



Rhodiolife[®]

Back to the Roots

A Sustainable, Standardized
Adaptogen from Cultivated
Rhodiola Rosea

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Harnessing the Power of Nature

 Sports

 CNS

Rhodiola rosea is one of the most powerful adaptogens found in nature. Studies have demonstrated that it offers a range of cognitive health benefits, including reduced fatigue and stress, and improved mental sharpness.

In addition, *Rhodiola rosea* has also been shown to deliver a boost to athletic performance by aiding recovery and enhancing immune health after exercise. As such, it has proved popular in the sports nutrition category, where it is valued by athletes and active consumers across all demographics.

***Rhodiola rosea*'s adaptogenic activity is usually attributed to four principal active compounds: salidroside, rosin, rosavin, and rosarin, which are found at high concentrations in the roots.**



Harnessing their benefits is a complex task. Ensuring the final ingredient will deliver the appropriate quantity of the desired bioactive components requires skill and care.

This challenge led Nektium to develop Rhodiolife® – the first commercially available standardized *Rhodiola rosea* extract that is still available today. Plant biochemist Dr. Zakir Ramazanov, who was also a founding partner of Nektium, first brought *Rhodiola rosea* to the attention of the English-speaking world, and promoted it through his extensive research on its health benefits, starting as early as 1979. In connection with his Spanish co-founder, Dr. Miguel Jiménez del Río, they introduced *R. rosea* to the supplement industry. Launched 25 years ago, the Rhodiolife® brand has earned a reputation as a high-quality and effective adaptogenic botanical extract. Rhodiolife® is also available as certified drug-free by the third-party Banned Substances Control Group (BSCG), specifically intended for athletes.



Prioritizing Sustainable Sourcing

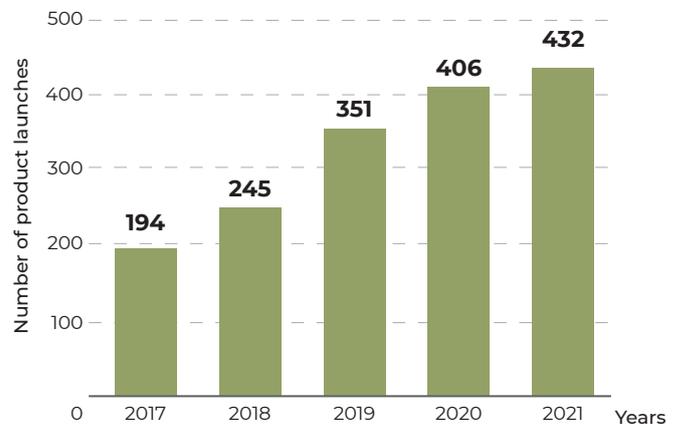


Like all ingredients derived from nature, a sustainable source of raw materials is key. This is particularly the case for *Rhodiola rosea*, which grows wild in the remote and sparsely populated Altai mountains. This is an unspoiled and non-industrialized region in south and central Asia that covers an area of 326,000 square miles (845,000km²) at the intersection of four countries: Russia, Kazakhstan, Mongolia, and China.

The Altai mountains derive their name from the Mongolian word ‘altan’, meaning ‘golden’, which may also be a reason why *Rhodiola rosea* is often referred to as the ‘golden root’. Most importantly, however, the Altai mountains offer conditions that are ideal for growing *Rhodiola rosea*, which thrives in cold climates at high altitudes.

As one of the first businesses to commercialize *Rhodiola rosea* extract successfully, Nektium has an established history of working alongside, and supporting, the local partner who undertakes the harvesting of this valuable plant.

However, the rapidly developing market for adaptogens has increased demand for *Rhodiola rosea*. This has placed significant pressure on wild-harvested supplies, leading to concerns about over-harvesting and sustainability.



New product launches containing *Rhodiola rosea* extract globally (Source: Innova Database)

The Transition to Cultivation

As a responsible supplier of botanical ingredients, Nektium is acutely aware of the importance of conservation. That's why, in an industry first, the company is taking steps to secure the long-term sustainability of Rhodiolife® by switching a significant proportion of its sourcing of *Rhodiola rosea* roots to cultivated plants. This will reduce reliance on wild-grown supplies and help to secure a reliable and sustainable source of the plant for years to come.

This major undertaking will require significant investment and time, but it will deliver substantial benefits to Nektium's customers.

Growing *Rhodiola rosea* in a controlled setting limits unknown factors and results in a more predictable and secure long-term raw material supply.

Cultivation also means improved price stability, superior safety, and more effective quality control.

It offers greater peace-of-mind around authenticity, which is especially significant in an age of widespread adulteration. According to the Botanical Adulterants Program, high demand for *Rhodiola rosea* means it is often mixed or interchanged with other *Rhodiola* species before being exported from Asia.

Importantly, there are no physical or phytochemical differences between Rhodiolife® *Rhodiola rosea* produced from wild-harvested vs. cultivated raw materials, a fact that has been validated by extensive testing.



Strong partnership

Nektium is implementing its pioneering *Rhodiola rosea* cultivation strategy in close co-operation with its long-standing, local partner. Both organizations have worked on a steady supply of *Rhodiola rosea* for over two decades, jointly developing expertise first in the field of wild harvesting, and later on cultivated plants sourced from Siberia. Nektium has provided support to set up the required procedures and programs for the crop production and management, involving critical elements such as land use and soil and erosion management.

Nektium has put into place a Quality Assurance system that monitors Good Agricultural and Collection Practices (GACPs) governing rules of production, harvesting, storage, and record keeping. This is accompanied by training programs, as well as traceability and recall plans, all of which has allowed the initiative to be established as a successful long-term project.

The plant material used to grow Nektium's cultivated *Rhodiola rosea* for Rhodiolife® was originally taken from wild harvested *Rhodiola rosea* plants from the area where the cultivation fields are now established.



Both organizations have worked to establish fields that offer conditions optimal for the controlled growing of *Rhodiola rosea*, ensuring the plant will flourish. Barren land in undeveloped and unpopulated locations was selected for conversion to ensure minimal impact on the communities close by.

Subsequent expansion of the initial cultivated area has been carried out not from seeds but through vegetative propagation of root rhizomes extracted from the cultivated *Rhodiola rosea*.

The vegetative propagation technique is faster, more reliable, and—crucially—ensures that the molecular composition of the cultivated *Rhodiola rosea* is identical to the wild-grown plant. This achievement was the outcome of many years of experimentation, testing, and refinement of techniques. (See 'Further Reading' section on page 9 for more details.)

To date, Nektium has planted more than 65 hectares (160 acres) to support this initiative and continues to explore further sites suitable for sustainable cultivation.



Respecting Tradition

 Pesticide free

 Traditional crop

Nektium has implemented traditional crop management techniques designed to ensure that cultivated plants enjoy similar growing conditions as their wild counterparts. Deployment of machinery is limited, a basic manual weeding program is in place, and successful cultivation is achieved without the use of fertilizers or pesticides.

Cultivated *Rhodiola rosea* requires little intervention, apart from occasional watering when rainfall is lower than usual. Water is sourced from nearby mountain streams that are many miles away from human settlements. This means there is no impact on village water supplies and the source remains completely unpolluted.

The fields have been designed to ensure they integrate seamlessly into the surrounding natural ecosystem. Trees and rock formations are maintained and worked around, a practice that prevents soil erosion and other damaging environmental impacts.



SUSTAINABLE DEVELOPMENT GOALS

Nektium's cultivation of *Rhodiola rosea* is aligned with three of the United Nations' 17 Sustainable Development Goals:

12 RESPONSIBLE CONSUMPTION AND PRODUCTION



Responsible consumption and production
Rhodiolife® from cultivated *Rhodiola rosea* is sustainably sourced and clean label due to a gentle manufacturing process

13 CLIMATE ACTION



Climate action
Growing *Rhodiola rosea* in fields that were previously barren contributes to CO₂ capture

15 LIFE ON LAND



Life on land
Cultivation of *Rhodiola rosea* supports conservation of the wild plant and promotes natural biodiversity

Optimal Growing Conditions

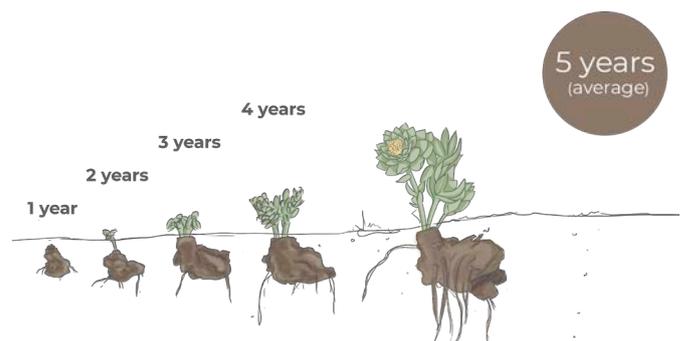


Rhodiola rosea is an extremely hardy plant that's well suited to the harsh weather conditions in the Altai mountains. Winter in the region begins October/November time, at which point it starts to snow, covering the mountains from peak to foot.

The coldest months are January and February, with the average temperature falling as low as 5°F (-15°C). The snow usually begins to melt in early May, when spring arrives, providing plants – including *Rhodiola rosea* – with a short window during which to grow.

Over the past 25 years of harvesting and processing *Rhodiola rosea* to produce Rhodiolife®, Nektium has developed significant expertise in understanding how growing conditions affect the plants and, in turn, when is the optimal time to harvest them.

The bioactive compounds in the *Rhodiola rosea* root reach their highest levels between three and five years of growth. If harvested too early, the overall level of actives is likely to be substantially lower. Through visual inspection and by analyzing climatic conditions, the local farmers decide whether to harvest a plant or leave it to grow for another year.



Manual Harvesting

Recycle & Reuse

Plant expertise

Harvesting takes place between late June and early September. Roots are separated manually from the rest of the plant, which is recycled for use as a natural compost. A proportion of the roots from each harvest is used for the replanting. Cultivated mother plants are taken out of the soil and the rhizomes are cut to include one to three buds, which are then directly replanted. These replanted buds are capable of regenerating the plant. The common size of the replanted root tips ranges from 0.5 to 4 cm in length and they weigh up to 5 g even though the size and weight of the plants is subject to natural variability. The overall volume of the annual planting stock dependent on seasonal crop conditions.

All other harvested roots are cleaned and dried before being transported to pre-processing facilities for additional cutting and drying at low temperatures.

To prevent over-harvesting, anybody gathering wild-grown *Rhodiola rosea* in the Altai

mountains must obtain an official permit. This is not necessary for the harvesting of Nektium's cultivated *Rhodiola rosea*, although the production fields are still subject to inspection by local authorities to guarantee the origin of the exported material.

In addition, Nektium works with an independent certification body which audits the cultivation fields annually.

Good Agricultural and Collection Practice (GACP) guidelines are followed to ensure prevention of contamination at any stage during growing, harvesting and processing. Nektium has introduced a process of registering information and additionally provides on-site support and training to assist local farmers in understanding and complying with GACP standards. Potential areas of improvement are considered and evaluated regularly.



Transportation to Europe

 Authenticity

 Clean label

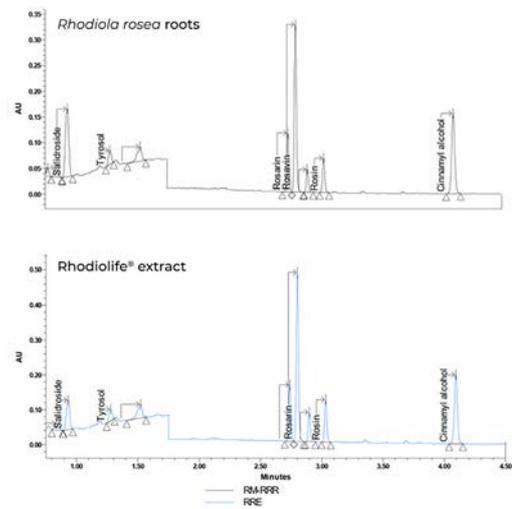
After harvesting and initial processing, the cultivated *Rhodiola rosea* begins its journey to Nektium’s state-of-the-art facility in Gran Canaria, Spain, for final processing and standardization. On arrival, staff carefully inspect the raw material to ensure it has not been adversely affected in transit.

Nektium’s quality assurance team conducts multiple identity tests on every batch, including macroscopic and sensorial analysis, establishing chromatographic profiles, and independent DNA barcode analysis to ensure the authenticity of the raw material.

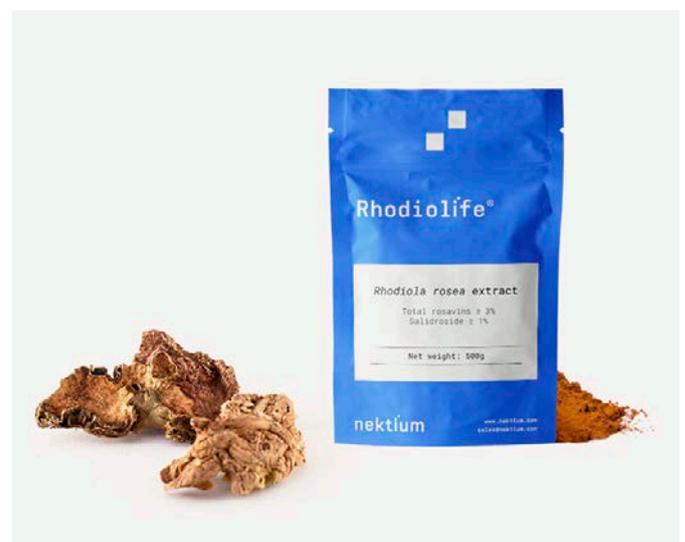
Once the authenticity and potency of each batch is confirmed, the dried roots are milled. A gentle extraction process is used to release the active constituents while preserving the naturally-occurring phytochemical profile of the root. The material is then standardized to provide the precise levels of bioactive compounds required.



Customers receive full documentation with every delivery of Rhodiolife® *Rhodiola rosea*, including a certificate of analysis, specification sheet, manufacturing flow chart, and ingredient profile.



UPLC profile of *Rhodiola rosea* roots and Rhodiolife® extract



For more information about Rhodiolife®, contact customerservice@nektium.com

Further reading

More details about the development of cultivated *Rhodiola rosea* can be found in the following scientific papers.

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2.Przybył J, Węglarz Z, Geszprych A, Pelc. M. Effect of mother plant age and environmental factors on the yields and quality of roseroot (*Rhodiola rosea* L.) seeds. Herba Polonica 2005;51:5-12.

3.Przybył JL, Węglarz Z, Geszprych A. Quality of *Rhodiola rosea* cultivated in Poland. Acta Horticulturae 2008;765:143-150

4.Revina TA, Krasnov EA, Sviridova TP, Stepaniuk GI, Surov IP. Biological characteristics and chemical composition of *Rhodiola rosea* L. cultivated in Tomsk. Rastit Resur 1976;12(3):355-360.

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6.D'Ambrosio M, Guerriero A, Mari A, Vender C. Characterization of wild and cultivated accessions of *Rhodiola rosea* L. from the Alpine region by analyses of their marker compounds. In: Book of Abstracts, Phytopharm 2008. 12th International Congress, 2-4 July, 2008, St. Petersburg, Russia; 2008; p 10.

7.Galambosi B. *Rhodiola rosea* L., from wild collection to field production. Medicinal Plant Conservation 2005;11(1):31-35.

8.Galambosi B, Galambosi Zs, Slacanin I. Comparison of natural and cultivated roseroot (*Rhodiola rosea* L.) roots in Finland. Z Arznei- Gewurzpfla 2007;12(3):141-147.

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10.Platikanov et al. Introduction of Wild Golden Root (*Rhodiola rosea* L.) As a Potential Economic Crop in Bulgaria, Economic Botany 2008; 62 (4)