



**Rhodiolife®**

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# Back to the Roots

A Sustainable, Standardized  
Adaptogen from Cultivated  
*Rhodiola Rosea*

nektium



**PLT**  
HEALTH SOLUTIONS

# **RHODIOLA ROSEA: Balancing Commercial Growth with Sustainability**

**The recognition of the need for developing cultivated forms of traditionally wildcrafted botanical raw materials is not a new one. Forward-thinking people in our industry and in academia have been writing about it and discussing it for over two decades. In the case of *Rhodiola rosea* however, developing a commercially viable, sustainable and phytologically sound solution has proven elusive. This shouldn't be surprising. We're trying to match the results of millions of years of evolution with our efforts.**

The challenges facing the development of a sound cultivation program for *Rhodiola* stem from multiple factors. *Rhodiola* is a slow-growing plant, taking four to five years to become the botanical that has the human health benefits we know today. This takes patience, hard work and a significant investment before any monetary return can be realized. Even at that point, success is not assured.

A statement from a US-China Development report addresses some of the issues:

*"Although people are trying hard to develop technology of artificial cultivation of *Rhodiola* in China, no one has been successful. All plants used for quality *Rhodiola* extracts thus far have been wildcrafted. Area of high altitude (1800-2500 meters), low temperature and non-pollution are the optimum growing environment for this herb. *Rhodiola* can be cultivated, but little to no active ingredient*

*can be detected in cultivated plants. There are two reasons for this, first farmers are harvesting too early due to market demand and also commercially cultivated plants are not under the same harsh conditions, which are necessary for the plant to produce higher contents of Rosavins and Salidroside."*

The document you are reading discusses the journey and the results of Nektium Pharma's quest to develop a cultivated *Rhodiola rosea* raw material source that matches the physical and phytochemical profile of mature, wildcrafted material and their ability to do so at a commercially viable scale, with good sustainability. Having succeeded in the task, this new cultivated material can take its place beside the raw materials that nature has given us, allowing expanded availability of *Rhodiola rosea* around the world, without the fear of overtaxing naturally occurring supplies – a truly sustainable solution.


At PLT Health Solutions, we think Nektium's program can serve as a model for the industry as we seek to balance commercial growth with sustainability of our raw material sources. We have engaged sustainability expert Botanical Liaisons to help guide our efforts of assuring and communicating the sustainability of this project moving forward. We're proud to be able to offer this solution to our customers in North America and invite you to a dialogue on how we can build on these ideas in the future.

**PLT HEALTH SOLUTIONS  
SEPTEMBER 2022**





# 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.

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***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.**

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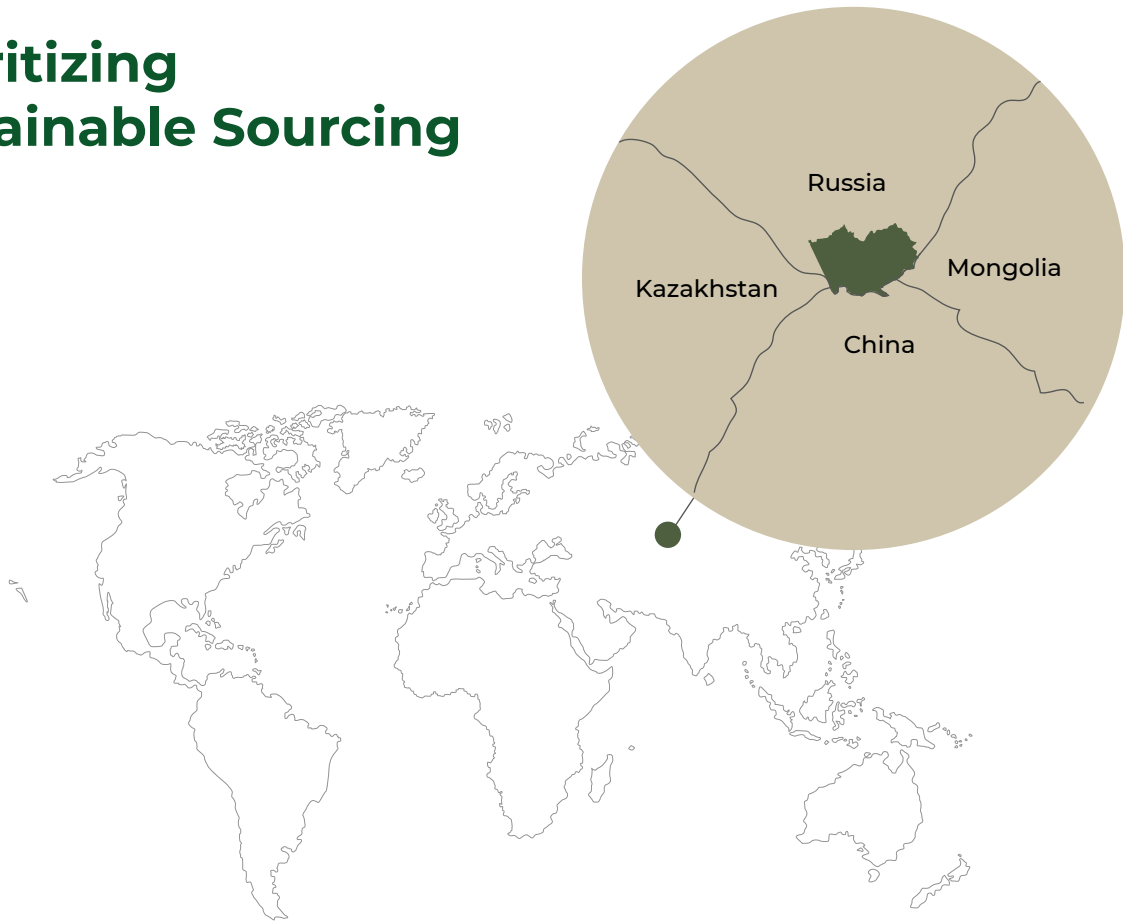


Harnessing their benefits is a complex task. Ensuring the final ingredient will deliver the appropriate quantity of the desired bioactive components requires skill and care.

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

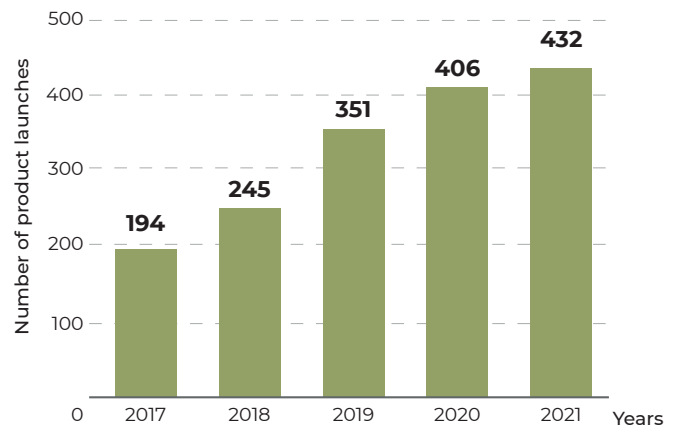


Like all ingredients derived from nature, a sustainable source of raw materials is key. This is particularly the case for *Rhodiola rosea*, which grows wild in the remote and sparsely populated Altai mountains. This is an unspoiled and non-industrialized region in south and central Asia that covers an area of 326,000 square miles (845,000 km<sup>2</sup>) 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.

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**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.**

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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.

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**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.**

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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 CO<sub>2</sub> capture

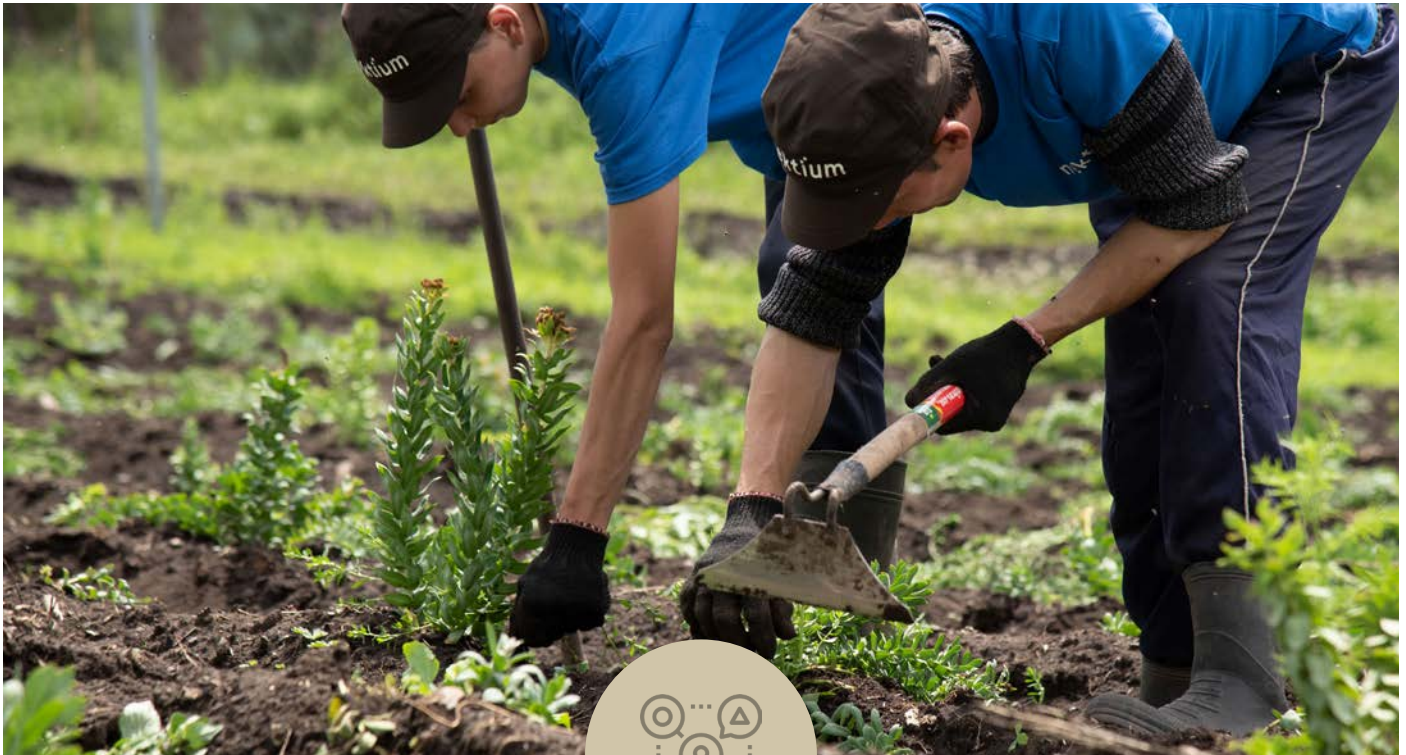
**15** LIFE ON LAND



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



# Optimal Growing Conditions

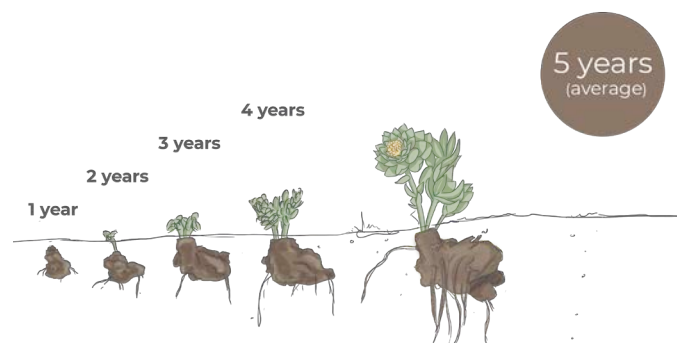


*Rhodiola rosea* is an extremely hardy plant that's well suited to the harsh weather conditions in the Altai mountains. Winter in the region begins October/November time, at which point it starts to snow, covering the mountains from peak to foot.

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 is 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.

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

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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

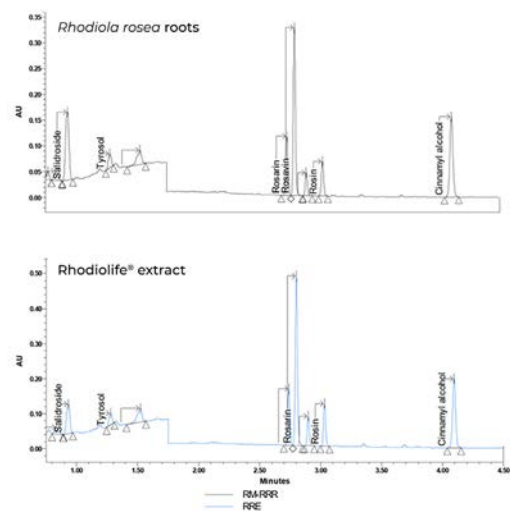
After harvesting and initial processing, the cultivated *Rhodiola rosea* begins its journey to Nektium’s state-of-the-art facility in Gran Canaria, Spain, for final processing and standardization. On arrival, staff carefully inspect the raw material to ensure it has not been adversely affected in transit.

**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.**

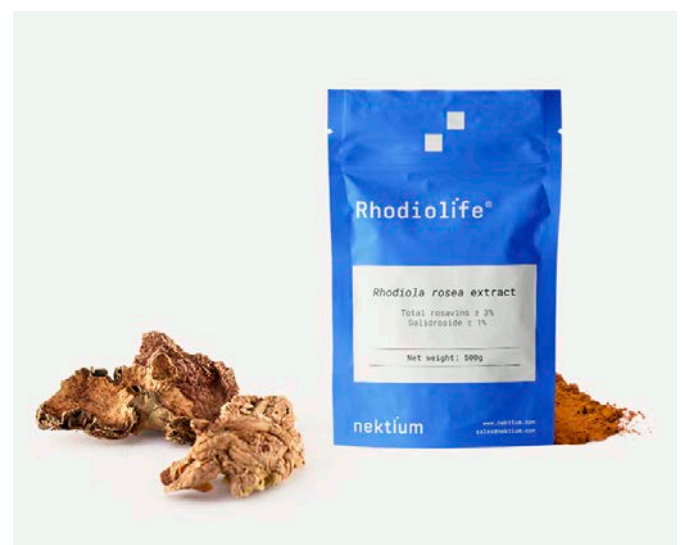
Once the authenticity and potency of each batch is confirmed, the dried roots are milled. A gentle extraction process is used to release the active constituents while preserving the naturally-occurring phytochemical profile of the root. The material is then standardized to provide the precise levels 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](mailto:customerservice@nektium.com)



## Further reading

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

1. Kozłowski J, Szczygłowska D. Seed germination biology of medicinal plants. Part XXII. Species of the family Crassulaceae: *Rhodiola rosea* L. *Herba Polonica* 2001;47(2):137-141.
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.
5. Frolov Yu, Poletaeva I. *Rhodiola rosea* in the European North-East. Ekaterinburg. *UrD RAS*. 1998;192.
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.
9. Galambosi B, Galambosi Zs, Valo R, Kantanen S, Kirjonen H. Elaboration of cultivation methods for roseroot (*Rhodiola rosea* L.) in Mikkeli, 1994-2002. In: Galambosi B, editor. *Use and Introduction of Medicinal Plants with Adaptogen Effects in Finland*. Maa- ja elintarviketalous 2003;37:47-62. [www.mtt.fi/met/pdf/met37.pdf](http://www.mtt.fi/met/pdf/met37.pdf)
10. Platikanov et al. Introduction of Wild Golden Root (*Rhodiola rosea* L.) As a Potential Economic Crop in Bulgaria. *Economic Botany* 2008; 62 (4).

## RHODIOLIFE: Sustainability and Social Responsibility

As one of the first businesses to commercialize *Rhodiola rosea* extract successfully, Nektium Pharma has an established history of working alongside and supporting the local partners who undertake the harvesting of this valuable plant. To assure that a similar quality of work was being conducted Nektium and PLT worked with Botanical Liaison's Trish Flaster on establishing criteria for continuing sustainability of the cultivated material.



**Trish Flaster**  
Executive Director  
Botanical Liaisons, LLC

*"PLT Health Solutions is one of those companies that has taken sustainability seriously for the*

*past 30 years by creating programs and lines of communication within their supply chain. Nektium's approach with this cultivation project for *Rhodiola rosea* fits this goal because its habitat is a fragile ecosystem – alpine. Nektium has collaborated with their suppliers to initiate a cultivation project, immediately relieving the pressures from the alpine terrain," she said.*

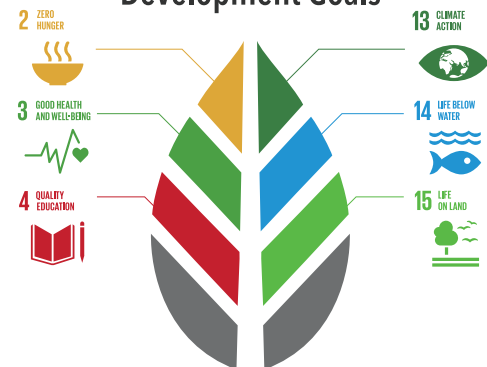
*"Cultivation may be the first step in being sustainable, but it is more than simply planting a seed and having it grown. Multiple factors must be considered before claiming to have a sustainable cultivated raw ingredient. As part of our sustainability audit, we reviewed propagation and growing techniques, growing locations, water sources, harvest timing and technique and post-harvest handling. PLT also takes cultural sustainability seriously, caring for those who handle the product at every stage of the process. In each of these areas, the *Rhodiolife* material is produced in the most sustainable manner possible and may well be the most sustainable *Rhodiola rosea* on the market today," she added.*

### PLT Sustainability Goals

At PLT Health Solutions, our awareness of the need for equitable, sustainable business practices has grown out of a 70-year concern with human health and well-being – delivered via the plant-based and botanical solutions that we bring to market. Sustainable practice comes naturally to us, and we realize it is necessary for our success.



### Supporting UN Sustainable Development Goals



The PLT People+Planet™ Initiative has been established to expand our sustainability efforts on behalf of both environmental and human issues – going beyond our everyday activities of promoting human health and wellness. This initiative supports and is guided by the 2030 Agenda for Sustainable Development adopted by all United Nations Members States in 2015.

To learn more about PLT sustainability initiatives, visit [www.plthealth.com/sustainability](http://www.plthealth.com/sustainability).

For more information or to request a sample, visit [www.plthealth.com/rhodiolife](http://www.plthealth.com/rhodiolife).

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