

# Phytonutriance®

Natural antioxidant solutions with a proven efficacy

## A Natural Ingredient for Detoxification and Anti-Bacterial Protection

**BrassiCare™**  
by Phytonutriance®



- > Broccoli extract powder
- > Standardized to 1.6% glucoraphane
- > High in sulforaphane
- > Liver detoxification
- > Associated with ulcer prevention
- > Powerful antioxidant

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# THE 'SUPER' VEGETABLE

## The Brassicare™ story

**Broccoli** has been cultivated since the Middle Ages, originating from Italy. Broccoli contains many phytochemicals, among which **glucosinolates**, a family of sulphur compounds, are at the root of the acknowledged health properties. Diana Naturals has selected the **best varieties of broccoli** to offer the **highest level of glucosinolates**, including glucoraphane and sulforaphane.

Extensive research on the health benefits of these compounds, especially sulforaphane, has shown two important benefits:

- Improvement in liver detoxification
- Prevention of peptic ulcers by fighting the bacteria responsible *Helicobacter pylori*.



## Focus on anti-bacterial properties

*Helicobacter pylori* is the only known bacterium able to survive in the highly acidic environment of the stomach.

### Brassicare™ Key Features

- 100% natural
- Guaranteed levels of glucoraphane and sulforaphane
- Strong scientific support
- Agronomic expertise
- Highly stable
- Highly water soluble
- Low broccoli flavor
- Food grade
- Kosher

According to the National Institutes of Health, 20% of people under 40 and half of those over 60 have *H. pylori* bacteria in their body. While many do not develop ulcers as a result, *H. pylori* is believed to be the cause of the majority of peptic ulcers in the USA.

Ulcers cause an estimated one million hospitalizations and 6500 deaths per year. Annual health care costs of peptic ulcer disease have been estimated at **nearly \$6 billion**: \$3 billion in hospitalization costs, \$2 billion in physician office visits, and \$1 billion in decreased productivity and days lost from work.

Additionally, according to market research firm Mintel, the gastrointestinal (GI) remedies market was estimated at \$2.6 billion in 2004 and continues to increase from year to year.

Due to its anti-bacterial capacities, Brassicare™ seems to be an effective active that may help to prevent ulcers.

“ In the USA over 25 million people will suffer from an ulcer at some point in their lives. ”

## Frequently Asked Questions

### What is Brassicare™?

Brassicare™ is an extract that includes all of the organosulfur compounds (especially glucosinolates) naturally present in fresh broccoli. It is standardized to 1.6% glucoraphane and is high in sulforaphane.

### What is glucoraphane?

Glucoraphane is a key protective compound from broccoli, part of the glucosinolates family. It is the precursor of highly bioavailable sulphur compounds, such as sulforaphane, generated in the digestive tract during digestion. Brassicare™ is rich in these glucosinolates. It delivers all the benefits of fresh broccoli due to the sulphur compounds generated from the glucoraphane carefully stabilized in the extract.

### How can Brassicare™ promote liver detoxification?

In addition to its direct antioxidant properties, broccoli also acts as an indirect antioxidant by activating the detoxification system. The effect of Brassicare™ on the activity of enzymatic detoxification complexes has been evaluated *in vitro*. Results show that Brassicare™ acts as a booster of the detoxifying system, helping the body counter the negative effects of modern life: increased stress, unbalanced diet, air pollution, etc...

### How can Brassicare™ help to prevent ulcers?

Ulcers are caused by a bacterium, *Helicobacter pylori* (H. pylori), which is present in two thirds of the world population. H. pylori is the only known bacteria able to survive in the highly acidic environment of the stomach. The effect of Brassicare™ on these bacteria has been evaluated *in vitro*. Results show that Brassicare™ is an effective anti-bacterial agent for H. pylori, and so may help to prevent ulcers.

### Is Brassicare™ safe?

Brassicare™ is a food-grade natural extract of broccoli. Its safety has been documented in toxicity studies.

### What is the recommended daily dosage of Brassicare™?

Scientific research on liver detoxification and anti-bacterial effects supports a 100-200 mg recommended daily dosage of Brassicare™.

### Where is Brassicare™ produced?

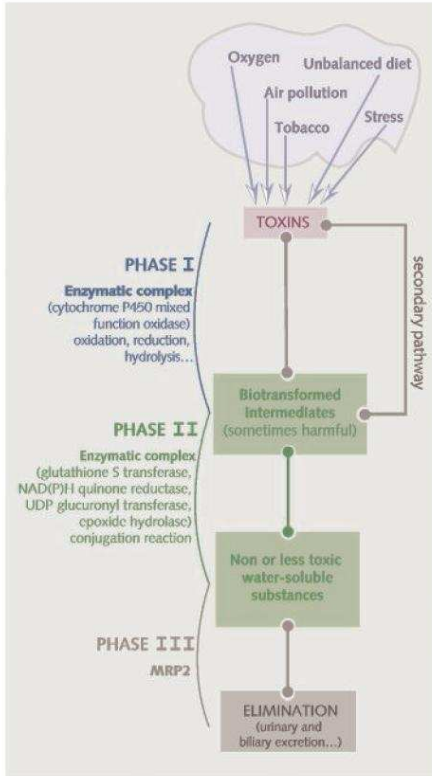
Brassicare™ is extracted from fresh broccoli, and is produced in France, in a NF EN ISO9001:2000 certified facility.

These statements have not been evaluated by the Food and Drug Administration.  
This product is not intended to diagnose, treat, cure or prevent any disease.

# SCIENTIFIC BACKGROUND

## > Brassicare™ activates liver detoxification

The influence of Brassicare™ on the activity of the different enzymatic detoxification complexes has been evaluated *in vitro*. Oltipraz, a sulforaphane-like molecule, was used as a positive control.



HepaRG cells were used to simulate the human hepatic detoxification system.

### Phase I inhibition

In the first phase of the detoxification pathway, the phase I enzymatic complex modifies toxins into intermediate compounds, to be transformed by phase II enzymatic complexes. This phase generates a large quantity of free radicals, which can be more toxic than the initial molecules.

Brassicare™ was effective on CYP1A2 (part of the phase I enzymatic complex), compared to the positive control Oltipraz. **Brassicare™ inhibits more than 60% of the CYP1A2 activity *in vitro*.**

### Phase III activation

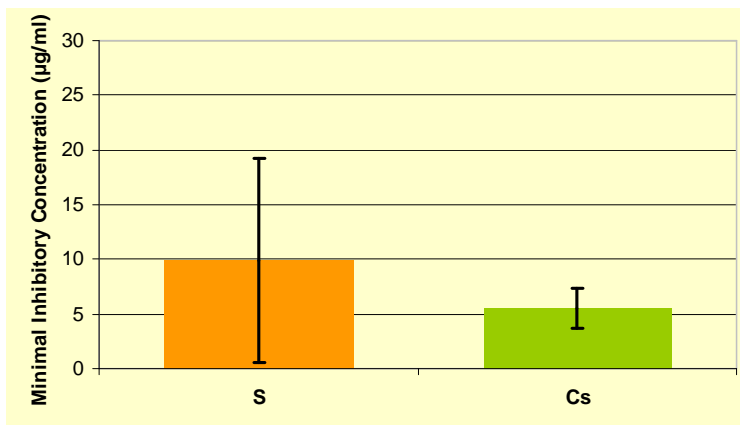
The major role of phase III enzymatic complex proteins is to expel the toxins from the cells, particularly those that have been modified to become water soluble and less toxic due to the phases I and II detoxification complexes.

Brassicare™ is a potent activator of the global excretion activity of the cultured HepaRG hepatocytes. The **maximum increase of excretion activity (6-7%) is reached at 100 µg/ml**. This is equivalent to treatment with 35 µM positive control Oltipraz.

## > Brassicare™ is an effective anti-bacterial agent

In an *in vitro* study conducted in collaboration with the CNRS (France), 11 strains of *H. pylori* (mainly human clinical isolates) were used to determine, at pH 5.8 (juxtamucosal pH), the minimal inhibitory concentration of:

- Brassicare™ treated with thioglucosidase to imitate digestion and transform glucoraphane into sulforaphane
- Pure sulforaphane



**Comparison of the average Minimal Inhibitory Concentration value of either pure sulforaphane (S) or corresponding sulforaphane from the treated Brassicare™ (cS) at pH 5.8.**

Results were read after incubation at 37°C under micro-aerobic conditions (shown at left):

Brassicare™ is an **effective anti-bacterial agent** against *Helicobacter pylori* (MIC = 3.71 µg/ml).

*Additional technical information and references available upon request*