxidants. SOD by Bionov[®], also called SOD B[®], was born.



Scientific evidence

SOD, naturally present in all aerobic living organisms, serves a key antioxidant role. McCord and Fridovich have first purified SOD from erythrocytes in 1969. Since then, more than 50,000 scientific publications have demonstrated the particular efficacy of SOD as primary antioxidant. The annual rate at which SOD papers appear continues to accelerate, which highlights the renewed interest of the scientific community in this unique molecule. SOD was the only antioxidant used as drug (Orgotein[®], Pegorgotein[®] and Ormentein[®]) for its anti-inflammatory properties in the treatments of high-energy radiotherapy, sclerosis, and rheumatoid arthritis.



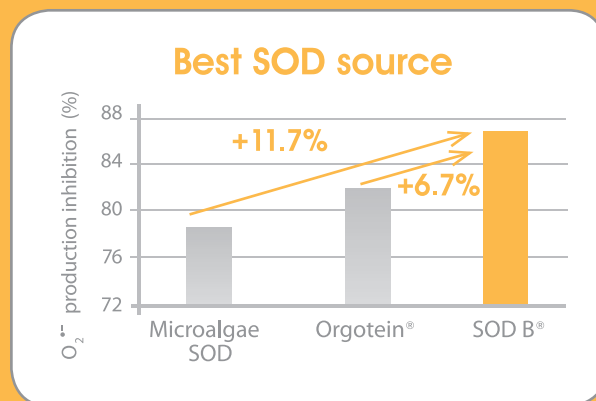
What is SOD B[®] ?

SOD B[®] is obtained from a unique selected French variety of melon fruits (*Cucumis melo* L.). It has been demonstrated to be the best source of 100% natural SOD available on the market: at equivalent SOD concentration (3 IU/mL), SOD B[®] is 7% and 12% more efficient than microalgae SOD or Orgotein[®] respectively.

SOD B[®] is a dried melon juice concentrate highly concentrated in SOD. According to the characterization of SOD B[®], SOD represents 85 to 90% of its total composition. As a concentrate, SOD B[®] contains additional antioxidants such as catalase, glutathione peroxidase, co-enzyme Q10, lipoic acid, glutathione, carotenoids, vitamins A,E, and C.

Bibliography

Lacan *et al.* Unpublished Work 1997,
Carillon *et al.* 2012



Several isoforms for a unique compound

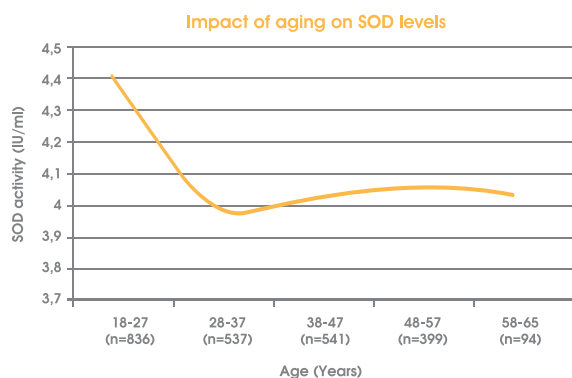
SOD exists in mammals under different isoforms that have similar functions but present differences in protein structure, chromosome localization, metal cofactor requirements, gene distribution and cellular compartmentalization. SOD B[®] is composed of the 3 different isoforms existing in plants.

Species	Some plants	Animals and plants	Animals and plants	Animals
Name		SOD1	SOD 2	SOD 3
Co-factor	Fe-SOD	Zn/Cu-SOD (dimer)	Mn-SOD	EC-SOD (Zn/Cu SOD tetramer)
Localization	Chloroplast	Cytosol	Mitochondria	Extracellular space

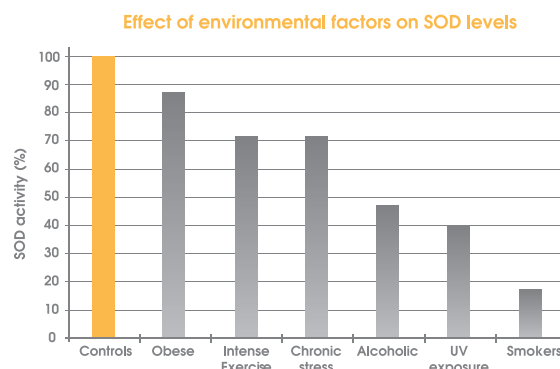
SOD B[®]



Why a SOD B[®] supplementation?



It has been scientifically demonstrated that SOD levels decrease with aging. Aged people have significantly lower SOD levels than younger population. The decline in SOD levels begin in young adults and is maintained until the old age.



It is scientifically established that the daily exposure to several environmental factors amplifies the depletion of SOD levels. There is an interest for these populations to restore their SOD levels through a SOD supplementation.

Bibliography

Inal *et al.* 2001 ; De la Torre *et al.* 1992 ; Reddy *et al.* 2012 ; Deshpande *et al.* 2013 ; Takahashi *et al.* 2000 ; Sato *et al.* 2010 ; Ohno *et al.* 1992

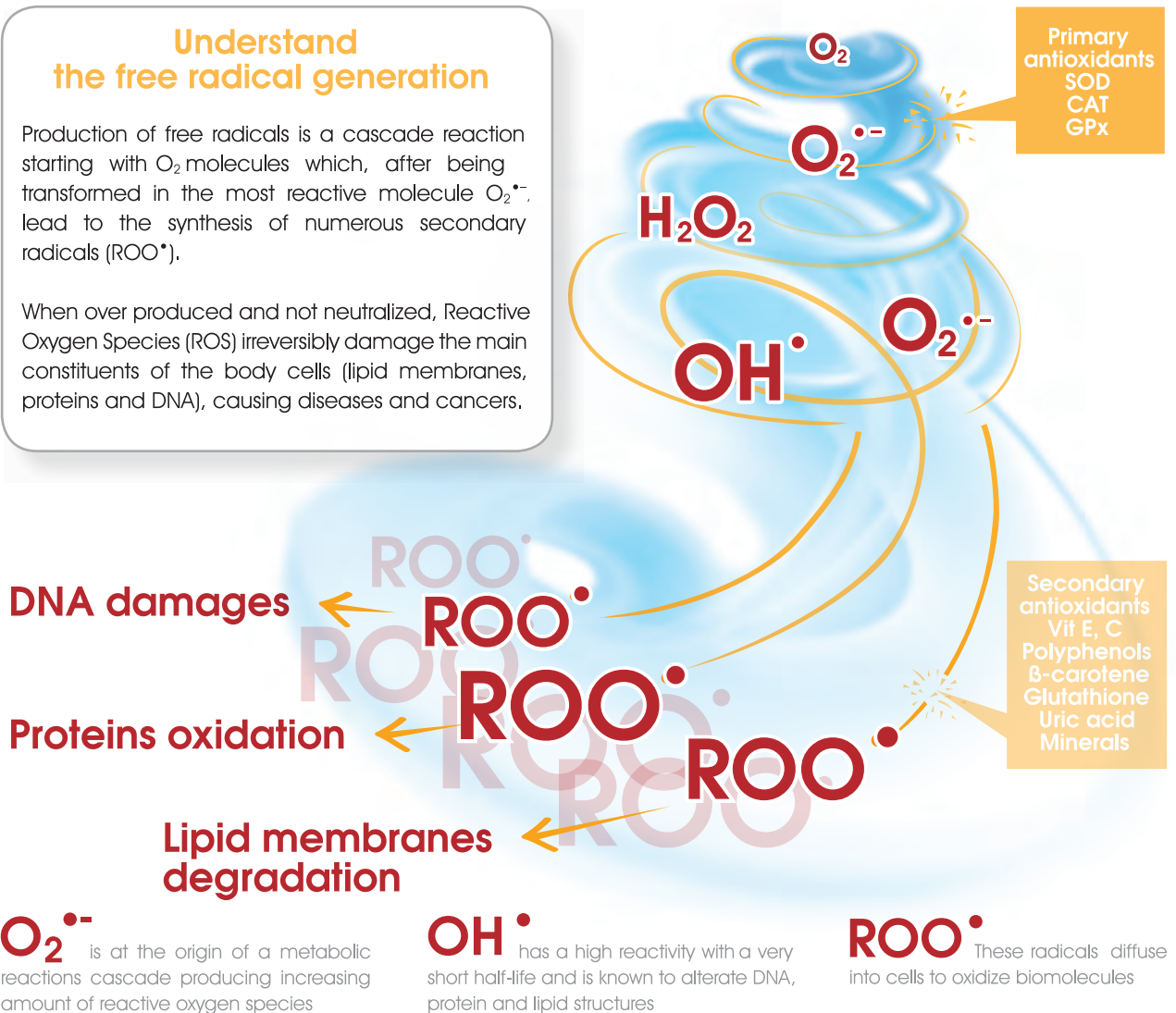
A unique mechanism of action

As a primary antioxidant, SOD acts differently as well-known secondary antioxidants, with a unique mechanism of action.

Understand the free radical generation

Production of free radicals is a cascade reaction starting with O_2 molecules which, after being transformed in the most reactive molecule $O_2^{\bullet-}$, lead to the synthesis of numerous secondary radicals (ROO^{\bullet}).

When over produced and not neutralized, Reactive Oxygen Species (ROS) irreversibly damage the main constituents of the body cells (lipid membranes, proteins and DNA), causing diseases and cancers.



$O_2^{\bullet-}$ is at the origin of a metabolic reactions cascade producing increasing amount of reactive oxygen species

OH^{\bullet} has a high reactivity with a very short half-life and is known to alterate DNA, protein and lipid structures

ROO^{\bullet} These radicals diffuse into cells to oxidize biomolecules

As an enzyme, SOD stays intact at the end of the dismutation reaction and is ready to be involved in another $O_2^{\bullet-}$ dismutation. This specificity makes SOD a unique and long lasting antioxidant.

Why antioxidants are not all equivalent?

Secondary radicals are usual targets of antioxidation approach. Present in natural sources like fruits and naturally found in breast milk, liver and kidneys, the so-called secondary antioxidants are active against the multiple secondary radicals, but do not control the production of the precursor species at the starting point of the cellular oxidation cascade.

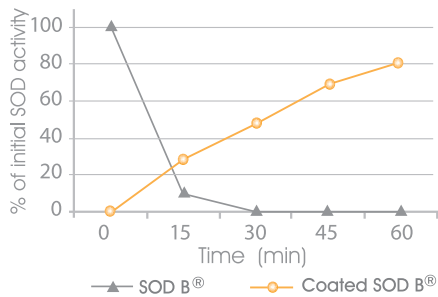
The unique molecules that are able to control the first steps of the cascade, by neutralizing the most reactive oxygen species, $O_2^{\bullet-}$, are enzymes named primary antioxidants. They are the first and most important defense line providing the best protection against daily oxidative attacks, through the control of the upstream reactions. There are only 3 primary antioxidants: Superoxide dismutase (SOD), Catalase and Glutathione peroxidase. All are naturally present in every living organism, but only SOD is available as industrially produced nutrient.

The guarantee of activity

Bioactivity of SOD B[®] oral administration results from the fact that :

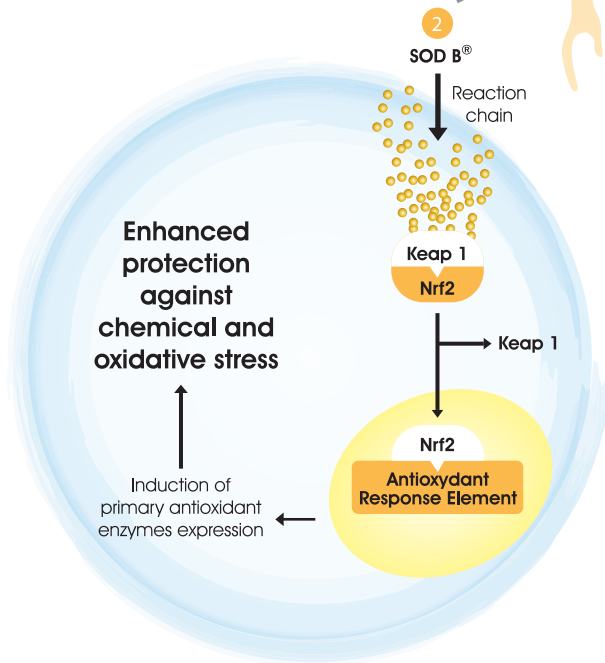
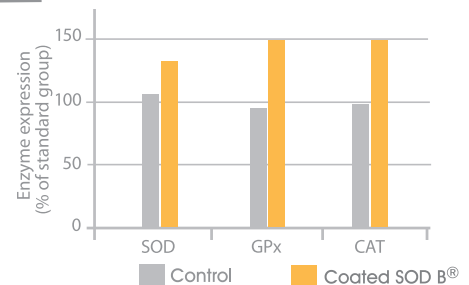
- 1 SOD B[®] is protected from the gastric acids thanks to its coating, allowing SOD B[®] to be progressively released into the intestinal tract ;
- 2 SOD B[®] acts possibly via an induction of Nrf2, a transcription factor known to induce primary antioxidant enzymes synthesis in the body ;
- 3 SOD B[®] induces the endogenous expression of SuperOxide Dismutase (SOD), Catalase (CAT) and Glutathione Peroxidase (Gpx) in targeted tissues.

1 Evolution of SOD B[®] activity in gastric environment



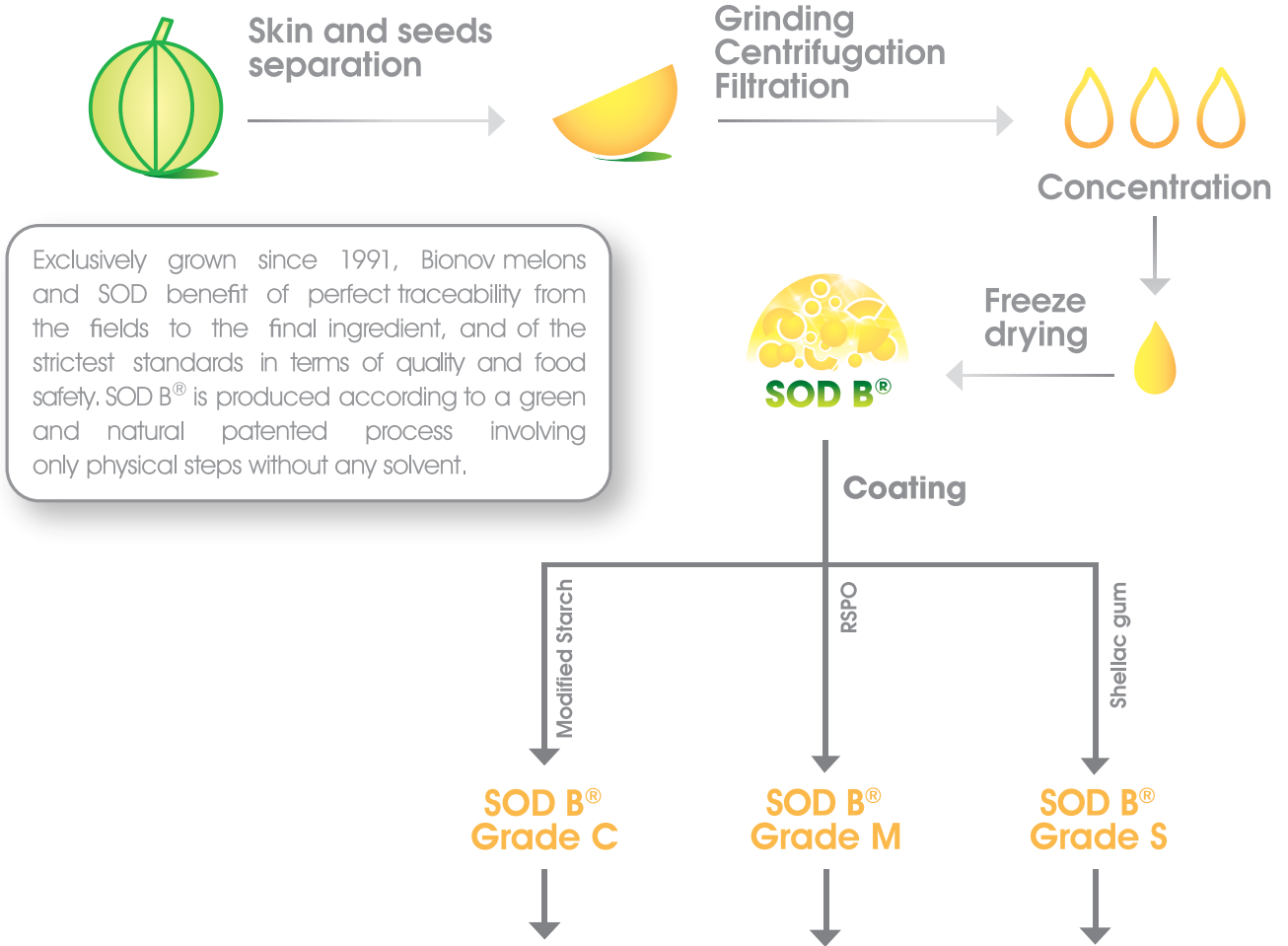
COATED SOD B[®]

3 Liver antioxidant enzyme expression after oral supplementation in a high fat diet model



Understanding SOD B[®] mechanism of action in the body is the main research focus of Bionov scientific department. Nowadays, results suggest that SOD B[®] could exert its antioxidant properties by triggering a cascade of events from the intestine that finally induces the expression of endogenous antioxidant enzymes, and thus corrects oxidative stress.

From Bionov fields to dedicated applications

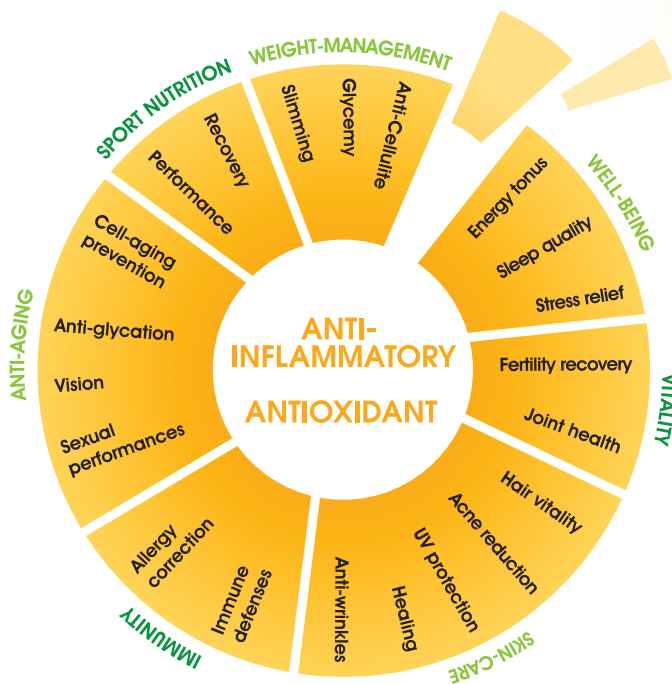


Products	Applications	Cosmetic products	Dietary supplements	Food and Instant drinks
<p>NEW</p> <p>SOD B DIMPLESS[®] Skin Beauty</p>	<p>Cellulite reducer ⁽¹⁾ Beautifying body ⁽²⁾ Skin shape ⁽²⁾</p> <p>Clinical daily dosage</p>	<p>5,000 IU/g 0,5-2%/day</p>	<p>12,000 IU/g 40 mg/day 480 IU/day</p>	<p>12,000 IU/g 40 mg/day 480 IU/day</p>
<p>SOD B PRIMO-ANTIOXIDANT[®] Anti-Aging</p>	<p>UV protection ⁽²⁾ Fertility recovery ⁽²⁾ Joint health ⁽²⁾ Vision ⁽²⁾</p>	<p>1,000 IU/g</p>	<p>5,000 IU/g 20-200 mg/day</p>	<p>5,000 IU/g 20-200 mg/day</p>
<p>NEW CLINICAL STUDY</p> <p>SOD B EXTRAMEL[®] Well-being</p>	<p>Stress relief ⁽¹⁾ Physical tonus ⁽¹⁾ Cognitive performances ⁽¹⁾ Sleep quality ⁽¹⁾</p> <p>Clinical daily dosage</p>	<p>N.A.</p>	<p>14,000 IU/g 10 mg/day 140 IU/day</p>	<p>14,000 IU/g 10 mg/day 140 IU/day</p>

(1) Proprietary clinical study
 (2) Scientific master file

SOD B[®] NATURAL & BIOACTIVE SOD

SOD B[®] health benefits



SOD B[®] is the most effective natural melon SOD with scientific demonstrated bioactivity. Thanks to Bionov expertise, SOD B[®] responds to specific consumer expectations, providing several antioxidant and anti-inflammatory health benefits.

Ready to use solutions

SOD B[®] benefits of the strictest standards in terms of quality and food safety, of scientific evidences, and responds to all specific consumer expectations.

SCIENTIFIC EVIDENCES



Published studies
(*in vitro*, *in vivo*, clinical)
Guaranteed bioactivity
Patented process
Patented coatings



Proprietary variety
Melon healthy image
Co-development
Formulation help
Claims support

INNOVATION SUPPORTS

GREEN AND NATURAL



Heavy metals free
Gluten & Allergen free
BSE & GMO free
Pesticide free
Solvent free



GRAS
Organic grade
FDA approved
Food grade
Kosher - Halal

CONSUMERS ORIENTED



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