



➤ Product Review ◀

November, 2017 #307

NEW GARLIC SELECT™ – OUR HIGH ALLICIN GARLIC EXTRACT & HIGH S-ALLYL CYSTEINE BLACK FERMENTED GARLIC COMBO FORMULA

INTRODUCTION

Certainly, for several years now, one of the staples of the functional medicine/clinical nutrition practice has been a garlic supplement. Therefore, it should come as no surprise that one of the most common requests we have received since we started the Moss Nutrition Select line was for a quality garlic product. However, the qualifier “quality” presented some challenges for us and is one of the reasons we have taken so long to release our new garlic product, **Garlic Select™**. Given that garlic has so many uses clinically, ranging from reducing inflammation to quenching free radicals to acting as an anti-microbial, and given that there are so many different garlic raw materials from which to choose, we were, initially, a bit overwhelmed as to what should ultimately be included in our product. Finally, after reading many research papers on garlic and looking at what was available from many different raw material suppliers, we decided on a **combination** of traditional **garlic extract** – containing significant quantity of allicin and **black fermented garlic** – a form of garlic that is found less often in the usual garlic products. The value of black fermented garlic principally lies with its content of the compound s-allyl cysteine, the unique properties of which I will be discussing shortly. First, though, I would like to discuss some of the more important general properties of garlic.

GARLIC: A BASIC OVERVIEW

As noted by Foroutan-Rad et al (Foroutan-Rad M et al. *J Evidence-Based Complementary & Alternative Med*, Vol. 22, No. 1, pp. 141-155, 2017), the first important point to note about garlic is that its benefit clinically can largely be attributed to the presence of sulfur compounds:

“Medicinal benefits and therapeutic properties of garlic are ascribed to presence of organosulfur compounds (OSCs).”

The authors go on to point out the following concerning key properties of garlic:

“*Allium sativum* contains many chemical ingredients, including 17 amino acids, more than 33 OSCs, 8 minerals (calcium, potassium, magnesium, germanium, selenium, copper, zinc, and iron), vitamins (A, B₁, B₂, B₃, B₆, B₁₂, C, D, E), and some enzymes (allinase). Allicin as the major biologically active component of fresh garlic is a candidate in antitumor survey.”

In addition:

“...the pungent flavor of garlic is due to the presence of allicin.”

Figure 1 at the end of this newsletter, that comes from the Foroutan-Rad et al paper, provides a general overview of all the reported clinical properties of garlic.

THE UNIQUE PROPERTIES OF S-ALLYL CYSTEINE, A KEY COMPONENT OF BLACK FERMENTED GARLIC

In examining the large volume of published research on garlic, what particularly impressed us was the information on the key component of black fermented garlic, S-allyl cysteine. Therefore, I would now like to present

highlights from a paper that focuses on S-allyl cysteine.

In “The antioxidant mechanisms underlying the aged garlic extract-and S-allylcysteine-induced protection” by Colin-Gonzalez et al (Colin-Gonzalez AL et al. *Oxidative Med & Cellular Longevity*, published online 2012) the basic biochemistry of S-allyl cysteine (SAC) is first discussed:

“SAC is formed from γ -glutamyl-S-allylcysteine catabolism and has been used to standardize commercial aged garlic extract.”

The next quote I would like to highlight from this paper offers information on bioavailability which, as you will see, is quite high:

“Oral bioavailability of SAC at 100 mg/kg dose is 91%, similar to that reported in other studies where bioavailability was 103.0% in mice, 98.2% in rats, and 87.2% in dogs.”

What about tissue distribution:

“After oral intake, SAC is easily absorbed in the gastrointestinal tract and can be detected in several tissues up to 8h after dosage.”

The next quote discusses the metabolic fate of SAC:

“N-Acetyl-SAC has been identified as a metabolite of SAC in urine of rats, dogs, and humans. Also, small amounts of SAC (less than 1%) have been observed in urine of rats. These data suggest that the absorbed SAC seems to be metabolized to N-acetyl-SAC by N-acetyltransferase, which is mainly found in liver and kidney. However, it has been shown that, when SAC is almost completely eliminated from the liver, it is readily retained at a comparatively high concentration in the kidney.”

Antioxidant properties of SAC

Probably the most important clinical role of SAC is its antioxidant capacity. Colin-Gonzalez et al state:

“SAC is the most studied compound of aged garlic extract and its antioxidant properties have been reported in several studies. SAC readily prevents lipid and protein oxidation and nitration, supporting its antioxidant

activity. Actually, SAC is known to scavenge superoxide anion (O_2^-), hydrogen peroxide (H_2O_2), hydroxyl radical ($\cdot OH$), and peroxyxynitrite anion ($ONOO^-$). Medina-Campos et al. reported that SAC scavenges hypochlorous acid (HOCl) and singlet oxygen (1O_2). Furthermore, these authors compared the scavenging activity of SAC against reference compounds (molecules that scavenge a specific reactive oxygen species) through the IC_{50} value for each reactive species. SAC scavenged HOCl in a similar manner compared to lipoic acid, and it was more efficient in scavenging 1O_2 than lipoic acid and reduced glutathione. Recently, Maldonado et al. reported that SAC was able to scavenge $\cdot OH$ and peroxy radical ($ROO\cdot$) in a concentration-dependent manner, and this effect is reduced when SAC is changed by S-propylcysteine, suggesting that allyl group in SAC is necessary for its scavenging activity.”

As many of you know, under certain circumstances iron and copper can act as powerful pro-oxidant agents. As you will see from the following quote, SAC can have a positive impact on negating this property of iron and copper:

“Dairam et al. found that SAC (30 $\mu g/ml$) possesses the property of chelating Fe^{2+} and Fe^{3+} in a concentration dependent manner. Moreover, it has been shown that aged garlic extract and SAC are able to inhibit Cu^{2+} -induced LDL oxidation, an effect associated to its ability to chelate Cu^{2+} .”

How might these various antioxidant properties play out clinically? Colin-Gonzalez et al state the following in the conclusion of their paper:

“...some groups have reported protective effects after chronic administration of aged garlic extract to patients with cardiovascular disease and the mechanisms of protection have been associated with the reduction of multiple cardiovascular risk factors, including blood pressure, cholesterol, platelet aggregation and adhesion, and vascular calcification.”

THE ANTIMICROBIAL PROPERTIES OF ALLICIN

Many of you who requested that we add a garlic product to our repertoire also requested a garlic product that can function as an antimicrobial for patients experiencing GI microbial imbalances, especially SIBO. Based on this request we wanted a garlic product that contained a significant amount of allicin. The previously discussed paper by Foroutan-Rad et al discusses the antimicrobial properties of allicin. The authors state:

“Allicin is a potential...antimicrobial agent, the activity of which has been the focus of many researchers in past decades. Numerous publications have introduced allicin as an effective molecule against infectious agents and this fact has been repeatedly confirmed. Based on reports, bactericidal activity of allicin has been verified against important pathogens, including *Enterococcus* spp, *Bacillus* spp, *Helicobacter pylori*, *Escherichia coli*, *Staphylococcus aureus*, *Salmonella typhimurium*, and *Vibrio cholera*, as well as methicillin-resistant *Staphylococcus aureus* strains. Also, antifungal effects of allicin

against *Epidermophyton* spp. are clear. Furthermore, it has been reported that allicin possesses antiparasitic activity against *Schistosoma*, *Plasmodium*, *Babesia*, *Theileria*, *Trypanosoma*, *Leishmania*, and *Entamoeba*. In addition, allicin by inhibiting the cysteine proteases of protozoa plays an important role as an antitrypanosomal and antiplasmodial agent. Antimicrobial activity of allicin is justified by its reaction with SH groups of different enzymes such as thioredoxin reductase, alcohol dehydrogenase, cysteine proteinase, and so on.”

SOME FINAL THOUGHTS

As I hope you can see, by **combining** a high allicin **garlic extract** along with a high S-allyl cysteine **black fermented garlic** we were able to create a garlic product that addresses the most common concerns most of you have expressed about a garlic product coming from Moss Nutrition – the need for both antioxidant and antimicrobial activity. For more information on **Garlic Select™**, please see the attached technical bulletin.

Garlic Select™ – 60 Vegetarian Capsules

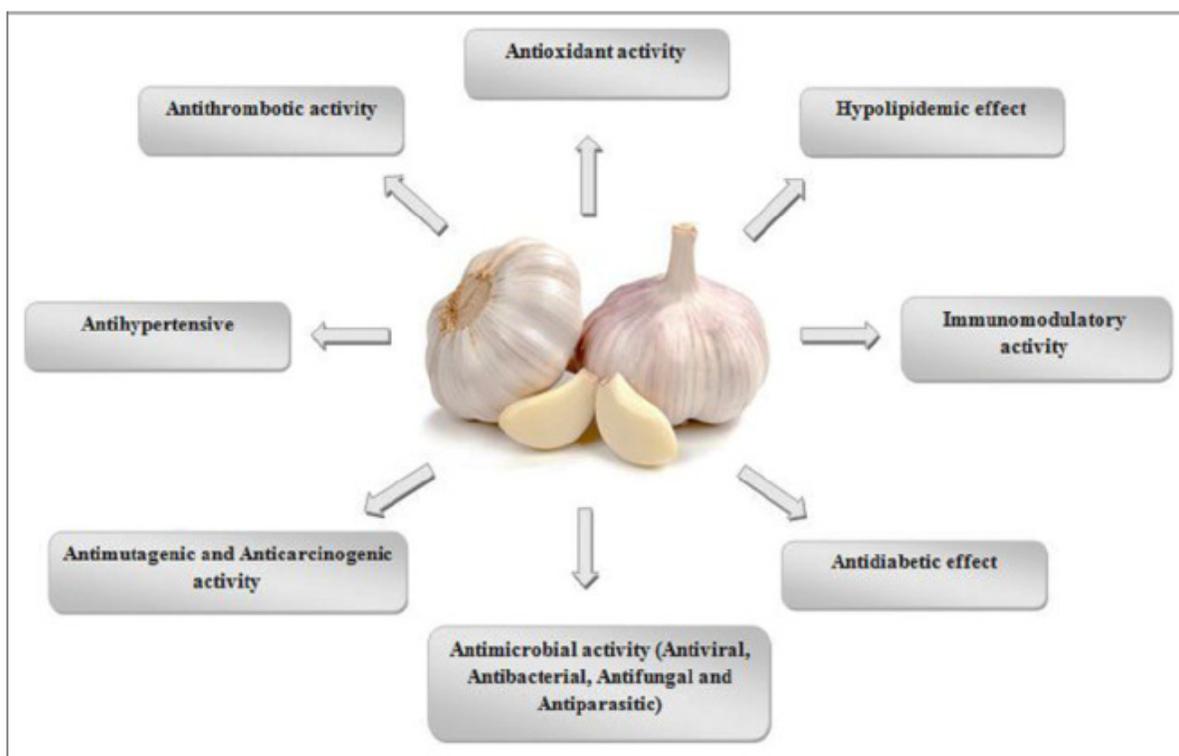


Figure 1. Summary of some therapeutic properties of *Allium sativum* (garlic) bulbs and cloves.