

Rhodiola rosea

The Herbal Heavyweight from Russia

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Rhodiola rosea, also known as "roseroot", is a plant indigenous to the high altitude Polar Regions of Europe and Asia. A quick look at the data behind this supplement indicates that *Rhodiola rosea* is, in fact, the "Golden Root" of ancient legend and more importantly, that its potential for improving physical and mental performance is unmatched. Authentic Russian Golden Root is now available for the first time in the U.S. as a dietary supplement. Is this ancient "adaptogen" from Siberia really worth its weight in gold? We think so, and invite you to read on and then decide for yourself.

In most Scandinavian countries, *Rhodiola rosea* has been used for decades by professional athletes, including Russian Olympic champions, as a safe, effective, non-steroid supplement to maximize endurance and accelerate muscular recovery (Seifulla, 1999). *Rhodiola rosea* extract has been shown to increase physical and mental performance by more efficiently mobilizing and sustaining muscular energy reserves. Professional Russian athletes already know that *Rhodiola rosea* helps build up their muscular energy reserves and lets them tap it when they need it the most - under the extreme stress of peak physical performance that is required to win.

There are three main physical benefits of *Rhodiola rosea* that have been verified by over 100 research studies:

- 1) It enhances muscle energy stamina during periods of peak physical stress;
- 2) It speeds cardiovascular and muscle energy recovery time; and
- 3) It possesses pharmacologically relevant anabolic activity.

Rhodiola rosea: Human Research in Soviet Sport Performance

Research on *Rhodiola rosea* supplementation in athletes and others

performing maximum physical and mental workloads has extended and confirmed the same pattern of improved performance demonstrated in animal studies¹. Human test subjects showed more robust pulse and arterial pressure, greater back muscle strength and hand endurance under static tension, better coordination, and improved recovery ability. Extensive experiments on swimmers, skiers and other athletes have reliably demonstrated the significant and unique value of *Rhodiola rosea* extract in increasing stamina and accelerating recovery from physical exertion.

Studies in Athletes

In one study of 112 athletes, researchers discovered that 89% of those supplemented with *Rhodiola rosea* showed rapid improvement in both speed and strength during track and field, swimming, speed skating and ski racing (Saratikov and Krasnov, 1987). Similar effects of *Rhodiola rosea* were observed in weightlifters, wrestlers and gymnasts (Seifula 1999). Based on the data obtained, it was concluded that supplement formulas containing *Rhodiola rosea* increased physical work capacity, decreased fatigue and improved the general mental and physical state of test subjects. In an experiment on healthy male athletes, adaptogens including *Rhodiola rosea* increased endurance by 64%, while reducing blood lactate levels and lowering blood pressure (Saratikov and Krasnov, 1987).

Triathlon Study

Any substance that demonstrates an increase in blood oxygen levels provides greater resistance to hypoxia and a more economical expenditure of oxygen, a major benefit to stamina and recovery. A group of Soviet skiers participating in a 30-kilometer triathlon race were given *Rhodiola rosea* and monitored for changes in oxygen saturation of arterial blood. Results revealed a significant increase in the duration of the stable and hypoxemic phases of respiration as well as a shortening of the respiratory recovery (Saratikov and Krasnov 1987). These results are an important part of the explanation of *Rhodiola rosea*'s multiple endurance effects. They demonstrate in humans under extreme physical stress *Rhodiola rosea*'s measurable ability to increase sustainable blood oxygen levels and to "economize" energy expenditure, which supports better aerobic energy production during intense exercise.

Biathlon Study

The influence of a preparation containing both *Rhodiola rosea* and *Eleutherococcus* was tested on the speed, stamina, coordination, and cardiovascular capacity of healthy athletes doing intense, prolonged exercise in low temperatures by Dr. O.I. Dalziger at Tomsk State University (Saratikov and Krasnov 1987). Skiers were required to ski 12 miles (30 km) while carrying a rifle and to shoot at fixed targets during programmed

halts. The subjects, consisting of 42 healthy individuals, 20-25 years of age, were all rated master of sport first rank. They were subdivided into two equally ranked groups, one experimental group and one control group. The experimental group took 10 drops of *Rhodiola* extract or a dose of placebo solution similar in appearance and taste 30-60 minutes before the start of the race.

The *Rhodiola* group showed better technical results for the distance competition. They achieved significantly better shooting scores than the control group, apparently due to less arm tremors from racing fatigue. These positive results applied not only to stamina but to recovery of pulse rate and arterial pressure resulting from post-race combined trial tests, which included the following: 20 squats in 30 seconds, a 15 second run of maximal intensity, and a 3-minute run at a rate of 180 steps per minute. Thirty minutes after completing the competition and post-race trials, the heart rates of both the *Rhodiola* and control groups were evaluated, as an indicator of the level of recovery after a period of intense exertion. In the *Rhodiola* group, the average heart rate was 104% to 106% of their resting baseline, close to full cardiovascular recovery. In the control group, however, it still averaged 128.7 ($p < 0.02$), or 25% higher. Thus, the preparation containing *Rhodiola rosea* enhanced stamina (distance times), eye/hand coordination (shooting scores), and the speed of cardiovascular recovery and its related physical and metabolic imbalances and disorders.

Mental and Physical Work Load Studies

In another experiment, an adaptogen preparation containing *Rhodiola rosea* increased measured working capacity and improved self-assessed ratings of perceived exertion by 80% and 90%, respectively (Baranov 1994). In a subsequent study, a battery of 14 tests was used to evaluate the effect of a preparation containing *Rhodiola rosea* on the quality of operator activity and mental working capacity during monotonous work. Results indicated that subjects in the experimental (*Rhodiola*) group experienced less fatigue. Quality of operator activity increased considerably and mental working capacity was preserved even after 24-hours of continuous repetitive work (Baranov, 1994).

Treadmill Studies

In another human trial, an electric bicycle ergometer (Saratikov and Tuzov, 1963) was used to assess the effects of *Rhodiola* on the magnitude and intensity of cycling work. The following four factors were examined:

- The subjects' work output and the distance traveled during set intervals of time.
- The work intensity of the athletes' leg muscles by means of a recording voltmeter.
- The tempo of work and eye/leg muscle coordination and effort with

a voltmeter placed between the subjects' eyes.

- The magnitude of the work performed and changes in intensity measured by a load rheostat.

Results showed a marked improvement in all four performance parameters in subjects using *Rhodiola rosea* compared to control subjects.

In another study, fifty-two individuals aged 18 to 24 years were administered adaptogen preparations which contained: extracts of *Eleutherococcus*, *Panax Ginseng*, and *Rhaponticum* 2 ml per dose, and *Rhodiola* extract 15 drops or 10 mgs. Observations were made after 2-3 days. Some of the subjects then became blind controls and received a placebo solution, which resembled the preparations under study in external appearance and taste.

In the first series of observations, 30 minutes after taking the preparation the subjects turned the pedals of the electric bicycle ergometer for 30 seconds at a load of maximal intensity. After a 5-minute rest, the resistance of the pedals of the bicycle ergometer was increased such that the duration of the additional work (with a pre set speed of rotation of the pedals) ranged from 20-30 minutes; i.e., the load corresponded to work of great intensity.

In the second series of observations, the subjects performed standard workloads for 25 minutes immediately after taking the preparation in order to create baseline fatigue. A dynamic load was then performed after 5 minutes of rest. The subsequent experiment tested the maximal duration of work at a preset intensity, as carried out in the first series of observations. The special feature of the second series of observations was that both the dynamic work and the endurance work were performed against the background of fatigue arising after a standard physical load.

The effectiveness of the preparations were assessed by measuring the intensity of work performed using *Rhodiola rosea* compared to the initial baseline without it. During the performance of a maximal sprint test without baseline fatigue (series one), none of the preparations altered the volume of work. However, when the same load was performed over prolonged periods (series two) the *Rhodiola rosea* and *Eleutherococcus* extracts increased the work capacity of test subjects 9% and 6% respectively ($p < 0.04$) over the controls.

Improvement in general condition and functional parameters (pulse, arterial pressure, vital capacity of the lungs, strength of the back muscles, endurance of the hand under static tension, coordination of movements) was also demonstrated. Equally important and characteristic of *Rhodiola rosea*, the preparation also shortened the recovery period, defined in terms of the time of normalization of the heart rate and the arterial pressure. Thus, for example, at the 10th minute of the recovery period, the pulse slowed by a factor of 2.5 under the influence of *Rhodiola* extract (to 67

beats per minute), while in the control group, it slowed only by a factor of 1.9 (to 86 beats per minute). Judging by the time course of the pulse pressure, prescribing *Rhodiola* promoted an improvement in the respondent reaction of the blood circulatory apparatus to the physical load. No side effects were observed: palpitations, sleep disturbances, loss of appetite, etc.

All the preparations studied improved stamina and recovery, but their degree of effectiveness differed. Under the influence of *Rhodiola rosea* extract, the volume of repeat work performed increased by 28%, whereas without baseline fatigue, the increase in the duration of work was about 12%. These data indicate that *Rhodiola rosea*, like other adaptogens, promotes recovery from fatigue more than it increases the initial levels of stamina.

Optimizing Performance by Autonomic Regulation

An interesting theory that provides a larger conceptual context for these various *Rhodiola rosea* findings has been suggested by Baranov (1994). Based on his experiments, he concludes that normalization of regulatory systems (i.e. the autonomic nervous system) optimizes performance and endurance. This theory can also be applied to other *Rhodiola* studies on both animals and humans.

Physical work requires energy resources that are immediately mobilized by the sympathetic nervous system (SNS), the activating half of the autonomic nervous system. The SNS secretes epinephrine and norepinephrine to mediate vigilance, arousal, activation, and mobilization (fight, flight, fright). In a sense, the body is adapting to the demands of increased physical load just as it would to any other stressor – by stimulating SNS activity.

The ability of the SNS to mobilize cellular energy resources depends on the training level of each subject. More highly trained subjects display greater metabolic energy efficiency when stimulated by stress. Therefore, Baranov (1994) asserts that cumulative fatigue is more a consequence of SNS overexertion than inefficient energy mobilization. Further research is needed to elucidate this generally and specifically in the mechanism influenced by *Rhodiola rosea*.

No Side Effects !?!

One of the most interesting aspects of *Rhodiola rosea* use is the complete lack of side effects. Specifically, no negative indicators were noted on the functions of either the adrenal cortex or the endocrine glands. When compared to anabolic steroids, researchers discovered that *Rhodiola rosea* had comparable benefits without any detrimental side effects on the function of the adrenal glands (Seifulla, 1999).

Preponderance of Research Confirms Effects

The preceding body of research, extending over fifty years, strongly indicates that *Rhodiola rosea* extract is a remarkably versatile herbal supplement for significantly reinforcing physical stamina and recovery time in an impressive variety of subjects and settings. It can improve protein balance in athletes and increase the muscle mass resulting from increased workloads. This greatly helps competitive athletic performance by supporting the level of physical training even during the periods of lower activity, which typically precede competitions (tapering).

Rhodiola rosea is clearly an effective herbal supplement that enhances mental and physical performance in today's top athletes. In addition, *Rhodiola rosea* is as effective in female corporate executives and male construction workers as it is in highly trained Olympic athletes. A steadily growing body of research, accumulated over decades, demonstrates that *Rhodiola rosea* possesses a broad spectrum of positive physiological effects. Based on the multitude of Russian studies, beginning with Soviet scientists 35 years ago, scientists and trainers recommend *Rhodiola rosea* with increasing frequency in many arenas of athletic performance to improve speed, strength, stamina, muscle building, energy reserves, and recovery time (Seifulla 1999). This is a remarkable constellation of benefits for any herbal sports supplement. *Rhodiola rosea* is uniquely suited for the complete spectrum of fitness training, from the simplest to the most advanced.

Beyond Enhanced Physical Performance

Rhodiola rosea's extraordinary multifaceted ability to maximize peak physical performance is supported by enough solid science to justify offering it to the general public as a valuable supplement for enhancing physical fitness. This one general benefit by itself is sufficient to guarantee that *Rhodiola rosea* will become a major adaptogen for physical stress with a positive global impact in the near future.

Yet the benefits that *Rhodiola rosea* promise may be far more fundamental and profound than this, because *Rhodiola rosea* may well help alleviate the entire complex of disorders related to stress of all kinds, and in particular to the special health risks of chronic stress, which is a growing global health problem of epidemic proportions. This implies that it may well have an even greater contribution to global health in the not too distant future.

Conclusion

Extracts of *Rhodiola rosea* have been used for decades in the traditional medicine of Russia, Sweden, Norway, France, Germany and Iceland. Since 1961, more than 180 studies have been published in Slavic and Scandinavian journals. Based on these data, *Rhodiola rosea*

appears to be a safe, effective herbal supplement that gives its user a pronounced competitive edge by enhancing both physical and mental stamina and accelerating recovery time – without disturbing normal physiological functions. It does this by mobilizing, sustaining, and recovering energy reserves and clearing waste products in muscle tissue with greater metabolic efficiency. Moreover, with a clinically effective dose of 200-600 mg/day* and an LD₅₀ (lethal dose at which 50% of animals die) in rats of 3,360 mg/kg and 235 grams (or 235,000 mg) in a 70 kg man, the safety profile of *Rhodiola rosea* appears to be outstanding.

How much impact will this heavyweight phytomedicinal herb from Russia have here in the states? That depends on how quickly U.S. athletes get the hint.

Note: Standardized Russian *Rhodiola rosea* can be found in Pinnacle's Masculean, Juiced Creatine, and Juiced Protein as well as Cytodyne's MyoBlast.

* Currently, most *Rhodiola rosea* is standardized to contain 3-5% rosavins (the main active ingredient). The dosage in the Russian studies was approximately 2-10 mg of active extract (for example, 200 mg x .05 = 10 mg of active extract).

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