



## Getting to the Heart of ... Wild Bear's Garlic

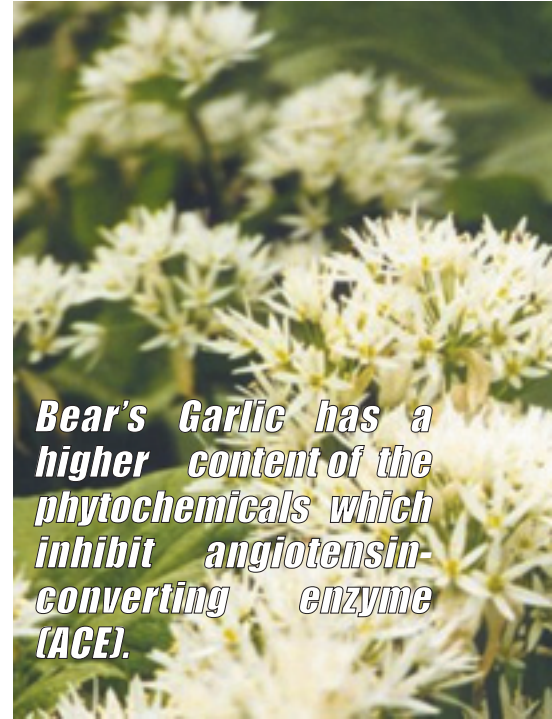
It's a common concern with health-conscious people. After decades of the kind of high-yield, low-cost, capital-intensive agricultural strip-mining that lurks behind today's food supply, we have no one to blame but ourselves if the depletion of nutrients from the soil has led to the depletion of nutrients from the earth. So it's no surprise when, comparing the nutrient content foods from organic vs. conventional sources,<sup>1,2</sup> or the USDA's food tables for 1963<sup>3</sup> and today<sup>4</sup> (or the equivalent data for Britain<sup>5</sup>), we see nutrient depletion in a food supply mass-produced for us by transnational agrobusiness conglomerates. Just as important, but not addressed by these sources, is the loss of **phytochemicals** from our foods. Phytochemicals are the unique nutrients made by plants which help guard our health, but which are not classic vitamins and minerals. Undernourished plants can hardly be expected to provide us with the full bounty of these health-promoting

But it's not just the way that conventional agriculture *raises* crops which affects their nutrient content. Studies comparing the levels of vitamins and minerals contained in domesticated crops, with the nutrient content in the wild fruits and vegetables eaten by hunter-gatherer cultures<sup>6</sup> or our primate ancestors in the wild,<sup>7</sup> show that **the species or strains that are used in modern agriculture are also less nutritious than their wild equivalents.** Over generations, we've selected plants to be fast-growing, sweet, and mildly-flavored ... but not to be *healthy*. And today, the short-sighted corporate use of gene technology threatens to accelerate this process even more.

**Garlic** is one excellent example of this phenomenon – a fact which will be of special interest to folks using this herb as a supplement for their heart health. The common, domesticated garlic created by millennia of selective breeding, sold in supermarket chains, is not the garlic that's found wild in Nature. And it's this common, *domesticated* garlic (*Allium sativum*) which is used to make the most readily-available garlic supplements – from the so-called “aged garlics,” to the reputedly high-allycin German garlic extracts, and all the way down to the indistinguishable masses of lower-cost but untested garlic pills which crowd health food store shelves.

But the garlic which flourishes wild in the forests of Europe ... which was tried and found true by millennia of traditional healing wisdom amongst the Celtic peoples ... which was declared superior by the Renaissance herbalists .... and which new research has begun to show to have more powerful properties in the support of a healthy heart ... is not *A. sativum*, but the great granddaddy of the young whippersnapper in your kitchen.

**The true, original garlic of traditional medicine and modern science is Wild Bear's Garlic, *Allium ursinum*.**



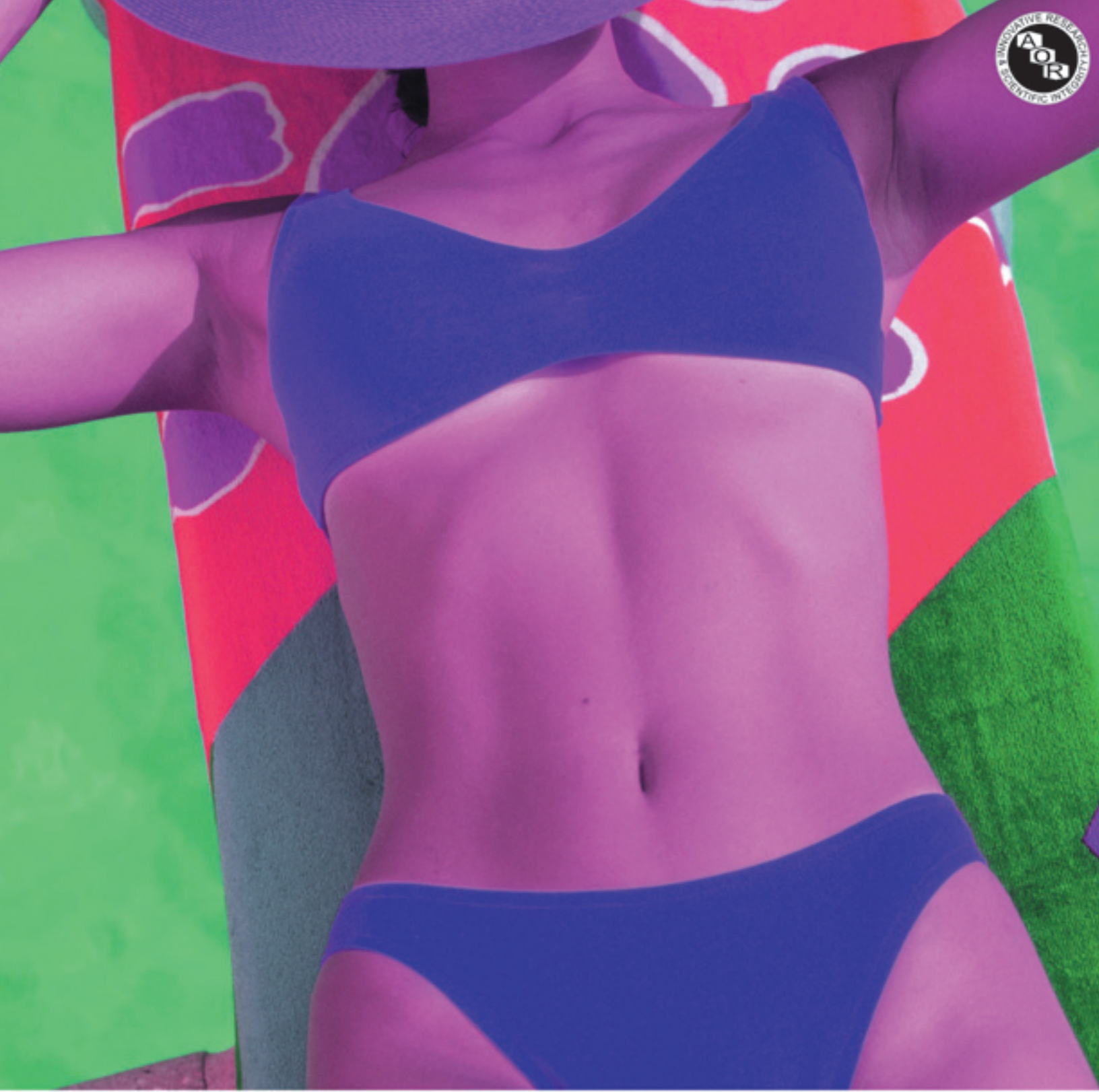
**Bear's Garlic has a higher content of the phytochemicals which inhibit angiotensin-converting enzyme (ACE).**

### The Bear's Garlic

Also known as “wild garlic,” “forest garlic,” or “ramson's garlic,” several languages attest to the traditional association between this wild garlic and the power of the bear. Aside from the Latin species name *ursinum* (from *ursus*, “the bear”), this feral garlic species is known to the Germans as *Bärlauch*, and to the French as *ail des ours*. *A. ursinum* has broad leaves which resemble those of the lily of the valley, and blooms into white flowers during the period from April to June. Found abundantly in the Alps, wild garlic spreads slow and thick like honey, forming dense colonies which weed out competing species in their midst, but which only expand at the rate of about a meter a year

### Nutrients and Phytochemicals

**Bear's Garlic** contains significantly more of many essential nutrients than common kitchen garlic, including such minerals as magnesium, manganese, and zinc.<sup>8</sup> But it's the phytochemicals, and not the mineral content, which will be of greatest interest to folks using garlic as part of a heart-friendly lifestyle.



**Make this summer a bikini summer.**

Aurantica supports your body's fat-burning metabolic fires. So you can burn the fat ... not your bod.

# Getting to the Heart of Wild Bear's Garlic

Compared to the kitchen garlic used in the more common garlic supplements, **Bear's Garlic** contains twice the amount of **ajoenes**,<sup>9-12</sup> the components of garlic believed to be responsible for garlic's ability to prevent the formation of dangerous blood clots.<sup>13</sup> But the most striking difference, phytochemically, between **Bear's Garlic** and kitchen garlic is the wild garlic's higher content of **gamma-glutamyl peptides**.<sup>14,15</sup>

Gamma-glutamyl peptides appear to be the phytochemicals responsible for garlic's ability to inhibit **angiotensin-converting enzyme (ACE)**.<sup>16</sup> It's the inhibition of ACE that underlies the ability of so-called "**ACE inhibitor**" drugs to lower blood pressure, and as a result, the water extract of **Bear's Garlic** is a more powerful natural "**ACE inhibitor**" than kitchen garlic extracts.<sup>15</sup>

Although not strictly speaking a phytochemical, **Wild Bear's Garlic** also contains *twenty-fold* higher levels of **adenosine** (the backbone of ATP, the universal energy molecule).<sup>17</sup> Adenosine has long been known to have a very powerful ability to lower blood pressure,<sup>18</sup> but for a long time no one understood why. It's recently been discovered that **adenosine works by opening up the ATP-dependent potassium (KATP) channel** in the smooth muscles of blood vessels,<sup>19</sup> leading them to relax and present less resistance to the force of the blood flowing through them. The profound role of the KATP channel in controlling blood pressure has *itself* only recently been discovered, and has led to a race to produce drugs which will open its floodgates and lower blood pressure.<sup>20,21</sup>

So why haven't the pharmaceutical

companies rushed to put adenosine in a pill? Well, aside from the fact that it's an unpatentable, natural substance, and not a drug, the drug companies know that you can't make an effective pill out of isolated, synthetic adenosine, because it does not survive the digestive tract. Experiments using adenosine as a way of lowering blood pressure have therefore always administered the adenosine by injection.

Does that mean that the adenosine in **Bear's Garlic** is only of interest in test-tube studies? Far from it! Here we see a true example of the *synergy* of natural substances – a word that is so overused by supplement companies that it's become almost meaningless. Studies done twenty years ago appear to demonstrate that polar sulfur-based phytochemicals present in **Bear's Garlic** protect adenosine from destruction, allowing a significant amount of it to pass into the intestines intact<sup>22</sup> and to penetrate cell membranes.<sup>17</sup> So it looks like Nature has beaten the drug companies to the punch once again: **Bear's Garlic may be a natural KATP-channel activator, too!**

## Bear-ing the Pressure

Kitchen garlic, and extracts made from it, do appear to have some ability to lower blood pressure, but the effect is weak and inconsistent.<sup>23-25</sup> The inconsistency is hardly surprising, granted that supermarket garlic contains so little of the key ingredients which might support lower blood pressure

at an adequate dose – the ACE-inhibiting *gamma-glutamyl peptides*, and *adenosine*, Nature's KATP-channel activator. But once scientists saw the high content of natural blood vessel relaxers present in **Bear's**

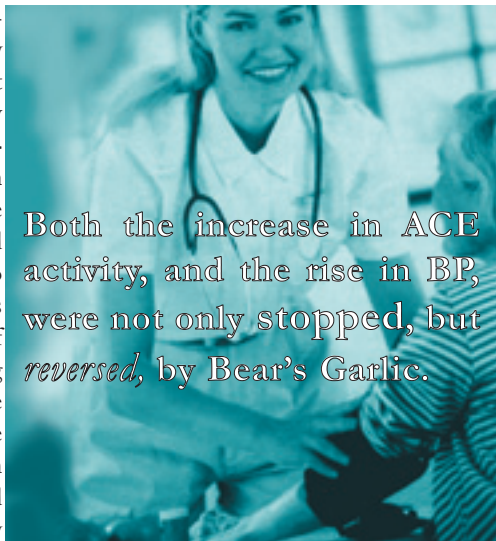
**Garlic**, they started to wonder: would **Bear's Garlic** soar where cultivated garlic extracts merely limped along?

The first study to confirm this line of thinking in a living organism was done in 1993,<sup>26</sup> but that study's focus was on the ability of **Bear's Garlic** to protect the heart during an experimental heart attack, rather than on its effects on blood pressure. This study *did* note **Bear's Garlic's** ACE inhibition in the rodents, but only as a side point in a larger picture. We'll review its exciting findings a little later on. Right now, we'll focus in on the newer studies,<sup>27,28</sup> which were specifically designed as *tests* of the hypothesis that **Bear's Garlic** would have more potent blood-pressure lowering effects than supermarket garlic.

**Bear's Garlic** aced these tests.

The first of these two papers<sup>27</sup> actually reports the results of three distinct experiments performed on lab rodents which are genetically predisposed to developing high blood pressure. In the first experiment, the effects of **Bear's Garlic** were tested against increases in blood pressure (BP) created by diet. Rats which normally develop high blood pressure because of a genetic defect were put on a diet which normally makes their condition even worse, raising ACE activity and causing their blood pressure to skyrocket. **Both the increase in ACE activity, and the rise in BP, were not only stopped, but reversed, by Bear's Garlic**, so that animals receiving **Bear's Garlic** on a sucrose diet had ACE activity levels and BPs which were not only lower than those of the animals on the unsupplemented *sugar* die, but lower than those animals on the healthier *starch* diet alone!

Next, three *different* garlic extracts (Kyolic<sup>®</sup>, Kwai, or wild **Bear's Garlic**) were tested for their effects on BP, with all animals receiving a 50-50 starch/sugar diet mix. As soon as the trial began, all of the animals began to show increases in blood pressure,



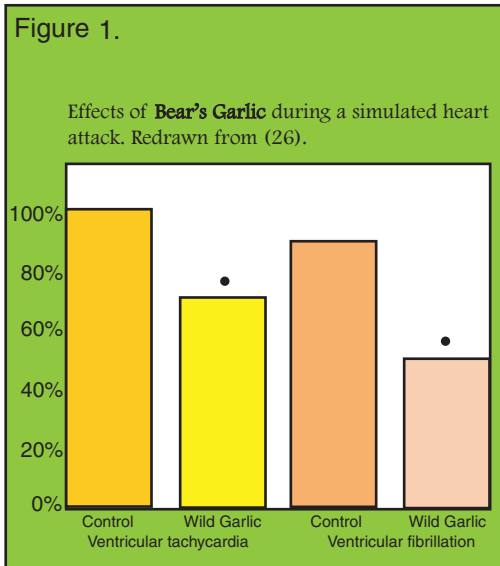
Both the increase in ACE activity, and the rise in BP, were not only stopped, but reversed, by Bear's Garlic.



which leveled off to a high plateau after twenty days. All of the garlic preparations helped to reduce the final blood pressure of the animals that got them (as compared to the animals who were not given *any* garlic extract), but **animals who received Bear's Garlic showed the greatest reductions in blood pressure.** In comparing the results achieved by **Bear's Garlic** to the observations with the other garlic extracts, the differences were judged to be statistically meaningful when compared with Kyolic® garlic extract (which displayed the least effect on BP) but not with the Kwai material (which had an effect intermediate between those of Kyolic® and **Bear's Garlic**). The same pattern, in both numbers and statistical calculations, held for ACE activity: **of the three garlics, the natural "ACE-inhibitor" power of Bear's Garlic was the strongest.**

For the last experiment reported in this scientific paper,<sup>27</sup> the effect of dose was examined. As you'd expect, all garlic extracts displayed more potent BP-lower-

ing effects as the dose in the diet was increased, but **at all concentrations, Bear's Garlic had the strongest effects on BP of the three garlics.** Again, at all concentrations, Kyolic® had the weakest numbers, Kwai an intermediate value, and **Bear's Garlic** the most impressive reduction in BP measurement; and again, the differences were found statistically significant in comparing **Bear's Garlic** to Kyolic®, but the differences between Kwai and either of the other two garlics were not judged to meet the statistical standard.



### Confirming Significance

These experiments demonstrated the superiority of **Bear's Garlic** to Kyolic® in terms of blood pressure. In these experiments, the *numbers* for **Bear's Garlic** were consistently more impressive than were those for Kwai; yet, again consistently, the difference was not powerful enough to meet the statistician's standard for meaningfulness [See sidebar, **Statistical Significance**]. That doesn't prove that the difference was just a fluke, however. Many

things can cause a result to not achieve statistical significance, even when the effect is real. The most common reason for this, when it happens, is that scientists just don't use enough subjects (human or animal) to prove that a result could not have happened by chance. If each of four people flips a coin, we expect, on average, to see two heads and two tails; if three come up heads, the numbers look different from an expected "random" result, but it's still quite easy to see that the finding could just be a coincidence. But if 75% of a group of 1000 people flip coins and come up with heads, we know that something is afoot.

In the newer paper,<sup>28</sup> researchers decided to see if the differences between **Bear's Garlic** and Kwai garlic could be proven to be real, and not a quirk of fate, by achieving statistical significance. To do this, the researchers simply repeated the earlier experiment,<sup>27</sup> with two key differences. This time, the scientists used only two garlic preparations: **Bear's Garlic** and Kwai. And this time, researchers used enough experimental animals to virtually guarantee that no *real* result would be mistaken for a fluke – or vice-versa.

Once again, in the new study, all animals showed increases in blood pressure. And once again, both **Bear's Garlic** and Kwai garlic helped to counteract the effect. Again in common with the first study, **Bear's**

### Statistical Significance

In a world as big as ours, *anything*, no matter how crazy-sounding, can happen by chance once in a while. A scientific study can report a difference which *looks* impressive, but was actually a sheer fluke. That's a big part of the reason why testimonials (or "anecdotal evidence") should be ignored by savvy folks concerned about their health: no matter how impressive one person's change is after trying a new drug, supplement, or lifestyle change, it *might* just be a case of the luck of the draw. For instance, people *do* occasionally just spontaneously get better from cancer and other life-threatening illnesses; the fact that a person took up gong therapy just before a sudden remission does not mean that gong therapy "cured" him or her. So how do you know when something happens by chance, and when it happens *because of* something you did?

Mathematical tests can help answer these questions. Such tests calculate the odds of a result being caused by blind luck to a *group* of people or animals, under *controlled* conditions. If the odds of something happening by chance are high enough, we can't conclude for sure that the event happened because of something we did. If four people flip coins, we expect, on average, to see two heads and two tails; if three come up heads, the numbers look different from an expected "random" result, but it's still quite easy to see that the finding could just be a coincidence. As more and more heads pile up, however, the difference in numbers eventually becomes large enough to be very unlikely to have been the result of luck, and the difference achieves *statistical significance*.

# Getting to the Heart of Wild Bear's Garlic

Garlic had a more powerful anti-hypertensive effect than Kwai. But this time, with the greater number of animals involved, the more powerful results of Bear's Garlic on blood pressure were proven to be statistically significant.

Thus, the results were very unlikely to have happened by chance; there was judged to be a *real difference* between the effectiveness of the wild Bear's Garlic extract, and the kitchen garlic used to make Kwai.

## Hope for Hearts In Crisis

Of course, unbalanced blood pressure doesn't kill a person immediately. It does, however, damage many of the organs of the body in frightening ways – causing kidney damage, and weakening the muscles of the heart and the vessels which carry the blood. A heart attack happens when the muscle of the heart is suddenly starved of its oxygen supply. So damage to the heart (the very muscle which keeps the oxygen-rich blood supply flowing) and to the vessels (which carry blood and oxygen from the heart to the body's different cells) put a person at greater risk of this crisis.

The most immediately dangerous part of a heart attack can be the risk of **ventricular fibrillation** – the fatal loss of the heart's rhythm, reducing a regular drumbeat to a spastic, ineffectual quiver with no power to pump blood. Once this happens, a vicious cycle begins: the heart isn't beating properly because of the heart attack ... and the heart attack won't end because the heart isn't beating properly, and can't deliver itself any life-saving oxygen. It's this failure to pump blood that we call "cardiac arrest." And it's fibrillation that is attacked on TV dramas when doctors pull out the white electrical paddles (**defibrillators**) and shout "Clear!" The hope: the sudden electrical surge will restore a regular heartbeat, saving the patient from certain death.

A study done a few years back<sup>26</sup> suggests that **Bear's Garlic** doesn't just support heart health through its effects on blood pressure levels, but may actually come to the rescue should the heartbeat fail.

**88% of the untreated animals' hearts had entered into ventricular fibrillation, versus only 20% of the hearts of animals who had received Bear's Garlic.**

In this experiment, rodents were fed either regular lab chow, or a diet supplemented with a pulverized moiety of **Bear's Garlic** for eight weeks. Then their chests were opened, and their hearts bathed

in a special fluid to keep them alive while scientists studied them. By suddenly blocking the blood vessel which feeds the heart its blood supply, the researchers were able to create a simulated heart attack, and see directly what influence a long-term **Bear's Garlic** supplement would have on the survival of the heart.

After twenty minutes of heart attack conditions, **88% of the untreated animals' hearts had entered into ventricular fibrillation, versus only 20% of the hearts of animals who had received Bear's Garlic (Figure 1)**. And after the regular flow of blood was restored to the animals' hearts, **every single one of the untreated animals' hearts entered into ventricular tachycardia**, a condition of wildly racing heartbeat which can lead the heart back into fibrillation; by contrast, **30% fewer animals whose diets had been supplemented with Bear's Garlic became tachycardic**. And despite being kept under identical conditions, **significantly less of the Bear's Garlic-supplemented animals' heart weight actually became starved for oxygen during the experimental heart attack** (33.6% vs 40.9% of heart weight). This lack of oxygen starvation, under the same low-oxygen conditions, can mean the difference between the permanent death of heart cells in a survivor, and maintaining functional heart cells once the crisis is over.

## Heart of the Bear

In the winter months of the year, the bear's instincts save it from dangerous times. Taking refuge from its feral wanderings, its heart rate slows, its blood pressure drops, and it sleeps until the snows melt and Nature is reborn. And it is in the bloom of spring that, ancient Teutonic legend has it, the bear will awaken from its slumber and feast on wild garlic to regain its strength. Based on the latest research, **Bear's Garlic** may hold a similar promise for a heart beating in a chest near you.

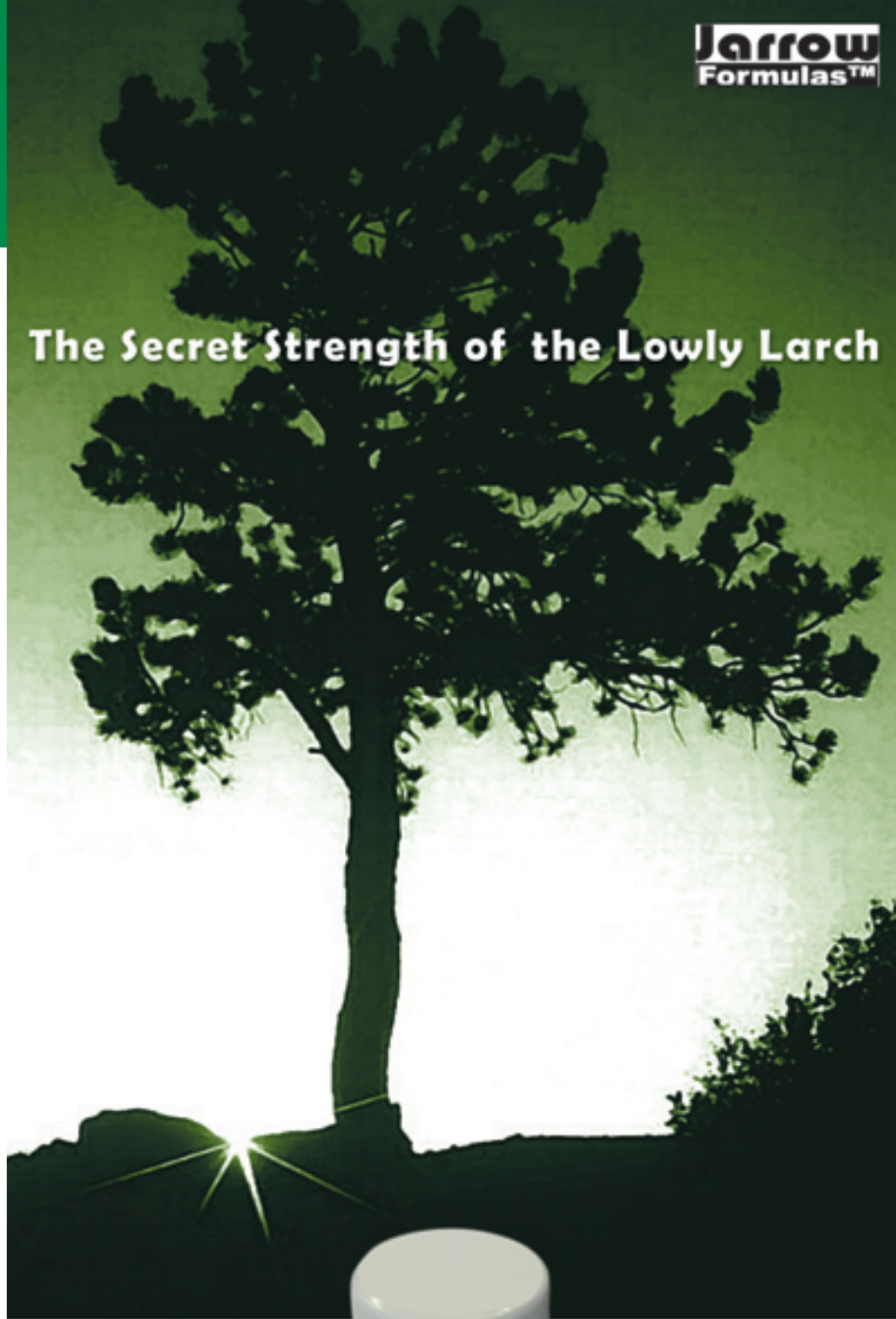
## References

1. Worthington V. Effect of agricultural methods on nutritional quality: a comparison of organic with conventional crops. *Altern Ther Health Med.* 1998 Jan;4(1):58-69.
2. Smith BL. Organic foods vs. supermarket foods: element levels. *J Appl Nutr.* 1993; 45(1):35-39.
3. U.S. Department of Agriculture, Agricultural Research Service. 1963. *Composition of Foods (Raw, Processed, Prepared): Agriculture Handbook No. 8.*
4. U.S. Department of Agriculture, Agricultural Research Service. 1999. *USDA Nutrient Database for Standard Reference, Release 13.*
5. Mayer AB. Historical changes in the mineral content of fruits and vegetables. *Br Food J.* 1997 Jun; 99(6):207-11.
6. Eaton SB, Eaton SB, Konner MJ. Paleolithic nutrition revisited: a twelve-year retrospective on its nature and implications. *Eur J Clin Nutr.* 1997 Apr;51(4):207-16.
7. Milton K. Nutritional characteristics of wild primate foods: do the diets of our closest living relatives have lessons for us? *Nutrition.* 1999 Jun;15(6):488-98.
8. *Certificate of Analysis for Bearlic™ for Pfannenschmidt, Mikroanalytisches Labor Pascher, Remagen-Bandorf, Germany (1993).*
9. Blania G, Spangenberg B. Formation of allicin from dried garlic (*Allium sativum*): a simple HPTLC method for simultaneous determination of allicin and ajoene in dried garlic and garlic preparations. *Planta Med.* 1991 Aug;57(4):371-5.
10. *Certificate of Analysis for Bearlic™ for Pfannenschmidt, Labore Wessling, Germany (1991).*
11. Lawson LD, Wang ZJ, Hughes BG. Identification and HPLC quantitation of the sulfides and dialk(enyl) thiosulfonates in commercial garlic products. *Planta Med.* 1991 Aug;57(4):363-70.
12. Sendl A, Wagner H. Isolation and identification of homologues of ajoene and alin from bulb-extracts of *Allium ursinum*. *Planta Med.* 1991 Aug;57(4):361-2.
13. Beretz A, Cazenave JP. Old and new natural products as the source of modern antithrombotic drugs. *Planta Med.* 1991 Oct;57(7):S68-72.
14. Wagner H, Elbl G, Lotter H, Guinea M. Evaluation of natural products as inhibitors of angiotensin-I converting enzyme I (ACE). *Pharm Pharmacol Lett.* 1991 Jan; 1:15-8.

15. Sendl A, Elbl G, Steinke B, Redl K, Bren W, Wagner H. Comparative pharmacological investigations of *Allium ursinum* and *Allium sativum*. *Planta Med.* 1992 Feb;58(1):1-7.
16. Mutsch-Eckener M, Meier B, Wright AD, Sticher O. Gamma-glutamyl peptides from *allium sativum* bulbs. *Phytochemistry.* 1992 Jul;31(7):2389-91.
17. Reuter HD, Sendl A. *Allium sativum* and *Allium ursinum*: chemistry, pharmacology, and medicinal applications. *Econ Med Plant Res.* 1994. 6:55-113.
18. Wilson RF, Wycbe K, Christensen BV, Zimmer S, Laxson DD. Effects of adenosine on human coronary arterial circulation. *Circulation.* 1990 Nov;82(5):1595-606.
19. Chen CW, Chang HY, Hsine TR. Mechanism of adenosine-induced vasodilation in rat diaphragm microcirculation. *Am J Physiol Heart Circ Physiol.* 2000 Nov;279(5):H2210-7.
20. Jang IJ, Yu KS, Shon JH, Bae KS, Cho JY, Yi SY, Shin SG, Ryu KH, Cho YB, Kim DK, Yoo SE. Pharmacokinetic/pharmacodynamic evaluation of a novel potassium channel opener, SKP-450, in healthy volunteers. *J Clin Pharmacol.* 2000 Jul;40(7):752-61.
21. Wang H. Cardiovascular ATP-sensitive K<sup>+</sup> channel as a new molecular target for development of antihypertensive drugs. *Zhongguo Yao Li Xue Bao.* 1998 Sep;19(5):397-402.
22. Yamasaki S. Metabolism of cholesterol. *Rinsbo Byori.* 1973 Feb;21(2):129-35. Cited by (17).
23. Auer W, Eiber A, Hertkorn E, Hoehfeld E, Koebrle U, Lorenz A, Mader F, Merx W, Otto G, Schmid-Otto B, et al. Hypertension and hyperlipidaemia: garlic helps in mild cases. *Br J Clin Pract Suppl.* 1990 Aug;69:3-6.
24. Mansell P, Reckless JP. Garlic. Effects on serum lipids, blood pressure, coagulation, platelet aggregation, and vasodilation. *BMJ.* 1991 Aug 17;303(6799):379-80.
25. Silagy CA, Neil HA. A meta-analysis of the effect of garlic on blood pressure. *J Hypertens.* 1994 Apr;12(4):463-8.
26. Rietz B, Isensee H, Strobach H, Makdessi S, Jacob R. Cardioprotective actions of wild garlic (*allium ursinum*) in ischemia and reperfusion. *Mol Cell Biochem.* 1993 Feb 17;119(1-2):143-50.
27. Mohamadi A, Jarrell ST, Shi SJ, Andranis NS, Myers A, Clouatre D, Preuss HG. Effects of wild versus cultivated garlic on blood pressure and other parameters in hypertensive rats. *Heart Dis.* 2000 Jan/Feb; 2(1):3-9.
28. Preuss HG, Clouatre D, Mohamadi A, Jarrell ST. Wild garlic has a greater effect than a cultivated garlic on blood pressure and blood chemistries of spontaneously hypertensive rats. *Int Urol Nephrol.* 2001; in press.



## The Secret Strength of the Lowly Larch



Many trees have a certain mystique about them. The Irish praised the strength of the ash, and used to build their kings thrones ... and weapons. The Druids formed their sacred groves in clearings of oak forests, and harvested the sacred mistletoe from its boughs. The Elder was the "Tree of Doom," associated with witches and the Dark Goddess. Moses was commanded to build the Ark of the Covenant of shittim wood and no other.

Yet somehow, the world's traditions seem to have passed over *the power of the larch.*

**Arabinogalactans from Larch**, found in **Larix-1000**, are complex carbohydrates which nourish probiotic *Bifidobacteria*, support the health of the immune system by activating natural killer cells and other key immune components, and may fight the spread of abnormal cells.

Larch arabinogalactans are recommended by Dr. Peter J. D'adamo in his new book, *Live Right for Your Type.*

*Dr. D'adamo is not a spokesperson for Jarrow Formulas. Holistic International reserves judgement on his dietary theories and recommendations.*

