

Rhodiolife™

THE FINGERPRINT MATTERS

When it comes to *Rhodiola rosea*,
identity – the fingerprint - matters...
to your customers!



Manufactured by: **nektium**



PLT

HEALTH SOLUTIONS

GROWTH THROUGH INNOVATION

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I

RAW MATERIAL



I. RAW MATERIAL

ABOUT THE ORIGIN

Rhodiolife® is different from the very beginning. Starting with the siberian origin, wildcrafting, roots selection, programmes for sustainability and social responsibility.

1.About the origin

1.1 Botanical Identity

Botanical identity is essential. Because of significant species-dependent variation in phytochemistry and pharmacology, the use of “Rhodiola” as a general term is inaccurate and misleading.

The correct identification of all Rhodiola species according to precise and generally accepted botanical, phytochemical, and genetic taxonomic criteria is not merely an abstract intellectual exercise. It is critical for both scientific and phytopharmacological accuracy, as well as for product labelling for the public. The pharmacological and medicinal properties of Rhodiola are species dependent phenomena. Of all the Rhodiola species, *Rhodiola rosea* has been the predominant subject of phytochemical, animal, and human studies.

Botanical Identity	
Class	Magnoliopsida
Superorder	Saxifraganae
Order	Saxifragales
Family	Crassulaceae – stonecrops, orpins
Genus	<i>Rhodiola</i> L. – stonecrop
Species	<i>Rhodiola rosea</i> L. – roseroot stonecrop



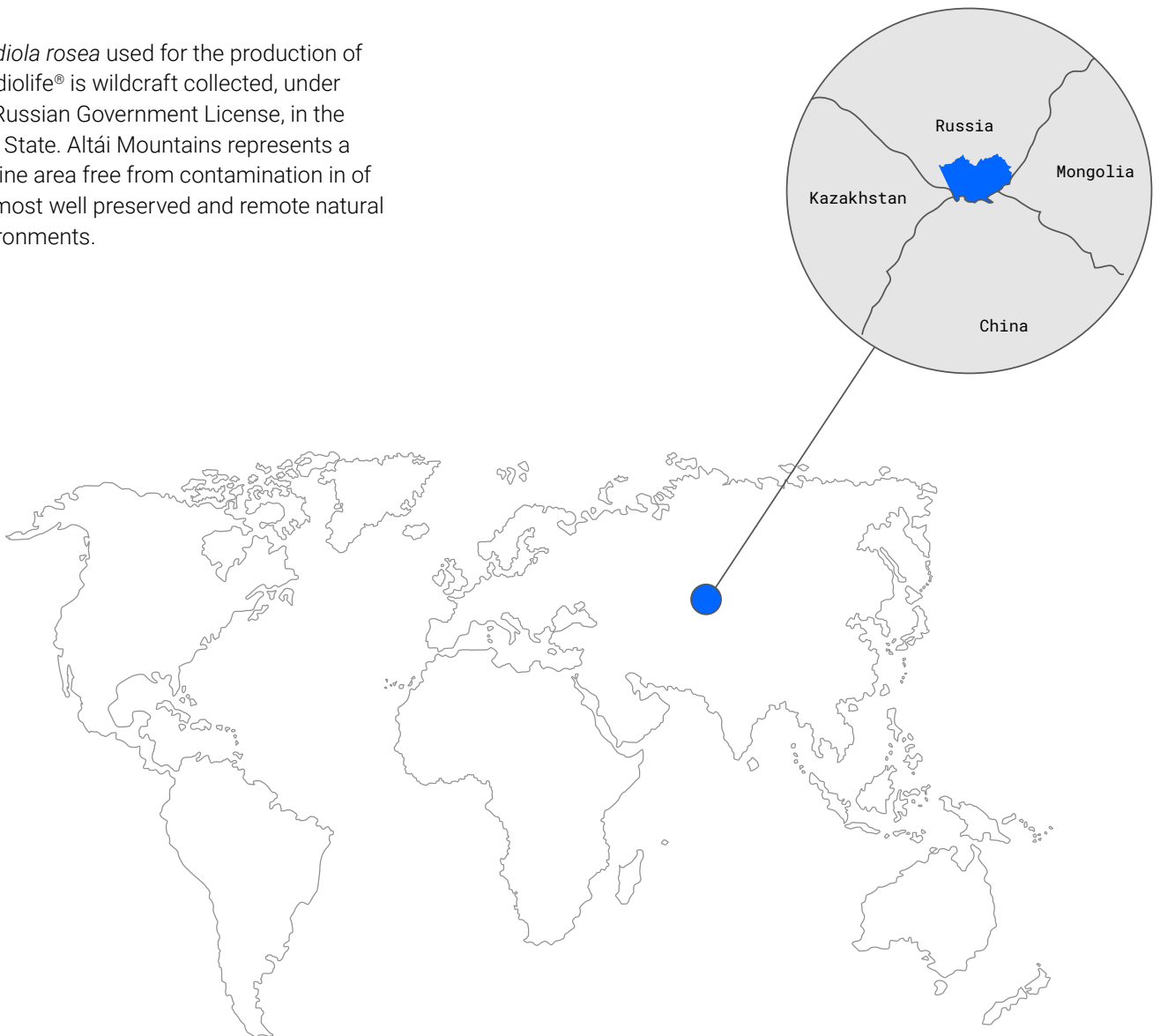
I. RAW MATERIAL

ABOUT THE ORIGIN

1.2 The Region

While *Rhodiola* as a genus may have originated in the mountainous regions of Southwest China and the Himalayas, botanists have established that *Rhodiola rosea* naturally display a circumpolar distribution in mountainous regions in the higher latitudes and elevations of the Northern Hemisphere. In Central and Northern Asia, the genus is distributed from the Altái Mountains across Mongolia into many parts of Siberia.

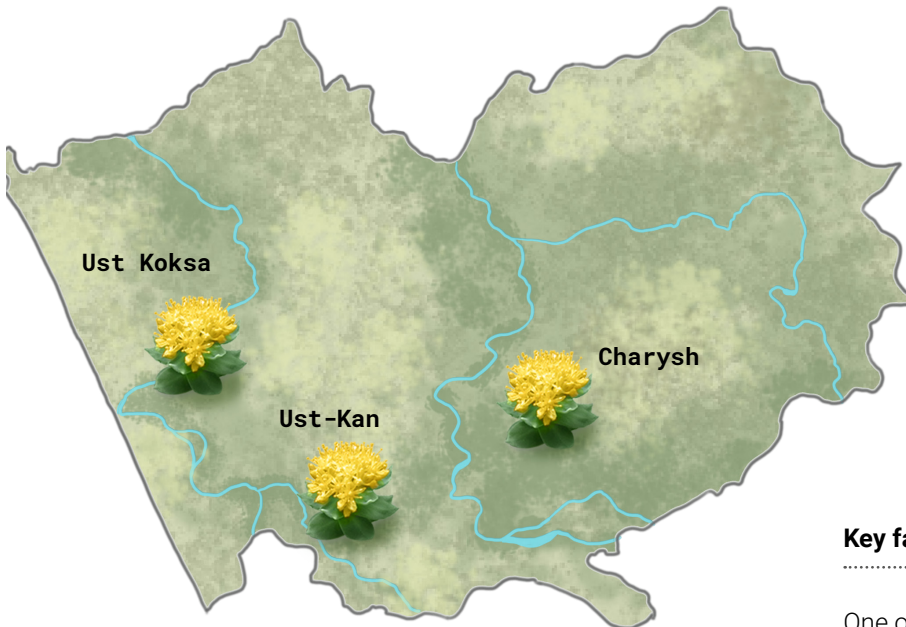
Rhodiola rosea used for the production of Rhodiolife® is wildcraft collected, under the Russian Government License, in the Altái State. Altái Mountains represents a pristine area free from contamination in of the most well preserved and remote natural environments.



I. RAW MATERIAL

ABOUT THE ORIGIN

Altái Republic [Russia]



Key facts about Altái

One of the meanings of the word Altái is "Golden Mountains" (from the Mongolian Word "altan")

Forests cover more than half of the Mountain territory.

There are more than 2000 species of supreme vascular plants and approximately 200 kinds of vegetable plants

A calculated total area of 728 km² of lakes is distributed amongst more than 7000 lakes in the region. The calculated amount of glacial water in the region is approximately 52 km² and there are more than 60000 km worth of waterways.

Altái has a temperate continental climate with short hot summers and long cold, frosty winters. The average yearly temperature is approximately 0°C with 50-700 mm annual rainfall.

The area is regulated by elaborated and established norms of recreational exploitation to ensure preservation of rare plants. In fact more than 60% of the surface is composed of strictly protected areas.

I. RAW MATERIAL

ABOUT THE ORIGIN



Figure 1 / Pictures from Altai (Siberia)

I. RAW MATERIAL

THE PROCESS

2.The process

2.1 Collection

Nektium closely collaborates with our supplier implementing operating procedures that provide general technical guidance for the sustainable collection and processing of *Rhodiola rosea* roots, following the overall context of quality assurance and the WHO guidelines on Good Agricultural and Collection Practices (GACP).

GACP provides a basis for a quality assurance system for the starting *Rhodiola rosea* roots used in the production of Rhodiolife®. This includes the collection of the plants in the wild, as well as primary processing of the plant material, such as drying, packaging in bulk, storage and transport of the raw materials until it arrives to the Nektium factory. The impact of collection on the environment and ecological processes, and the welfare of local communities are also considered.

GACP apply to the first part of the production, for which Good Manufacturing Practice (GMP) does not apply yet. Applying for GACP eliminates or reduces the risks of microbiological or chemical contamination, mistaken identity, and deterioration during primary processing and storage. Eliminating and reducing these risks enhance the reliability of the starting *Rhodiola rosea* roots used in the production of Rhodiolife®.

Nektium works with a local company, which is responsible for the Collection Management Plan. This Plan integrates all the aspects related not only to the GACP but also to the regulatory and permission necessary for the legal export of *Rhodiola rosea* raw materials from Russia.

Good Collection Practices

Application of GACP is primarily intended to provide a general technical guidance on obtaining *Rhodiola rosea* roots of high quality for the sustainable production of Rhodiolife®. Applying for Good Collection Practices pretends to ensure the long-term survival of *Rhodiola rosea* wild populations and their associated habitats.

Permission to Collect

Permission for collecting plants is given by the management of the Wood Industry of Altái Region after demand coordination in the Ministry of Natural Resources of the Russian Federation, which is also responsible for issuing the Export Licenses. Collecting permissions are strictly connected to export licences to prevent over collecting of *Rhodiola* roots. Nektium Pharma, SL (Nektium) is one of the few companies granted with an Export License by the Russian Government.

Collection areas and crafting activities are supervised by the Federal Office for Natural Resource Exploitation (FONRE).

Nektium audits regularly our supplier facilities and the whole process.

I. RAW MATERIAL

THE PROCESS

Collection Management Plan

Collection activities are supervised by the FONRE.

The collection management Plan includes the following requisites



THE COLLECTION PROGRAMME ENSURES THERE IS NO IMPACT ON:

- Local communities
- Ecological impact
- The stability of the natural habitat
- The maintenance of sustainable populations of Rhodiola plants in the collection area(s)

I. RAW MATERIAL

THE PROCESS

2.2 Personell

Collectors are organized in brigades (3 – 10 workers) and are transported to the collection fields up the mountains, where they live from mid-May till the end of September (about 4 months). They are familiar with good collecting techniques, transport, and handling of equipment and plant materials, including cleaning, drying and storage. Training of personnel is conducted regularly.

There are local experts (brigade leaders) responsible for the field collection with practical education and training in *Rhodiola rosea* biology and plant identification, with practical experience in fieldwork. They are also responsible for the supervision of workers and the full documentation of the work performed. Field personnel should have adequate botanical training, and be able to recognize medicinal plants by their common names and, ideally, by their scientific (Latin) names. Collectors should also receive instructions on all issues relevant to the protection of the environment and the conservation of plant species, as well as the social benefits of sustainable collection of medicinal plants.

Collectors are instructed for addressing three personnel important issues: training, safety and hygiene. This is relevant to all phases of collecting and post-harvest handling.



Training	Safety	Hygiene
In collection and post-harvest activities.	Clothing. Ensure that personnel wear clothing and shoes that provide protection that is appropriate to the work environment.	Prevention of contamination.
In the positive identification of <i>Rhodiola rosea</i> plants.	Environmental factors. Consider and establish procedures to protect personnel from environmental factors that are relevant to worker safety.	Provide toilets, hot running water and soap at postharvest handling facilities.
In proper hygienic practices with specific attention to preventing microbial contamination of handled <i>Rhodiola</i> .	Tools and equipment. Maintain all tools, equipment and vehicles used by personnel to ensure that these will be reasonably expected to be reliable and safe.	Establish minimum hand washing requirements.
		Sick personnel or those with open wounds/skin infections are not allowed to work.

I. RAW MATERIAL

THE PROCESS

2.3 Processing

Rhodiola rosea extract processing follows the indications given by the Russian Pharmacopoeia. After collection, the *Rhodiola rosea* is subjected to appropriate preliminary processing, including elimination of undesirable materials, the excess of soil, sorting and cutting. The collected *Rhodiola rosea* roots are protected from insects, rodents, birds and other pests, and from livestock and domestic animals.

Collecting tools, such as machetes, shears, saws and mechanical tools, are kept clean and maintained in proper condition. Those parts that come into direct contact with the collected medicinal plant materials should be free from excess oil and other contamination.

As the collection sites are located at large distances from the consolidation/processing facilities, the process is divided in two main steps.

PRIMARY PROCESSING

(AT THE COLLECTION SITES)



SECONDARY PROCESSING

(AT THE CONSOLIDATION SITES)



I. RAW MATERIAL

THE PROCESS



I. RAW MATERIAL

THE PROCESS

2.4 Environmental Practices & Sustainability Programmes

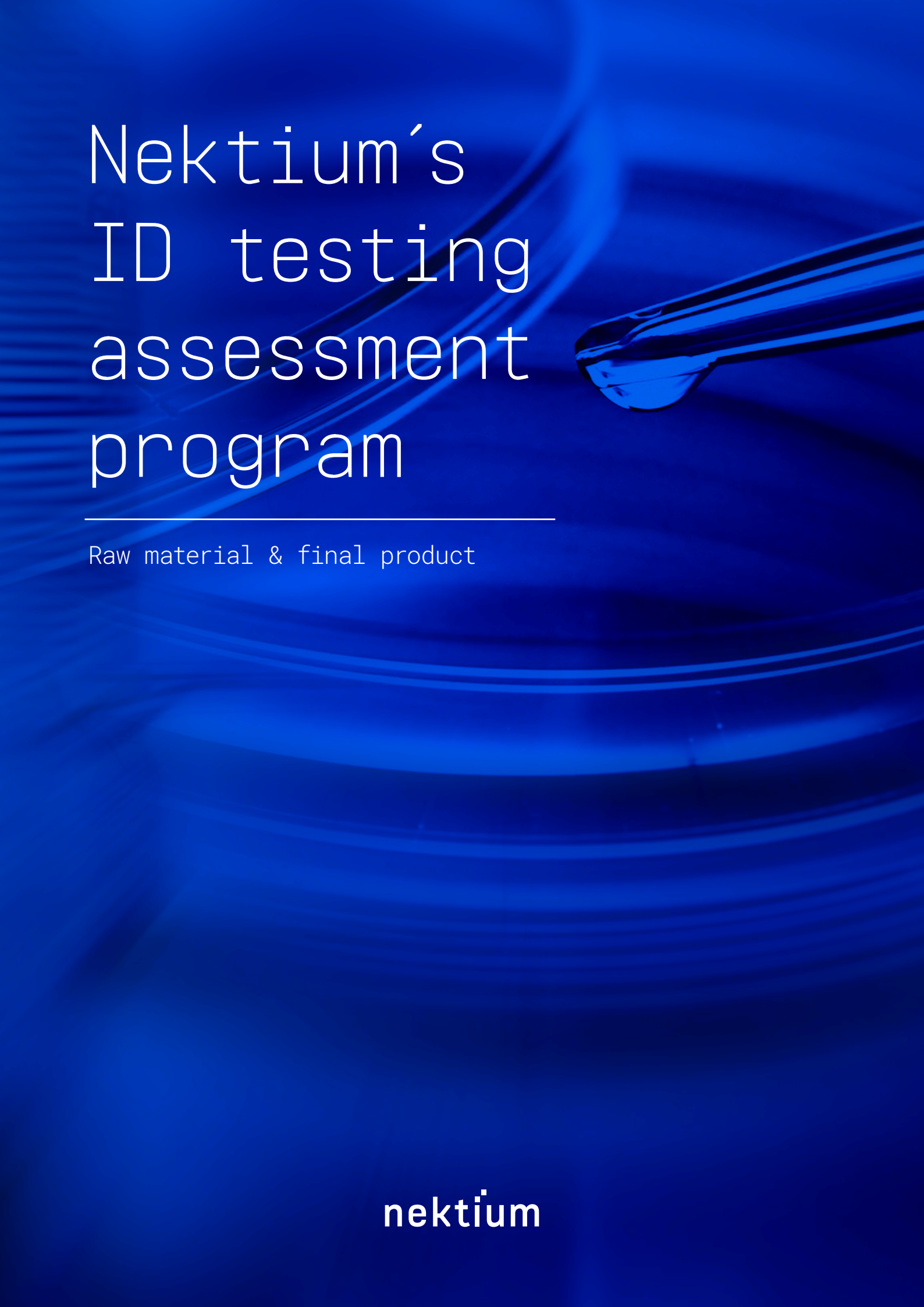
Collection practices applied by the collectors to the harvest of *Rhodiola rosea* address not only their need to gain economic benefits from the sale of the harvested plants, but also to make sure that *Rhodiola rosea* survives. In addition to preserving plant populations, harvest practices are oriented to minimize the damage to the local habitat.

Re-harvesting in the same location is restricted to every 5 years to allow sufficient reestablishment of the plant population. Furthermore, only 50% of the population from a specific location can be collected so that enough plants able to produce an adequate amount of seeds to sustain the population are kept.

Since *Rhodiola* can regenerate through vegetative growth, a portion of the root is left in the ground for plant regeneration.

The use of basic standardized procedures contributes to the batch-to-batch conformity and thus, to the reliability and high quality of *Rhodiola rosea* starting raw material. The application of GACP significantly contributes to improving the quality of starting raw materials before Nektium's GMP system takes the lead in the production of Rhodiolife®.

Nektium's ID testing assessment program



Raw material & final product

nektium

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I. INTRODUCTION


We understand the concern and importance of a proper botanical identification of raw materials used in extracts manufacturing processes. Each company has proposed its own identification program, ranging from traditional methods (macroscopic or sensorial) to very novel methods, as genetic identification of DNA barcode. All these methods provide useful information for the identification process through the analysis of genetic identification, what brings unquestionable proof of the biological material identity.

Unfortunately, the experience has shown that due to the production processes, the final products do not contain genetic material that allows applying the genetic analysis. Similarly, such processes often alter the final products phytochemical profiles with respect to its raw materials, especially in highly purified extracts materials. Therefore, there is no single analytical method to trace the identity of the product from raw materials to finished products.

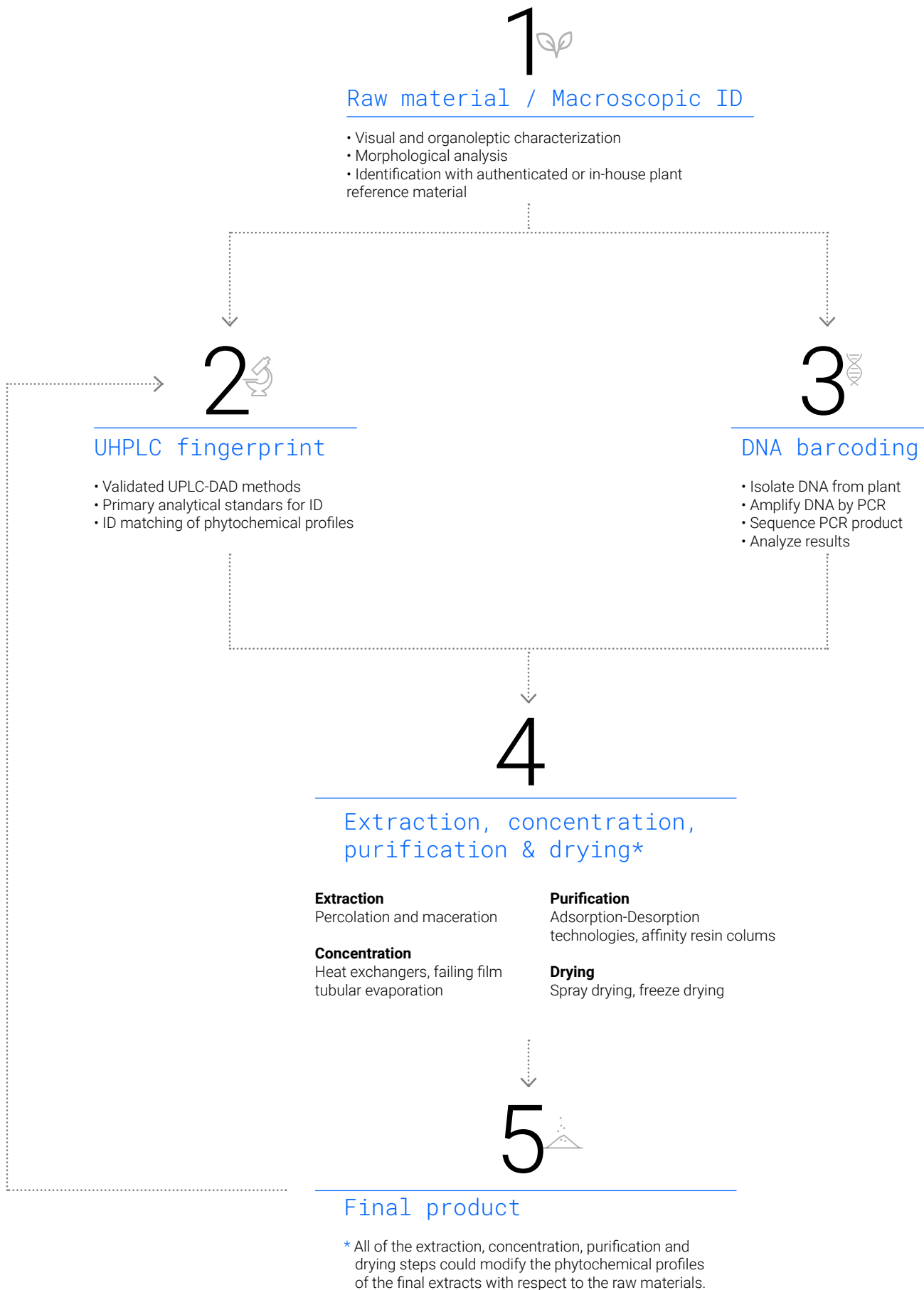
This identification process is performed through the application of different complementary methodologies that allow assessing what methodology is appropriate to apply at every step and what should be used as reference markers on the positive evaluation of the product identity. With regard to this, Nektium has proposed an Identity Assessment Program that permits, combining different methodologies, performing the traceability of product identity from raw materials to finished product, guaranteeing our customers the correct identity and quality of supplied products.

The ID methods used in the identification of raw materials and final products are:

Raw material	Methodology	Principle
	Macroscopic identification	Reference description according to standard sources
	DNA barcoding	Molecular taxonomy (DNA barcode)
	UHPLC fingerprint	Phytochemical fingerprint. Identification of specific markers

Final product	Methodology	Principle
	UHPLC fingerprint	Identification of specific markers

II. ID TESTING ASSESSMENT PROGRAM



Nektium's opinion of the different methodologies suggested for identification of species is:

1. Raw material

Raw materials DNA barcode results obtained are unequivocal. The Ultra-High Performance Liquid Chromatography (UHPLC) and HPTLC techniques provide the supplementary data only. DNA barcode determines characteristic sequences of particular specie, what is easily comparable with public databases. Also, when possible, UHPLC profiles are used, where one or more characteristic markers are employed as a genus or species evidence. Commercially available, analytical standards supplied by well recognized companies are employed by Nektium in our UHPLC methodologies.

On the other hand, a macroscopic evaluation is also used as a part of methodology identification.

2. Final product

UHPLC profiles in the final products identification are only used when their active compounds are determined by liquid chromatography. With our point of view, the qualitative information supplied by UHPLC determination is more reliable than data obtained by HPTLC. Positive identification of active compounds and other markers by UHPLC is made on basis of retention times and absorbance spectra obtained from analytical standards. In addition, absorbance spectra obtained can be compared with libraries created by Nektium with confirmatory purposes. On the other hand, UHPLC and HPLC are fully automated instrumental techniques with a high reproducibility, which does not allow any discrepancies in the chromatogram interpretation. In contrast, HPTLC profile interpretation is more subjective and the technique is not fully automated, so it is more susceptible to human bias. Finally, UHPLC as well as HPLC techniques are commonly employed and less scientific information can be found on HPTLC. To conclude, Nektium selected UHPLC as the most suitable technique for its purposes.

1. *Rhodiola rosea*

We attach the following results obtained for *Rhodiola rosea* ID testing:

1. Raw material DNA barcode report; includes a photo of raw material used by Nektium.
([Document 1](#))
2. Raw material and final product phytochemical profile comparison (UHPLC chromatograms).
Rhodiola rosea extract is a clear example of the final product that keeps all identified markers in the raw material. Unfortunately, not all extracts keep the characteristic profile of raw material; during manufacturing processes some markers (not active compounds) are lost.
([Document 2](#))



IV. EXAMPLES OF ID TESTING PERFORMED BY NEKTUM

1. *Rhodiola rosea*

Document 1 | *Rhodiola rosea* raw material DNA barcode report



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REAL JARDÍN BOTÁNICO (RJB)

CERTIFICATE OF ANALYSIS

Client: Sra. Beatriz Ercilla
NEKTUM PHARMA, S.L.
C/Taibique, 4, LAS PALMAS DE GRAN CANARIA
C.I.F.: B35472158

Report Date: 03/07/2017

Client Sample Description: rhizome fragments (1 bag): RM-RRR17-1003 (Fig. 1)

Internal code CSIC: RJB 0601021701061

Sample Internal number: RF08

Type of Analysis: DNA identification of plant samples

Results

DNA isolation from 1 sample in the batch was performed and sequences from diagnostic nuclear ribosomal DNA *ITS* obtained. The *ITS* region is used for DNA identification of *Rhodiola* and other Crassulaceae species identification. The analyzed sequence was compared to related sequences in GenBank by BLAST search algorithm. BLAST search retrieved accessions from the following species: *Rhodiola rosea*, *Rhodiola quadrifida*, *Rhodiola pamiroalaica*, *Rhodiola kirilowii*, *Hylotelephium ewersii*, *Rhodiola linearifolia* and *Rhodiola recticaulis* (Table 2. Figure 2)

The resulting analyses conclude that sequences from samples RM-RRR17-1003 has an identity of 99.7% with the species *Rhodiola rosea* (L.) Scop., and therefore identified as such species.

Signed and reviewed
Javier Fuertes Aguilar
Científico Titular/Senior Scientist
Real Jardín Botánico, CSIC

IV. EXAMPLES OF ID TESTING PERFORMED BY NEKTUM

1. *Rhodiola rosea*

Document 1 | *Rhodiola rosea* raw material DNA barcode report



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REAL JARDÍN BOTÁNICO (RJB)

CERTIFICATE OF ANALYSIS

Sample Description: rhizome fragments (1 bag): RM-RRR17-1003 (Fig1)



Table1. DNA isolation results

Sample	[DNA] (ng/μl)	Ratio 260nm/230nm	Ratio 260nm/280nm	PCR result
RF08	16.44	1.7	1.9	++

Table 2. Average amount (%) of nucleotide identity between *rbcl* aligned sequence (PI) and the closest species

Taxon	Length No. nucleotides	<i>Rhodiola rosea</i>	<i>Rhodiola linearifolia</i>	<i>Rhodiola kirilowii</i>	<i>Rhodiola quadrifida</i>
RF08	740	99,7	93	93	90

IV. EXAMPLES OF ID TESTING PERFORMED BY NEKTUM

1. *Rhodiola rosea*

Document 1 | *Rhodiola rosea* raw material DNA barcode report

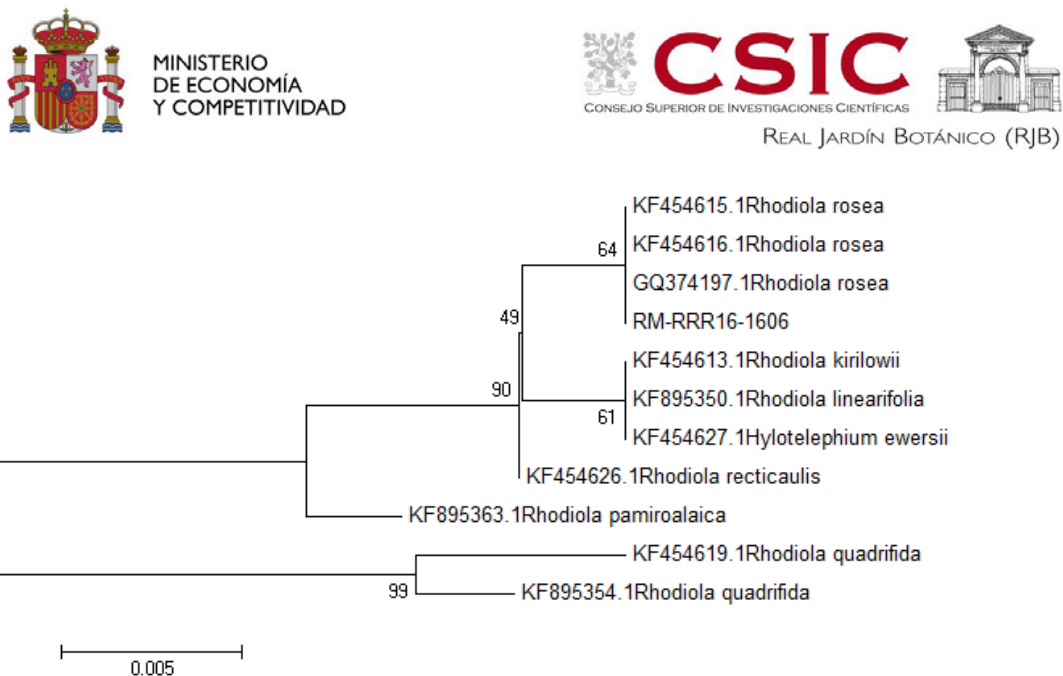


Figure 2. Maximum-likelihood tree based on a GTR+G substitution model. Numbers above branches represent bootstrap values.

Methodology

Genomic DNA isolation

Tissue from rhizome fragments was homogenized in a Tissue Lyser using iron beads prior to isolation. The DNA isolation protocol using the Qiagen DNeasy Plant Mini Kit (Qiagen Inc., Valencia, CA) was followed with modifications in incubation time (14 h). DNA quality was assessed by 260/280nm and 260/230 nm absorbance ratio in a Nanodrop UV spectrometer (Thermo Fisher Scientific). gDNA integrity was visualized on an agarose gel by electrophoresis using SybrSafe (Invitrogen) as a stain.

PCR and sequencing

Polymerase Chain Reaction (PCR) was performed by using illustra™ PuReTaq™ Ready-To-Go™ PCR Beads, which are premixed, predispensed, single-dose reactions optimized for hot-start. Reactions were done in provided predispensed 0.5-ml PCR tubes. When a bead is reconstituted to a final volume of 25 ml, the concentration of each dNTP is 200 mM in 10 mM Tris-HCl (pH 9.0), 50 mM KCl, and 1.5 mM MgCl₂. PCR temperature profile 25-ml reactions was: 95 °C for 5 min followed by 40 cycles of 95 °C for 30 s, 47 °C for 1 min, and 72 °C for 2 min. Reactions were analyzed by gel electrophoresis with a 3 µl loading volume. Primers (Fuertes Aguilar et al. 1999)

ITS P1A TCCGTAGGTGAACGTGCGG

ITS P4R TCCTCCGCTTATTGATATGC

PCR results were visualized by agarose gel electrophoresis and purified for sequencing using ExoSAP-IT For PCR Product Cleanup (Affymetrix). Sequencing reactions (Sanger method) was performed in Secugen (CIB, Madrid). Sequencing reactions were carried out using the TaqDyeDeoxy Terminator Cycle Sequencing Kit (ABI Applied Biosystems, Darmstadt, Germany), and products were analyzed on an ABI 3730XL DNA Analyser automated sequencer.

IV. EXAMPLES OF ID TESTING PERFORMED BY NEKTUUM

1. *Rhodiola rosea*

Document 1 | *Rhodiola rosea* raw material DNA barcode report



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REAL JARDÍN BOTÁNICO (RJB)

Sequence analyses and taxon assignment

Sequence data sets were subject to 3 analyses: 1) a heuristic maximum likelihood phylogenetic analysis (ML), where models of nucleotide substitutions and the gamma distribution shape parameter were selected using JMODELTEST 3.6 (Posada and Crandall, 1998) in conjunction with PAUP*, version 4.0b10 (Swofford, 2001). 2) a Neighbor-Joining tree based on the genetic distance between sequence pairs (GD) after a global multiple sequence alignment 3) the percentage identity (PI) following a basic local alignment search tool (BLAST). The PI method is similar to the GD method, but the value in the matrix is the minimum dissimilarity between samples, based on the percentage identity, as provided by a BLAST method implemented in Blastclust.

References

Blastclust (version 2.2.23, <ftp://ftp.ncbi.nih.gov/blast/executables/release>).

RAXML Version 8: A tool for Phylogenetic Analysis and Post-Analysis of Large Phylogenies". In Bioinformatics, 2014, [http://bioinformatics.oxfordjournals.org/content/early/2014/01/21/bioinformatics.btu033.abstract?](http://bioinformatics.oxfordjournals.org/content/early/2014/01/21/bioinformatics.btu033.abstract?keytype=ref&ijkey=VTEqUJYCDcf0kP)

keytype=ref&ijkey=VTEqUJYCDcf0kP

Posada, D. & K. A. Crandall. 1998. MODELTEST: testing the model of DNA substitution. Bioinformatics 14: 817–818.

Swofford, D. L. 2001. PAUP*: phylogenetic analysis using parsimony (* and other methods). Sinauer, Sunderland, Massachusetts, USA.

IV. EXAMPLES OF ID TESTING PERFORMED BY NEKTUM

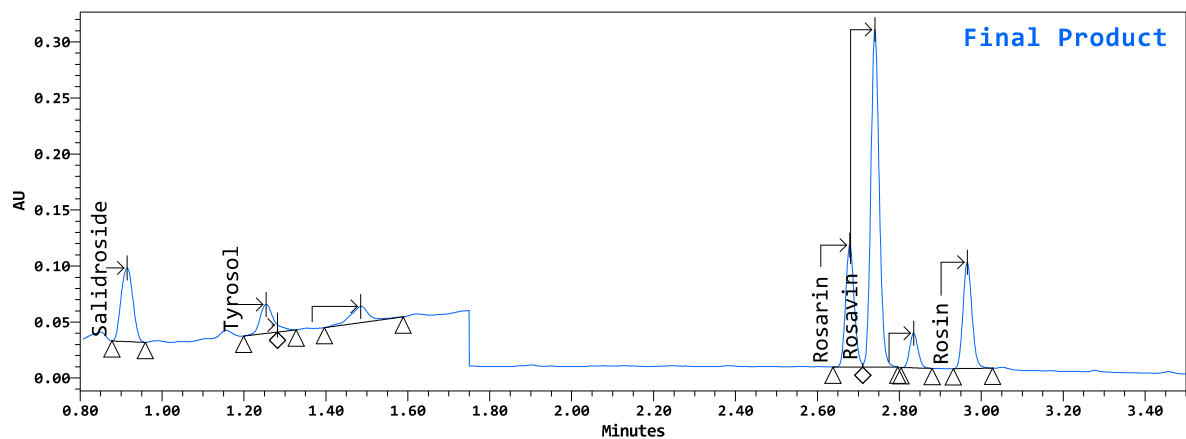
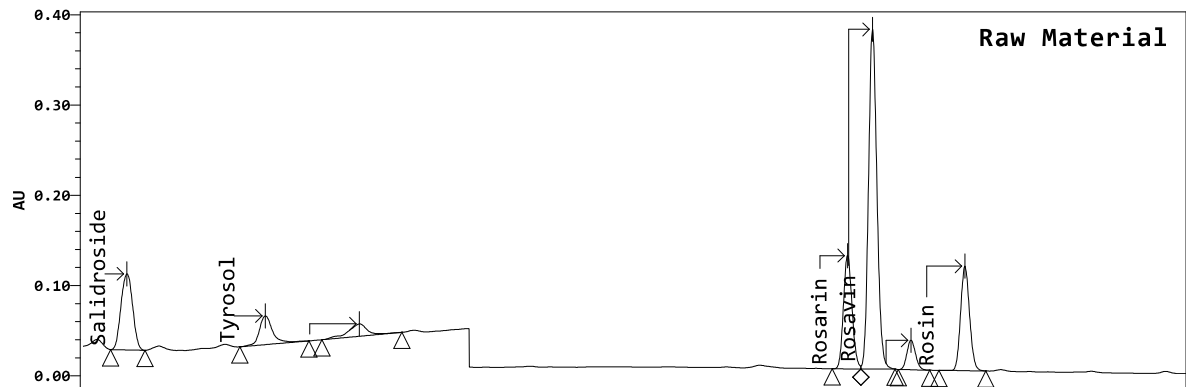
1. *Rhodiola rosea*

Document 2 | *Rhodiola rosea* chromatographic comparison: raw material vs final product

nektium

Chromatographic comparison: raw material vs final product

Sample:	RM-RRR, RR	Injection Volume:	1.00 u1
Vial:	1:5, 1:2	Run Time:	7.5 Minutes
System:	Acquity con PDA	Chanel:	PDA Timed
Injection:	1, 2	Column:	ACQUITY UPLC® BEH C18 1.7µm



— RM-RRR; PDA Timed Wavelength (0.00, 221.0) (1.75, 250.0)
— RR; PDA Timed Wavelength (0.00, 221.0) (1.75, 250.0)

Note: -Processed Channel Description- the wavelength employed for range 0.00 to 1.75 min is 221 nm and for 1.75 min to 7.50 min is 250 nm.

V. TRACEABILITY

We keep the traceability from the incoming material to the manufactured extract for each batch.

We state the raw material used into each CoA showing all the implemented step from the ID program. Therefore, we also keep the traceability for each Report of Macroscopic Identification, DNA Barcode for each lot of raw material, and Phytochemical identification by UHPLC fingerprint.

V. TRACEABILITY

Rhodiola rosea

Document 5 | CoA - Rhodiola rosea extract 3%

Certificate of Analysis

C/ Taibique 4, Pol. Ind. Las Majoretas · 35259 · Ingenio, Las Palmas, Spain

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Rhodiola rosea extract 3% total rosavins

Code RRE03S
Source Rhodiola rosea
Batch No. RRE03S17-0405

Manufacture Date 04-05-2017
Testing Date 04-05-2017
Expiration Date 04-05-2020
Shelf Life 3 years

01 Product description	Specification	Test method	Result
Plant part used	Roots	Visual	Complies
ID testing of raw material used	Reference description	Macroscopic	Complies
Traceability code: RM-RRR	Rhodiola rosea	DNA barcoding	Complies
Carrier used	Phytochemical fingerprint	UHPLC fingerprint	Complies
Plant:Extract ratio	None	N/A	N/A
	4-6:1	By weight	Complies

02 Physical tests	Specification	Test method	Result
Appearance	Free flowing powder	Visual	Complies
Color	Brown	Visual	Complies
Aroma	Specific, rose	Organoleptic	Complies
Flavor	Astringent	Organoleptic	Complies
Particle size	100 % through 80 Mesh	US standard sieve	Complies
Solubility in Water	Slightly soluble	EU Pharm. 5.11.	Complies
Bulk density	0.6 - 0.8 (g/cm ³)	USP 616 / EU Pharm. 2.9.34.	0,61 (g/cm ³)

03 Chemical tests	Specification	Test method	Result
Total rosavins	≥ 3.0%	MUPLC01	3.10 %
Salidroside	≥ 1.0%	MUPLC01	1.68 %
Moisture	≤ 7.0 %	USP 921	6.18 %
Total heavy metal	≤ 10.0 ppm	EU Pharmacopeia 2.4.8.	1.78 ppm
Total arsenic	≤ 1.0 ppm	ICP-MS	0.64 ppm
Lead	≤ 1.0 ppm	ICP-MS	0.82 ppm
Cadmium	≤ 0.5 ppm	ICP-MS	0.27 ppm
Mercury	≤ 0.1 ppm	ICP-MS	≤ 0.05 ppm
Residual solvents	≤ 0.05 %	USP 467 / Directive (EU) 2016/1855	≤ 0.05%
Pesticides	Complies with USP 565 and regulation 396/2005/CE and amendments		
Contaminants	Complies with regulation EC 1881/2006 and amendments		

04 Microbiological test	Specification	Test method	Result
Total plate count	≤ 10000 (cfu/g)	ISO 4833	700 (cfu/g)
Yeast & mold	≤ 200 (cfu/g)	ISO 7954	< 10 (cfu/g)
Salmonella	Absent (cfu/25g)	ISO 6579	Absent (cfu/25g)
E. coli	Negative (cfu/10g)	EU Pharm. 2.6.13.	Negative (cfu/10g)
Total coliforms	< 10 (cfu/g)	M0042-Part V.VRB Plate Count	< 10 (cfu/g)
Staphylococcus aureus	Negative (cfu/10g)	EU Pharm. 2.6.13.	Negative (cfu/10g)

05 Additional Information	
Extraction method	Water: ethanol extraction and spray dried
Packing	25 kg cardboard drums with double PE bags
Storage	Original container in a cool, dry place
Shelf life	3 years (under indicated storage conditions)
Country of origin/manufactured	Spain
Non-Allergens/Gluten	This product does not contain any of the food allergens cited in the Regulation (EU) No 1169/2011
Non-BSE/TSE	All ingredients in the product are of vegetable origin
Non-Irradiation	This material has not been subjected to irradiation
Total heavy metal, microbiological, residual solvents, pesticides and contaminants results are based on	historical data review and routine testing.

Rev. initial
09/01/2017

Company Certification



Quality Assurance Director
Beatriz Ercilla

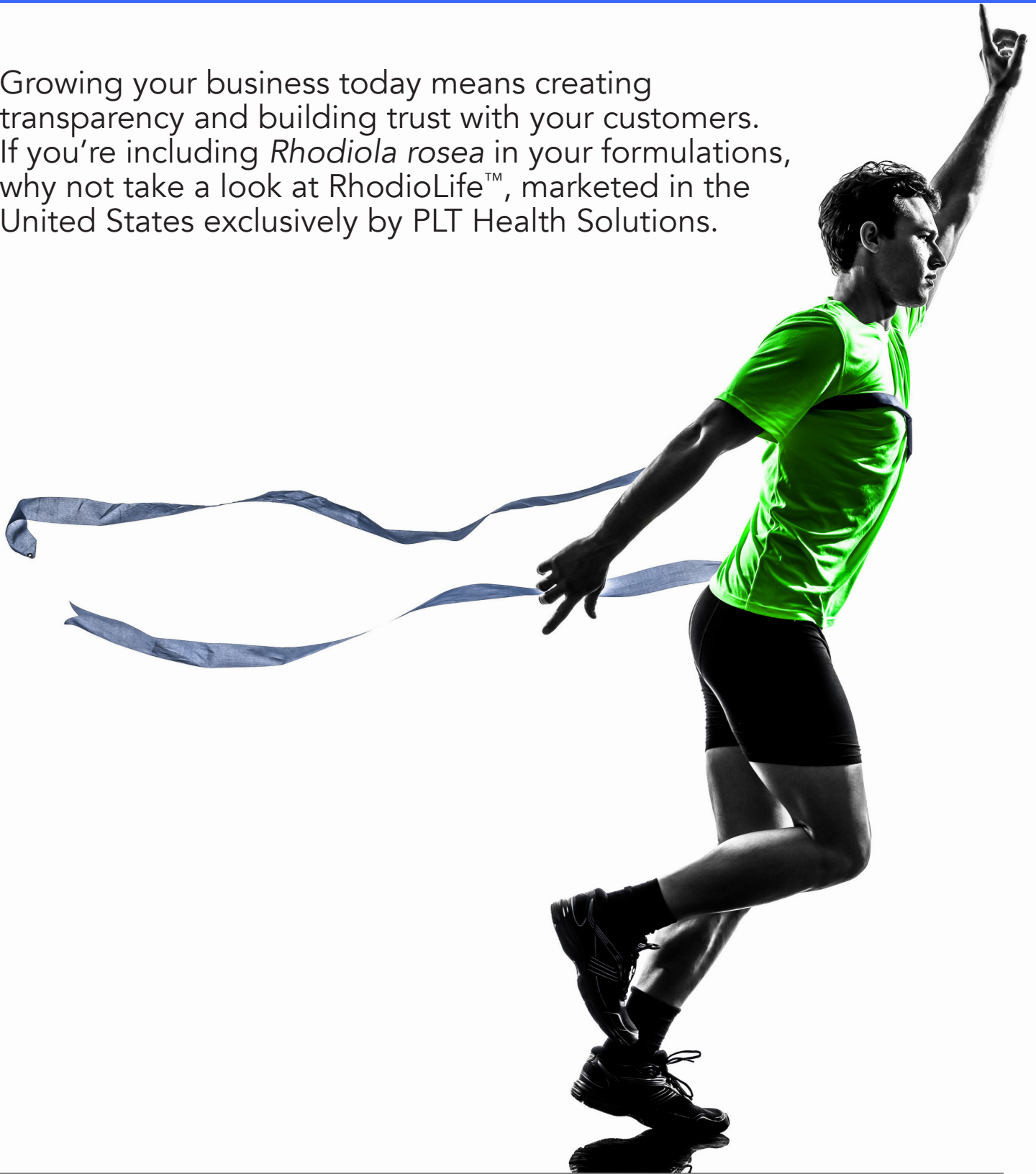
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Product certification



WHEN IT COMES TO *RHODIOLA ROSEA*, IDENTITY – THE FINGERPRINT - MATTERS... TO YOUR CUSTOMERS!

Growing your business today means creating transparency and building trust with your customers. If you're including *Rhodiola rosea* in your formulations, why not take a look at RhodioLife™, marketed in the United States exclusively by PLT Health Solutions.



THESE STATEMENTS HAVE NOT BEEN EVALUATED BY THE FOOD AND DRUG ADMINISTRATION.
THIS PRODUCT IS NOT INTENDED TO DIAGNOSE, TREAT, CURE, OR PREVENT ANY DISEASE.

Contact PLT Health Solutions for samples and more information.

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