# Avmaquin™

**Directions for Use:** One chewable tablet daily for dogs of all sizes, six months and older. Tablets should be given on an empty stomach at least two hours after a meal or one hour before a meal.

**To order,** contact your Nutramax representative, visit Vet-EZ-Order.com, or call 1-888-886-6442.

# Avmaquin™

## Sulforaphane Producing Supplement



NUTRAMAX® LABORATORIES
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U.S. Patent Nos. 9,421,183 and 10,583,178

# What is **A**vmaquin™?

**Avmaquin™ Sulforaphane Producing Supplement** is a tasty and convenient way to administer the ingredients, glucoraphanin and active myrosinase enzyme, to promote **sulforaphane production** in dogs. Avmaquin™ helps protect cells against oxidative stress by **increasing the production of selected cytoprotective Phase 2 detoxification and antioxidant enzymes**.

Nutramax Laboratories has scientifically studied the bioavailability of Avmaquin™ in dogs to determine appropriate levels of administration of glucoraphanin for **sulforaphane production.**

Formulated with Broccoli Seeds and Sprouts

Maitake Mushroom Extract and Beta-Glucans

Tasty Chewable Tablets

# Why use **A**vmaquin™?

**Unfortunately, for pets to receive the health benefits of broccoli, it is not as simple as feeding broccoli itself.**

**1 Sulforaphane Production**
Avmaquin™ produces sulforaphane in the body and is shown to be bioavailable in dogs.
*When sourced from broccoli, sulforaphane production is dependent on many factors.*

**2 Administration**
Just give one tasty, convenient tablet of Avmaquin™ daily.
*It is very difficult to determine how much broccoli must be fed to dogs to achieve sulforaphane production.*

**3 Consistency**
Avmaquin™ provides a reliable and consistent level of glucoraphanin and myrosinase for sulforaphane production in dogs.
*Heating and cooking broccoli can damage the enzyme necessary for sulforaphane production.*
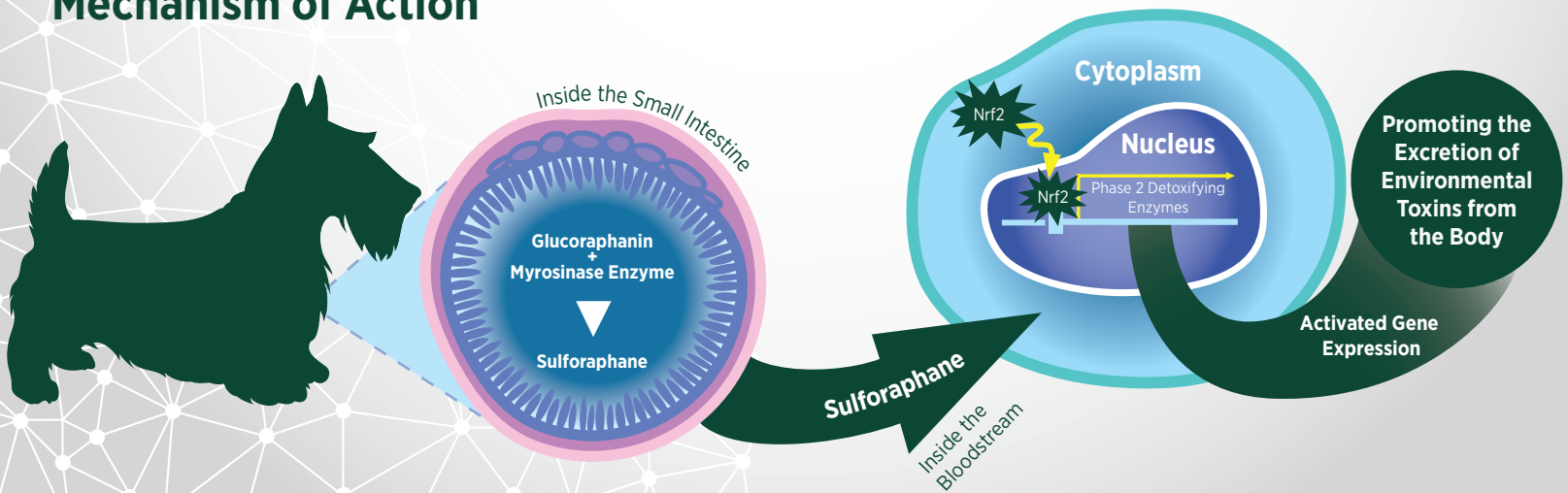
# What is sulforaphane?

Sulforaphane is a phytochemical obtained from the consumption of cruciferous vegetables, most notably **broccoli**. It is produced from necessary ingredients found in these vegetables: glucoraphanin, the glucosinolate precursor to sulforaphane, and myrosinase, an enzyme that interacts with glucoraphanin to convert it to sulforaphane.



**Glucoraphanin**

**Myrosinase**
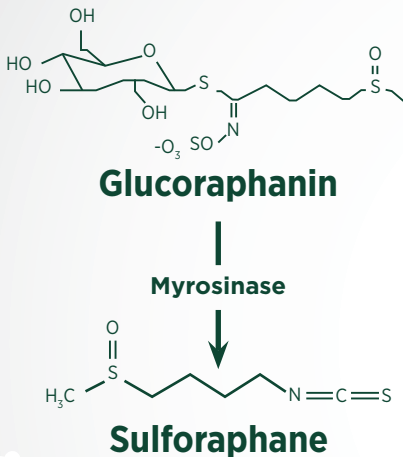
**Sulforaphane**

# Why sulforaphane?

Sulforaphane supports cellular detoxification by stimulating Nrf2 which causes production of certain Phase 2 enzymes. Nrf2 upregulates protective enzymes and proteins to help protect cells from oxidative stress. The production of these enzymes also promotes antioxidant activity against free radicals, which can damage DNA, proteins, and lipids.

# What are Phase 2 enzymes?

The body's detoxification system consists of two major pathways, serving to manage cellular stress and cellular imbalance in the body. Phase 1 enzymes, also known as Cytochrome P450 enzymes, initially process toxins entering the body into metabolites. Then, **Phase 2 enzymes** further support cellular health by **detoxifying these potentially harmful metabolites** to enhance excretion from the body. NQO1 is an important Phase 2 enzyme.

# Mechanism of Action



Inside the Small Intestine

Glucoraphanin + Myrosinase Enzyme

Sulforaphane

Sulforaphane

Inside the Bloodstream

Cytoplasm

Nrf2

Nucleus

Nrf2

Phase 2 Detoxifying Enzymes

Activated Gene Expression

Promoting the Excretion of Environmental Toxins from the Body

# Science of Avmaquin™

**(1)** Bioavailable  **(2)** Bioactive  **(3)** Synergistic

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**1** Avmaquin™ is **bioavailable** in dogs, with sulforaphane concentrated in the bladder.

### Total Plasma SFN



★ Mean Urine SFN (µM/nM creatinine) concentrating in the bladder
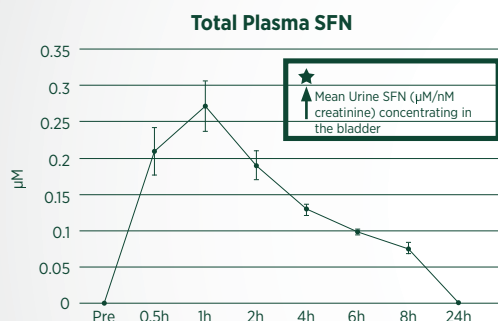
Gillette R, et al. 2020 Virtual Poster Veterinary Cancer Society Annual conference.

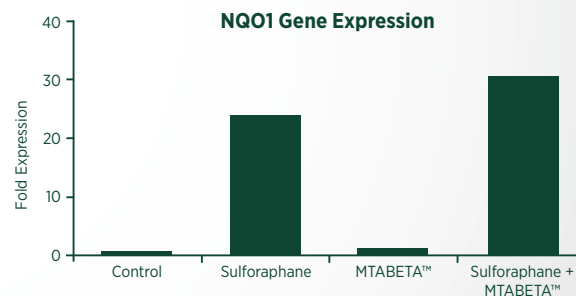**2** Avmaquin™ is also **bioactive** in dogs, with NQO1 levels rising after administration.

### NQO1 Gene Expression in Dogs after Administration of Avmaquin™
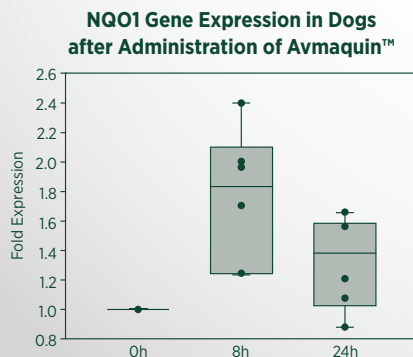


Gillette R, et al. 2020 Virtual Poster Veterinary Cancer Society Annual conference.

**3** Avmaquin™ contains beta-glucans that work **synergistically** with sulforaphane to promote the body's own detoxification process. When cells are exposed to sulforaphane and MTABETA™, NQO1 levels are synergistically increased. This powerful Phase 2 detoxifying enzyme binds to toxins which are thereby excreted from the body.

### NQO1 Gene Expression



Control · Sulforaphane · MTABETA™ · Sulforaphane + MTABETA™

Data on file. Nutramax Laboratories Veterinary Sciences, Inc. 2019.

**Avmaquin™**
Sulforaphane Producing Supplement
45 chewable tablets for dogs of all sizes