

resinæ

october **2023**

NATURAL RESIN
NATURALLY RENEWABLE



@ Câmara Municipal Marinha Grande



**Is the policy
for the Natural
Resin sector - a
success story?**
Marco Rebelo

**RN21 promoting
new applications
for the Natural
Resin sector**
CENTI

**The Natural Resin
Sector in Portugal**
RESIPINUS

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EDITORIAL

It is with great honor that we present the Resinae technical magazine dedicated to Natural Resin. This magazine emerges within the framework of the Integrated Project RN21 - Innovation in the Natural Resin Sector to Strengthen the National Bioeconomy, led by CoLAB ForestWISE, constituting a milestone for the Natural Resin sector in Portugal and beyond.

Natural Resin, derived from maritime pine (*Pinus pinaster* Ait.), has a deeply rooted history in our country. However, challenges such as forest fires, labor shortages, and global competition have jeopardized the stability of this sector. Integrated Project RN21 emerges as an extraordinary opportunity for the revitalization of this sector, an unprecedented effort in our country. This project covers the entire value chain of Natural Resin, boosting not only production and transformation but also innovation in every step of the process. The RN21 Consortium, brings together various entities, with the aim to strengthen collaboration among producers, entrepreneurs, and researchers, essential for the success of this Project.

Resinae emerges as a vehicle to disseminate research and new products developed within the Integrated Project but also to promote and showcase the entire Natural Resin sector. In the following pages, articles about Natural Resin and its applications in the industry will be presented. All partners will be highlighted, and a detailed presentation of Project RN21, with its objectives, and expected impact on the Natural Resin industry will be provided.

At a time when Portugal is seeking a greener and more resilient future, Project RN21 assumes a guiding and disruptive role. We hope to witness the transformation of the Natural Resin sector and its undeniable contribution to a more sustainable and economically, socially, and environmentally competitive Portugal.

Carlos Fonseca
CTO CoLAB ForestWISE



The Integrated Project RN21 aims to modernize and promote sustainable Natural Resin production in Portugal, involving the entire value chain, from the forest to the end user. The RN21 consortium, under the leadership of CoLAB ForestWISE, represents an unprecedented collaboration that brings together 37 entities from the entire Natural Resin sector.

PUBLIC POLICY FOR THE NATURAL RESIN SECTOR – A SUCCESS STORY?

Sustainable bioeconomy is understood, in the Recovery and Resilience Plan, as a strategic component to "accelerate the production of high added value from biological resources, as an alternative to fossil-based raw materials, promote climate transition, and the sustainable and efficient use of resources." Through a transition to a Sustainable Bioeconomy, it is possible to support the modernization and consolidation of the industry by creating new value chains and more ecological industrial processes, presenting an opportunity for the country and for all of Europe. There are significant challenges ahead. Portugal has decoupled economic growth from greenhouse gas emissions, but decoupling from raw materials, means transforming how we produce, consume, and manage resources, this is one of those challenges. The solution lies in a circular vision, through a sustainable development model based on the entire lifecycle of products, focusing on reduction, reuse, recovery, regeneration, and recycling of resources. The transition to a circular and carbon-neutral economy has been a lever for sustainable investment, for the creation of more qualified jobs, and has contributed to sustainable recovery. With this in mind, the Recovery and Resilience Plan provides 145 million euros to promote sustainable bioeconomy.

The forestry sector holds great importance in

the national context due to its land occupation, the ecosystem services it provides, and its role in generating employment in rural areas and serving as the base for industrial sectors.

Pine resin is a sector in the forestry industry with significant potential for applying the principles of sustainable bioeconomy. It constitutes a renewable natural resource and an ecological alternative to resins produced from petroleum. The production and transformation of natural resin has a long tradition in Portugal, contributing to job creation and the establishment of local businesses. Maritime pine, the main resinous species explored in Portugal, is native and plays a crucial role in environmental protection. Maritime pine forests represent the largest carbon reservoir in the national forest.

With the goal of promoting and valorizing Natural Resin, the Action Plan for the Promotion of Natural Resin (2020) was developed, and identified three action pillars: promoting national natural resin production, strengthening the sustainability of the transformation industry, and the positive differentiation of natural resin and derivative products. These pillars are detailed in a set of 17 priority actions aimed at making the resin sector one of the success stories of bioeconomy in



Marco Rebelo
General Secretary
Secretaria Geral do Ambiente

“MARITIME PINE PLAYS A CRUCIAL ROLE IN ENVIRONMENTAL PROTECTION”

Portugal. From 2021 to the present date, the Fundo Ambiental has published four Calls with a total allocation of 28.246 million euros.

The support from the Fundo Ambiental aims to contribute to the promotion of Natural Resin in Portugal, providing financial support for the implementation of measures integrated into the three pillars established in the Action Plan for the Promotion of Natural Resin. These measures aim to create new products, processes, or services or introduce improvements in existing products, processes, or services, ensuring the intrinsic coherence and complementarity of objectives and results. They should contribute to increasing resin tapping productivity, increasing industrial production efficiency and incorporating actions to mitigate its environmental impacts, fostering new materials and products derived from Natural Resin for higher-value applications, and promoting the positive differentiation of Natural Resin. The emergence of the RESINAE magazine, within the framework of the Integrated Project RN21 – Innovation in the Natural Resin Sector to Strengthen the National Bioeconomy, supported by the Fundo Ambiental is

an example of implementing a strategy outlined in integrated public policies and the joint effort between the Government, companies, science, and technology in favor of a fairer, more sustainable economy, and one prepared for the future. Opportunities for companies and other entities in the scientific and technological system do not end with the funding from the Recovery and Resilience Plan, but this constitutes a lever that allows supporting initiatives such as the creation of a genetic improvement program for maritime pine, benchmarking studies of other *Pinus* species that produce resin, or research and innovation in resin tapping techniques, for the creation of products based on Natural Resin and for the application of natural resin in textiles and footwear.

We hope that this publication fully achieves its purpose of disseminating the Natural Resin sector in Portugal, addressing its pressing challenges, highlighting exemplary practices, and, most importantly, reinforcing that promoting Natural Resin is promoting the forest, rural communities, and an important tool in mitigating and adapting our territory to climate change.

RN21 is an example of achieving a strategy outlined in integrated public policies and the joint effort among the government, businesses, science, and technology towards a fairer, sustainable economy, and one prepared for the future.





THE INTEGRATED PROJECT RN21

The Integrated Project RN21 aims to modernize and make Natural Resin production more sustainable in Portugal, encompassing the entire value chain from the forest to the end user.

**Promoting Natural Resin as a biological and
renewable raw product.**

INTEGRATED PROJECT NATURAL RESIN 21

With the prospects of a growing population, increasingly accelerated global development, and a rising resource consumption, it is becoming increasingly clear that businesses, as they exist, are not an option for a sustainable future^[1].

“REVITALIZATION OF THE ENTIRE NATURAL RESIN VALUE CHAIN”



Global challenges related to the environmental sustainability, including climate change, represent the present major adversities faced by mankind. Limiting global warming, improving resource efficiency, and halting biodiversity loss while enhancing human well-being require radical shifts from the current resource-intensive and high-emission development trajectories^[2,3,4]. There is growing consensus that finding solutions for the planet's sustainability requires doing things differently, and innovation and the creation of new knowledge are largely favored mechanisms for these solutions^[5,6]. The modernization and consolidation of the industry through the creation of new value chains and more ecological industrial processes are possible through the transition to sustainable bioeconomy, presenting an opportunity for the entire Europe. A sustainable and circular bioeconomy contributes to the European Green Deal and plays a crucial role in transitioning to a sustainable, carbon-neutral economy, offering numerous opportunities for revitalizing more traditional sectors of the Portuguese economy, rooted in the exploitation of natural resources, such as the production and transformation of Natural Resin.

Assuming that not all activities in the bioeconomy are sustainable and circular and that developing an economy based on biological resources, such as Natural Resin, involves various trade-offs, ensuring the success of this economic transition is crucial.

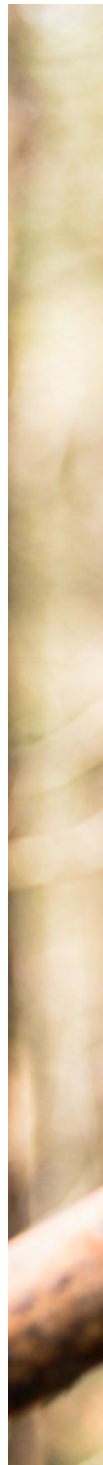
Two guiding principles that must always be present are circularity and sustainability.

Since the 10th century in Leiria, Portugal has been using resinous products. However, it was in the 19th century that organized resin extraction began, first in the National Forest of Leiria and then in maritime pine plantations and common lands in the Central and Northern regions of the country. Portugal became the world's second-largest producer of Natural Resin in the 1974-75 campaign, with production reaching 140.000 tons^[7]. From the 1930s to the 1980s, there was significant industrial expansion in the activity, accompanied by intense technological development in resin tapping and usage. However, in the 1990s-2000s, there was a sharp decline in production, resulting from multiple factors, such as the entry of Chinese resin, and later Brazilian resin, into international markets at more competitive prices than Portuguese resin. However, the national transformation industry has remained an international reference.

In transitioning to a sustainable bioeconomy, there needs to be greater valorization of Natural Resin as a "bio" product, expanding its range of market applications. Simultaneously, revitalization of the entire value chain is necessary to achieve greater modernization, innovation, and incorporation of technical-scientific knowledge. Reinforcing the production capacity of this raw material at competitive prices, in a disruptive manner compared to international markets, is of particular importance. This reinforcement should occur through increased profitability in resin tapping activities by actively managing maritime pine forests and reversing the trend of forest area contraction to forest fires and biotic factors. This would increase Natural Resin production

in Portugal, contributing to rural development and consequently territorial cohesion.

The Integrated Project RN21 – Innovation in the Natural Resin Sector to Strengthen the National Bioeconomy, led by CoLAB ForestWISE and framed in Component C12 of the Recovery and Resilience Plan, aims, in general, to transform Natural Resin into a added-value resource for subsequent use in the economy and by the tertiary sector through the creation of new value chains. For this reason, it brings together, for the first time, the entire Natural Resin value chain in Portugal in an integrated and mobilizing consortium for research and innovation, promoting the modernization and revitalization of Natural Resin as a high-value, "bio," ecological, and endogenous product, as a viable alternative to hydrocarbon-based (fossil-based) resins. The Consortium aims to support the sector companies in diversifying their portfolio of higher-value biological products derived from Natural Resin and in improving and modernizing production processes through the incorporation of digital technologies, decarbonization, and the adoption of Circular Economy principles.



Transforming Natural Resin into a added-value resource for subsequent use in the economy and incorporation by the tertiary sector through the creation of new value chains.

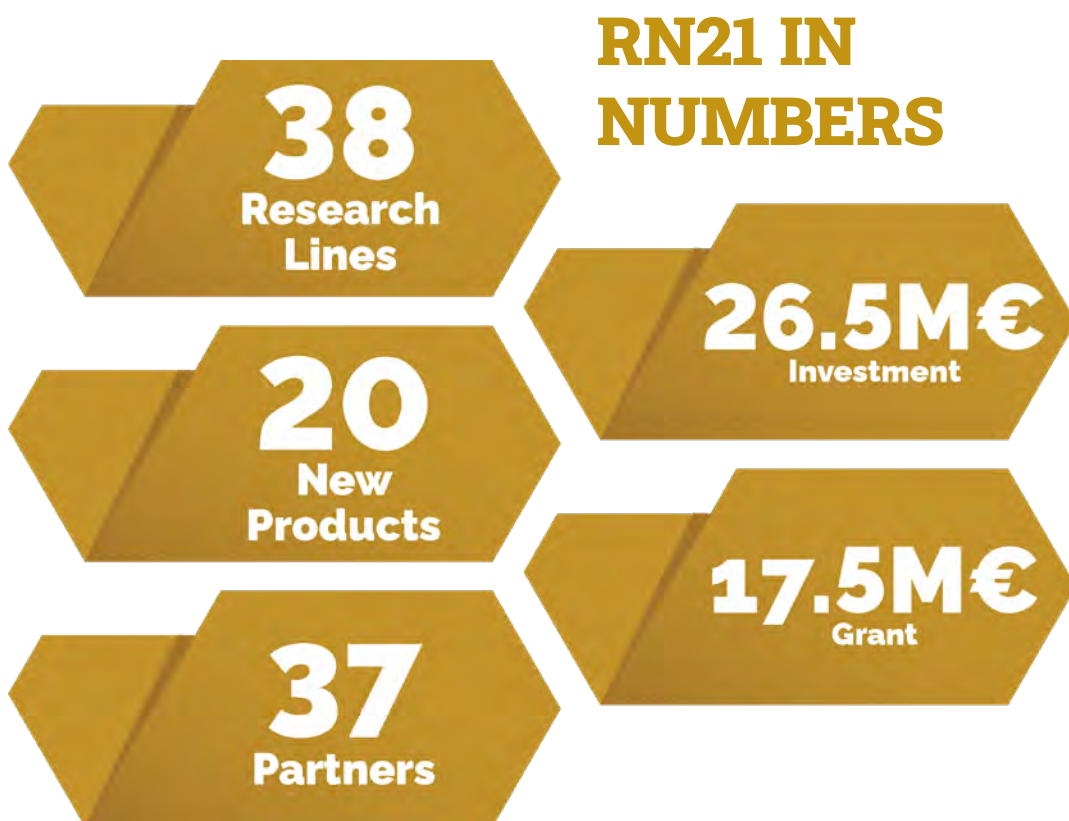


PROJECT RN21

With an investment of over 26.5 million euros and a grant of 17.5 million euros, RN21 consists of 37 entities, combining public and private investments, creating timely conditions for collaboration between companies and R&D&I partners and leveraging ecological and digital transition through three major pillars of action: Promoting national Natural Resin production, aiming to improve the production capacity of national pine forests, optimizing resin tapping processes with new products and technologies, and encouraging forest owners to participate actively; Strengthening the sustainability of the transformation industry, supporting investments in the first and second transformation, ensuring innovation throughout the value chain, with the aim of creating markets for "bio" products derived from Natural Resin; Positive differentiation of Natural Resin and derivative products, aiming to create a brand for natural resin and

its derivatives, certifying the sustainability of the entire process, from the pine forest to the final products. Within the aforementioned pillars, 22 key measures are currently being implemented, resulting in 38 new R&D&I lines, as well as products, projects, and services, rooted in research and knowledge, for resin producers, processing industries, and the market. Each measure commits to achieving results and development and innovation goals, encompassing, in some cases, processes from fundamental research to transfer and eventually market introduction; productive innovation; development of platforms and databases; knowledge transfer, outreach, and promotion; and dedicated training and capacity building.

CoLAB ForestWISE



By addressing the challenges of the Natural Resin sector in a holistic manner, promoting collaboration across the entire industry coupled with innovation and research, and aligning with the Sustainable Development Goals, RN21 outlines a promising path towards a more sustainable future.



@CoLAB ForestWISE

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THE RN21 CONSORTIUM

Led by CoLAB ForestWISE, it brings together, for the first time, 37 entities from across the value chain of the Natural Resin sector.

Pillar

I

Promoting the production of portuguese Natural Resin

- Reinforcing the productive capacity of the pine forests;
- Increase resin extraction productivity;
- Training program for resin tapping;
- Make resin extraction more attractive to the forest owners.

Pillar

II

Strengthening the sustainability of the transformation industry

- Industrial investment and value chain support;
- Development of new products and applications for gum rosin derivatives;
- Industrial Simbioses.

Pillar

III

Positive differentiation of Natural Resin and its derivatives

- New brand to differentiate products containing Natural Resin;
- Technical journal;
- Marketing campaign.

The RN21 Consortium aims to implement 22 key measures, aimed to create products, projects, and services based on research and specialized knowledge. Each measure is led by a complete mini-consortium committed to achieve results and goals through complementary activities, covering research, innovation, platform development, knowledge transfer, outreach, promotion, and specialized training. The RN21 Consortium brings together companies from the Natural Resin sector in Portugal in an unprecedented effort of sectoral cooperation. Specifically, the consortium includes one company in production - RAIZES IND - three in the 1st transformation - VIEIRAFABRIL, GUM CHEMICAL, PRORESINA - four in the 2nd transformation - EUROCHEMICALS, GUM ROSIN, UNITED RESINS, KEMI - and one with vertical integration of the 1st and 2nd transformation - PINOPINE. The consortium brings together the majority Portugal's Natural Resin transformation companies, which is an unprecedented event.



Leader of Consortium RN21 | Collaborative Laboratory
Participates in Initiatives 1, 2, and 3 of Pillar I, Initiatives 1 and 2 of Pillar II,
and Pillar III

The CoLAB ForestWISE's mission is to enhance the value of the Portuguese forest through the promotion of sustainable management, based on (co)research and development activities, knowledge and technology transfer, acting as a bridge between industry, academia, and public administration.

As the leader of the Integrated Project, CoLAB ForestWISE has brought together, for the first time, the entire value chain of Natural Resin in an unprecedented effort aimed at modernizing and boosting the entire Natural Resin sector. CoLAB ForestWISE expects that the Consortium, now assembled, will pave the way for a future Natural Resin Cluster. RN21 also aims to promote Natural Resin and its derivatives as a raw material with the potential to replace fossil-based raw materials. We hope to shape a future that values and enhances the pine forest where Natural Resin plays a central role in the transition to a greener, circular, and sustainable economy.



Forest Producers Association
Participates in Pillar I Initiatives 1 and 2

Natural Resin serves as a source of income for the territories covered by Aguiar Floresta, enabling population retention and job creation. It ensures a permanent presence in the forest environment, contributing to the reduction of ignitions due to the dissuading effect it causes.

We aim to leverage and revitalize the resin sector through the actions undertaken and planned, enabling better management of forested areas with environmental and economic benefits. It is expected that a set of best forestry practices can be implemented, involving both forest contractors and small landowners, to improve the sector in the future, attracting more people. Additionally, participation in the Project will demonstrate to the general population all the direct and indirect benefits that resin extraction activities represent.



Centre for Nanotechnology
and Smart Materials

Institute of Research & Technological Development
Participates in Initiatives 1 and 2 of Pillar II

CeNTI is dedicated to the study and development of new products and sustainable processes using Nanotechnology, Advanced Materials, and Intelligent Systems, with a focus on technology transfer and knowledge to the business sector, promoting the development of innovative solutions.

Being part of the RN21 Integrated Project Consortium allows CeNTI to strengthen and foster new synergies with companies and other entities within the Scientific and Technological System, aiming to enhance the value of Natural Resin and its derivatives in various application sectors. CeNTI's participation is envisioned as enriching in technical and technological terms, helping to promote the development of new materials and disruptive products for areas such as food and agriculture, automotive, textiles and footwear. The use of a biological/natural based material like Natural Resin and its derivatives, combined with increased functionalities and improved final product characteristics, represents a significant step in meeting the demand for sustainable and economically viable solutions.



Association of Pine sector stakeholders of the Pine Sector
Participates in Initiatives 1, 2, and 3 of Pillar I

Pine resin has the advantage of generating annual revenue for forest producers. Thus, resin tapping has significant potential to change the perception of the maritime pine forests for the producer and catalyze much-needed forest management, with beneficial consequences for the Pine Industry, the forestry sector, and the country.

The RN21 Project, besides being a significant opportunity to encourage forest management and the promotion of pine forests by the owner, will provide better answers to very relevant questions from forest managers such as: How to reconcile the production of timber with resin tapping? What is the proper silviculture for a tapped pine forest? Under what circumstances is resin extraction advantageous? Which management practices promote Natural Resin production? Is a resinous pine forest more vulnerable to pests and diseases? On the other hand, the Natural Resin sector has the merit of reinventing itself as a service provider, with fire prevention being one of its standout services.



Intermunicipal Community of Alto Tâmega and Barroso
Participates in Initiatives 1 and 3 of Pillar I, and in Initiative 1 of Pillar III.

Our mission is the definition, promotion, planning, and implementation of strategies for economic, social, and environmental development in the region. The economic activity generated by Natural Resin contributes to population retention area and serves as an example of leveraging local resources and wealth creation.

We anticipate that the Integrated Project RN21 will have a positive impact on our region, especially concerning the retention of local population. We hope that the activities developed within the scope of the Project will help consolidate the Natural Resin industry in our territory, strengthening it as a solid source of economic sustenance for our community. By participating in and supporting this Project, we contribute positively to achieving a range of benefits that extend to the environment, the economy, and society.



COMUNIDADE INTERMUNICIPAL
REGIÃO DE COIMBRA

Intermunicipal Community of the Coimbra Region
Participates in Initiatives 1 and 2 of Pillar I, and in Initiative 1 of Pillar III

Based on a supramunicipal strategy, CIMRC has been testing a new approach to regional development that allows for a stronger intervention with economic, social, and cultural agents, aiming to enhance the region's values and assert itself on the national stage.

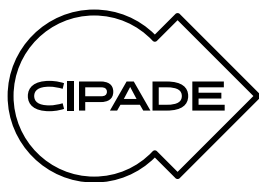
The natural heritage existing in our territory is of utmost relevance to the economic development of our region. The development of the pine sector and its by-products, such as Natural Resin, represents a challenge of enormous importance. It allows us to preserve, promote, and value our forest resources while empowering the economic and business fabric of our region, which in recent years has ensured the innovation and continuity of this noble activity. The main expectations that CIM Região de Coimbra has in the implementation of the Integrated Project RN21 are associated with promoting the use of Natural Resin as a high-value economic product.



Intermunicipal Community of the Leiria Region
Participates in Initiatives 1, 2, and 3 of Pillar I, and in Initiative 1 of Pillar III

The Intermunicipal Community of the Leiria Region participates in the RN21 Consortium with the aim of contributing to the valorization and resilience of the Natural Resin sector in general, and to the efficient management of forest resources, as a central element in the transformation of forested territories.

The sustainable exploitation of Natural Resin holds significant economic value for the Leiria region, creating employment opportunities and income for the local population. Given this region's substantial forested area, the conservation and sustainable management of forests, particularly in terms of biodiversity conservation and promoting green economy, are integral parts of our mission. It is our belief that Project RN21 has the necessary conditions to implement the foundational actions that will lead to a more productive and resilient forest, thus contributing to the goals of carbon neutrality and territorial cohesion.



Medium-sized adhesive products company
Participates in Initiative 2 of Pillar II

The use of Natural Resin in our formulations enhances the performance of adhesives and their adhesion. By choosing products of biological origin produced in Portugal, we aim to significantly minimize the carbon footprint of our formulations, contributing to the reduction of environmental impact.

Our main expectations are to contribute to the circular economy by increasing the incorporation of bio-based products into our formulations, in order to achieve more sustainable adhesives with reduced environmental impact. The sharing among partners within the RN21 Consortium and the subsequent exploration of new sustainable raw materials for incorporation into our formulations, always considering the sustainable consumption of domestically sourced products, will contribute to our knowledge and sustainable growth.



Technological Center for the Textile and Clothing Industries of Portugal
Participates in Initiative 2 of Pillar II.

The mission of CITEVE is to support the development of technical and technological capabilities of companies in the textile sector, through the development and dissemination of scientific knowledge and technology, the enhancement of creativity, and instrumental support for the definition and implementation of public policies.

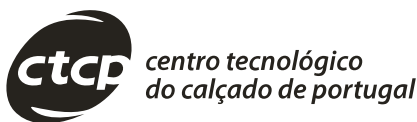
CITEVE aims to obtain more sustainable solutions derived from natural resources that enable the development of biobased polymeric materials that could serve as potential substitutes for petroleum-derived products in the Textile and Clothing Industry. Thus, CITEVE seeks the development of laminated and/or finished structures using a renewable material, characterized by its biodegradability and environmental sustainability. CITEVE has increasingly focused on the development of sustainable and circular solutions. The emphasis on Natural Resin, of national origin, instead of other types of resins or from other sources, is seen as an opportunity to replace resins or other fossil-based products.



Big company of industrial adhesives
Participates in Initiatives 1 and 2 of Pillar II.

Natural Resin plays a fundamental role in our research and development work, as it aims to enhance the quality of our adhesives, increasing their adhesion to various materials. The use of these resins allows us to create a range of bio-based products.

Participation in this project comes with great expectations from Colquímica Adhesives. Our goal is to add value to the market by introducing highly technological products that can be beneficial to our industrial customers. As part of our internal project, the Colquímica Sustainability Challenge, the company defined as one of its pillars the objective of reducing the ecological footprint in its processes and products. We are committed to continuously promoting sustainability throughout our value chain, and the adoption of greener technologies is a valuable advantage in this regard.



Technological Center of Footwear of Portugal
Participates in Initiative 2 of Pillar II

CTCP aims to explore the use and properties of Natural Resin and contribute to the development of new adhesives, polymeric materials, and soles with a higher biological content that can be used in the production of footwear products.

At RN21, CTCP aims to identify new biologically-based solutions, generate and transfer knowledge to the footwear Cluster, promoting the development and use of new adhesives and soles with higher biological content, thereby contributing to the reduction of fossil-based resource usage. RN21 enables the establishment of synergies, initially unlikely, between companies in the footwear cluster and the Natural Resin sector, as well as entities within the National Scientific and Technical System, fostering the development of biologically-based solutions and thus supporting the transition of the footwear Cluster into a sustainable bioeconomy.



Small company in the plastic injection sector
Participates in Initiative 2 of Pillar I

Dreamplas has the mission of developing innovative manufacturing technologies capable of operating in various sectors of activity, oriented towards external markets, and the development and supply of products with innovative and eco-sustainable characteristics.

Dreamplas offers more than a dozen proprietary products and intends to continue investing in the development of these products and its own brand for direct sales to the end user. At the same time, we plan to continue the development and production of our clients' products. With our participation in the Integrated RN21 Project, we hope to produce new products applied to the extration of Natural Resin. DreamPlas aims to become a national reference company with an excellent performance, focusing on sustained growth based on internal capacity for research and development of innovative products and solutions.



**EUROCHEMICALS
PORTUGAL S.A.**

Small second transformation company of Natural Resin
Participates in Pillar II Initiative 2

Natural resin plays a central role in our mission, providing the essential raw material for our products. We believe in the exceptional properties of Natural Resin and its potential as a sustainable solution that enables us to offer high-performance and quality products.

With an industrial history dating back to 1970 and extensive experience in the Natural Resin sector, Eurochemicals has always adapted to market needs, positioning itself as an active participant and agent of change. We have high expectations for our involvement in the Integrated Project RN21. We are a company committed to sustainability, and we hope to strengthen synergies with various project partners, suppliers, customers, universities, and research centers in the development of new solutions with a high incorporation of bio-based materials, more sustainable processes, and environmentally friendly products.



**Ciências
ULisboa**

Higher Education Institution
Participates in Pillar I Initiative 1.

The investigation of genetic variability associated with Natural Resin production in maritime pine and the transfer of this knowledge will enable the development of innovative approaches in sustainable forest management practices related to Natural Resin production.

In the context of this project, we aim to contribute to a sustainable bioeconomy by strengthening the capacity for Natural Resin production. The participation of the Faculty of Sciences is associated with the creation of the knowledge necessary for the establishment of tools to support tree selection and genetic improvement for resin production, in line with one of the specific objectives of the RN21 Project - promoting the production of national Natural Resin.



**GUM
CHEMICAL**

Medium-sized first transformation company of Natural Resin
Participates in Pillar II Initiatives 1 and 2

Company specialized in the production and preparation of Natural Resins, such as rosin and turpentine from various origins and specificities. Natural Resin is closely related to our mission, both for the quality and performance of the products and for our commitment to sustainability.

By participating in the Integrated Project RN21, we have the expectation of developing new products that can offer competitive advantages and market opportunities in various sectors, driving innovation and company growth, gaining access to new technologies and knowledge, enhancing opportunities for international expansion, strengthening the company's brand and reputation, collaborating with strategic partners, fostering economic growth, and creating job opportunities. Gum Chemical Solutions sees Project RN21 as a unique opportunity, an innovative initiative, and a unique collaboration and partnership among various sectors within the Natural Resin industry.



Small second transformation company of Natural Resin
Participates in Pillar II Initiative 2.

Pine Natural Resin, as a fundamental raw material, is essential for the implementation of the innovative Gum Rosin project. Our mission is to achieve the capacity to supply the market with high-performance, polyterpene biopolymers, with numerous industrial applications.

The participation of GUM ROSIN in the Integrated Project RN21 represents a strategic opportunity for the company to position itself as a reference company in the production of terpene-based biopolymers, driving its sustainable development. Our main expectations can be expressed in the following aspects: the creation of new products, access to new markets and a presence in the global market, economic growth, and job creation.



Technological Interface Center
Participates in Pillar II Initiative 1.

The mission of INEGI is to contribute to the development of various industrial sectors, including the Natural Resin industry, and the economy in general, through scientific and technological innovation, while simultaneously ensuring the personal and professional development of employees and the enrichment of higher education.

In the scope of its mission, INEGI contributes to the execution of Integrated Project RN21 through its competencies and technical and scientific know-how of extreme relevance, highlighting its knowledge and experience in developing action plans for the decarbonization of industrial unit operations, with a focus on optimizing energy use in industrial thermal processes, recovering, storing, and reusing residual heat, and integrating renewable energy sources and renewable gases. INEGI's participation in Project RN21 aims to address European challenges by accelerating the decarbonization of industrial processes in the Natural Resin sector through methodologies, tools, and technologies.



Institute of Technological Research and Development
Participates in Initiative 1 of Pillar II

To contribute to the decarbonization of the Portuguese industrial sector through the implementation of measures that improve energy efficiency in industrial processes, the integration of local renewable energies, and the development of management and monitoring systems for energy usage in the Natural Resin industry.

Identification of energy efficiency and water usage improvement measures that offer the best cost-benefit ratio for the Natural Resin sector, through quantifying the potential for renewable energy integration and replacement of fossil energy sources, as well as process-level interventions. The project will make a significant contribution to the decarbonization roadmap of this industry, aligning with national climate mitigation goals. Lastly, close collaboration with some Natural Resin companies will enable the development of measures that are more suited and tailored to the sector.



Instituto Nacional de
Investigação Agrária e
Veterinária, I.P.

State Laboratory
Participates in Initiatives 1 and 2 of Pillar I

INIAV is the State Laboratory in the field of Agriculture, Forestry, and Rural Development competences, which conducts research activities in the agronomic and veterinary fields. Natural Resin is a core forest value chain for INIAV's research.

The opportunity created by RN21, to restructure the Natural Resin Sector, has been and continues to be the chosen path for all of those involved in this project to rejuvenate this economic sector. The path to gaining recognition should involve having a distinguishable product – Natural Resin/Gem – characterized by its quality, where everyone contributes, and there is an advantage in being part of the collective effort, as the coordination of the Consortium formed is a comparative and distinctive advantage that strengthens it. If we all work together - each one is a part of the whole, and the whole cannot progress without the participation of each part - wealth will be generated for the national economy in a coordinated and sustainable manner.



Higher Education Institution
Participates in Initiative 1 of Pillar I.

ESAC's objectives, in addition to training technicians, is providing support to the community, and contributing to the appreciation of natural resources. Natural Resin is a natural resource with tremendous potential that needs to be valued from plant selection to the final product.

We intend to contribute to the assessment and understanding of the genetic basis of maritime pine and its potential for the production of Natural Resin, with the aim of producing the best plants for the finest end product, Natural Resin. The constant challenge for research and development entities and institutions, such as ours, is the production of the best plants that are more resilient to climate changes and associated disturbances (fires, pests, and diseases), and also have a higher potential for producing quality Natural Resin.



Higher Education Institution
Participates in Initiative 1 of Pillar I, and in Initiative 2 of Pillar II.

Our focus has been on the search for biobased materials solutions and digital transformation processes, with special attention to those that apply additive manufacturing technologies. Natural resin is a raw material of great importance because it enables the development of solutions with a minimal ecological footprint.

We are looking forward to the development of new materials and products, but more importantly, the creation of a network of partners that will endure beyond the project, dedicated to the development of new projects that allow us to create value in the Natural Resin sector. The Center for Rapid and Sustainable Product Development (CDRSP) is based in Marinha Grande, thus having a special connection to the raw materials produced there. The RN21 Project could be the beginning of a Natural Resin Cluster that should remain active after the project conclusion, so it would be of utmost importance to continue fostering this community.



Higher Education Institution
Participates in Initiatives 1, 2, and 3 of Pillar I.

As a university and scientific research institution, it is ISA's mission to ensure high standards with constant updating and the integration of innovative means, carry out technology transfer processes, and contribute to sustainable development.

Non-wood forest products, so characteristic of the Mediterranean forest, and in which Natural Resin is included, constitute an important area in the Forchange Research Group - Forest Ecosystem Management in a Global Change Environment. The RN21 Project will allow us to generate cutting-edge knowledge to transfer to students, society, and the scientific community through teaching, demonstration activities in pine forests, and technical and scientific article writing. The RN21 Project also enables the creation and strengthening of relationships with Project partners, enhancing opportunities for future partnerships to advance knowledge about the forest.



Forest Producers Association
Participates in Initiative 3 of Pillar I.

Our mission is to promote and support integrated strategies for the promotion, valorization, and defense of the forest. It is only natural that we see the encouragement given to the valorization of Natural Resin as an important step towards improving the economic, environmental, social, and even cultural sustainability of the rural territory.

We believe that Project RN21 will contribute to the revitalization and promotion of the entire Natural Resin value chain, particularly in forest production and Natural Resin extraction. We also hope that participation in RN21 will enable us to increase our knowledge about the potential of Natural Resin in our region, especially the potential of "resin extraction to the maximum extent." We believe that acquiring this knowledge will allow us to become increasingly better and more capable in providing the technical and operational support necessary for the management of maritime pine forest stands.



Medium-sized second transformation company of Natural Resin
Participates in Initiatives 1 and 2 of Pillar II.

Pine Natural Resin is essential for our company as it is directly related to our mission and purpose as an organization: the provision of state-of-the-art Natural Resins derived from rosin, as well as blends and formulated compounds for high-performance applications.

The expectations regarding KEMI - Pine Rosins' participation in Integrated Project RN21 are aligned with the goals of the Integrated Project and the company's interests. KEMI - Pine Rosins' participation in Integrated Project RN21 thus represents a strategic opportunity for the company to position itself as one of the leading companies in the sector, driving its innovation and international growth, and contributing to sustainable development.



Medium-sized, vertically integrated, first and second transformation
company of Natural Resin
Participates in Initiative 1 of Pillar II.

Natural resin is the most important raw material for our company. Besides being natural, it is also a renewable raw material, which contributes to proper environmental sustainability, alongside carbon neutrality, allowing us to stand out in our market.

The demand for 100% biobased raw materials is a constant in the markets where we operate. Being able to offer our customers products derived from a natural raw material, such as Natural Resin, with the additional advantage of all other raw materials used also being biobased, will unquestionably provide a competitive advantage over other players in the rosin derivatives market. The fact that we can achieve the initially proposed goals will allow us a positive differentiation in an increasingly environmentally demanding market segment, such as the adhesive sector.



Small first transformation of Natural Resin company
Participates in Initiative 1 of Pillar I and Initiative 1 of Pillar II

Since 1912, we have been carrying out the first transformation of Natural Resin, which involves its distillation, resulting in two products: rosin and turpentine. Our mission is aligned with our tradition of evolving and progressing, keeping our production as natural as possible and continuously enhancing its quality.

The main expectations of Proresina involve the promotion of our raw material, the Natural Resin from maritime pine. In this way, we assure our customers that they receive a product originating from our maritime pine forests, completely natural. We hope that, with this joint effort, there will be a greater appreciation of our raw material, the Natural Resin from maritime pine, which has been overlooked and undervalued, despite being present in numerous products we use in our daily lives.



Small Natural Resin exploration company
Participates in Initiatives 1, 2, and 3 of Pillar I

Natural Resin is a raw material extracted by us for the past 12 years. Through this activity, we directly employ 8 full-time workers. Human presence in these territories has allowed the development of other activities related to the forest, such as managing younger pine tree areas, surveillance, and rural fire prevention.

Our expectations revolve around finding better solutions for the extraction of Natural Resin, particularly making it more efficient, attractive, productive, and innovative. It is essential to achieve these goals in order to attract young people to the sector, with appropriate economic conditions, thus ensuring the viability of this activity. We intend to achieve these objectives through the development of a closed resin collector to ensure higher quality in the final product extracted from pine trees, and the development of a mechanized prototype to facilitate the debarking stage. These measures align with our actual needs.



Distillers and Resin Explorers Association
Participates in Initiatives 2 and 3 of Pillar I

A representative association of the resin tapping and distillation sector of Natural Resin in Portugal. RESIPINUS aims to be the voice of national producers and distillers and work towards the defense, promotion, and future of resin tapping.

RESIPINUS is dedicated to the development and promotion of the Natural Resin sector in Portugal, and embarks on the Integrated Project RN21 with high expectations. This ambitious project is largely the result of the Association's tireless work over the past years. For RESIPINUS, this is a crucial moment that will determine the future of the sector in the country. Only by fully seizing this opportunity will it be possible to ensure its continuity. Assuming various responsibilities, with special emphasis on resin tapper training, RESIPINUS is committed daily to ensure the success of this project and, consequently, the prosperity of the sector.



Big thermoplastic injection company working in the automotive sector
Participates in Initiative 2 of Pillar II

The RN21 Project will contribute to achieve the sustainability goals of the Automobile Constructors and bring environmental, economic, and social benefits to the entire country, especially in regions where the dynamics associated with the existence of pine forests and their use for resin extraction are stronger.

With the commitment made by the European Union to achieve carbon neutrality by 2050 and the goals of most automobile manufacturers to have 25% of the weight of polymers made from green materials by 2025, the introduction of Natural Resin in the formulation of thermoplastic polymers as a potential solution for a biocomposite is essential and a significant opportunity to achieve these goals. We expect to develop biobased products derived from Natural Resin that exhibit the same characteristics as the currently used materials of fossil origin. The development and use of new, more sustainable materials are necessary to achieve carbon neutrality.



Center of Competence for Agri-Food in the Meat Sector
Participates in Initiative 2 of Pillar II

The development of new products using Natural Resin is very important, as it can replace several high-carbon footprint and hard-to-recycle products currently used in food packaging.

Tecmeat's expectations in participating in Integrated Project RN21 are to develop and discover new biobased and easily recyclable solutions for manufacturing packaging in the agri-food industry. As a Center of Competence, we can serve as an interface between the solutions developed through RN21 and the companies in the sector, working on technology transfer and demonstrating solutions.

T I N T E X

Medium-sized textile sector company
Participates in Initiative 2 of Pillar II

Tintex aims to create advanced textile solutions, resulting from economic and transformational operations, that are transparent and universally supportive of ecological and social responsibilities, fostering the principle of a better future.

With Project RN21, Tintex aims to establish an extension of the Natural Resin value chain, intending to enhance its applications in the Textile industry. To achieve this goal, the plan is to incorporate rosin derivatives into Tintex's textile materials and composites processes, either as additives in a process or as integral components of the final material matrix. The synergy between Tintex and the Natural Resin sector will operate within the textile value chain at three levels: 1) enhancing territorial cohesion; 2) reducing the carbon footprint of distribution and supply routes; 3) bio-materialization of processes, serving as raw materials, and products, promoting biocompatibility throughout their lifespan.



universidade de aveiro
theoria poesis praxis

Higher Education Institution

Participates in Initiatives 2 of Pillar I and Initiative 1 of Pillar II

The valorization of plant biomass as a resource of added-value chemicals is a key research area at the University of Aveiro. In this regard, abundant components such as the rosin acids present in Natural Resin may be worthy of research interest.

As a National Scientific System Entity, UA hopes to contribute with its scientific knowledge and extensive experience in project development in cooperation with the industry, to improve processes and develop new ideas and solutions susceptible to intellectual property protection. This will enable us to contribute to the valorization of this economic sector. Additionally, it is important to contribute to the advanced training of human resources who can contribute in the future to the increasing valorization and sustainability of the Natural Resin sector.



**UNIVERSIDADE D
COIMBRA**

Higher Education Institution

Participates in Initiatives 1 and 2 of Pillar II

The UC has been conducting various studies to enhance the value of Natural Resin in collaboration with academic and industrial entities. This is an area of immense significance from both environmental and socio-economic perspectives, considering the importance of the forestry sector in Portugal, at both regional and national levels.

The University of Coimbra has the ambition to decisively contribute to the development of new high-value-added products that allow the valorization of the forestry sector. These products will contribute to the economic development of the region and the country, thereby improving forest management and attracting highly qualified professionals to the inland areas of the country. The use of natural-based products is crucial for the development of technologies that can enhance the institution's long-term sustainability. UC aims to become a university increasingly capable of building the future in a sustainable and socially responsible manner.



united
biopolymers

Medium-sized bioplastics company
Participates in Initiative 2 of Pillar II.

The use of Natural Resin in the formulation of bioplastics provides new properties, optimizing some characteristics of bioplastic formulations. The future outlook is that Natural Resin and its derivatives will become an increasingly important component in bioplastic formulations.

Participation in the Integrated Project RN21 emerged as an opportunity to collaborate on projects spanning various business sectors, where we could assess the current or future need for the use of bioplastics. Additionally, there is the possibility of incorporating the use of Natural Resin, which is a historical raw material in Portugal but has been somewhat overlooked by the business community. We believe that if Natural Resin once enabled our ships to sail the world, today, along with BIOPAR® produced by United Biopolymers, it holds the potential to conquer new markets and applications.



united
resins

Medium-sized second transformation company of Natural Resin
Participates in Initiatives 1 and 2 of Pillar II

The increase in national Natural Resin production will meet the existing demand in Portugal and the new demand triggered by the research carried out under the Project RN21. The technological, operational, and industrial know-how allows us to be at the forefront of productivity today.

The RN21 Project has allowed different segments of the Portuguese industry, such as textiles, footwear, automotive, food, and the Natural Resin sector, to come together in the same project and work towards a common goal. These connections have existed in the distant past and have now been resumed under a shared goal: to enhance the sustainability of these industries. Another expectation related to the Integrated Project RN21 is the revitalization of the Natural Resin extraction industry. Currently, we source the raw materials from 10,000 km away. We hope to reduce the ecological footprint and increase sustainability by promoting local production.



Higher Education Institution
Participates in Initiatives 1, 2, and 3 of Pillar II

The CITAB - Center for Research and Technology in Agro-Environmental and Biological Sciences at UTAD, has, as one of its focuses, sustainable development, the promotion of more competitive and sustainable natural product value chains, and the development of strategies to mitigate climate change.

UTAD's mission is to produce and disseminate innovative scientific knowledge, in line with the needs of the society and businesses it serves, acting as a catalyst for economic development and improvement of the quality of life for communities, thus being a significant factor in territorial cohesion. The resin industry has a long-standing tradition in Trás-os-Montes and Alto Tâmega. Any research that adds knowledge and value to this industry, as we hope will be the case with RN21, is important for the region and, consequently, for UTAD.



Vieirifabril
A Essência do Pinheiro

Small first transformation company of Natural Resin
Participates in Initiative 2 of Pillar I and Initiative 1 of Pillar II

Natural resin is the only raw material we process in our factory, making it essential to Vieirifabril's operations. We aim to promote the sustainable expansion of the Portuguese pine forest, based on good economic, social, and environmental practices.

Our expectations in participating in the Integrated Project RN21 are that the overall objective of the Project, namely, the promotion of national Natural Resin production, will be achieved. For this to happen, it is necessary for the entire sector to work together. Vieirifabril's expectations include reducing imports of Natural Resin, creating job opportunities and wealth, especially in rural areas, and transforming the Portuguese forest, which is heavily affected by rural fires, to make it more resilient. This transformation aims to gain benefits in terms of carbon sequestration and prevention of rural fires, which are essential for achieving national carbon neutrality.





RESIPINUS

THE NATURAL RESIN SECTOR IN PORTUGAL

The forest tradition driving sustainability

Resin tapping is an activity of extreme economic, environmental, and cultural importance, playing a fundamental role in the sustainability of the country's forestry industry.

Portugal is a country rich in forestry traditions dating back to the plantation of the Pinhal de Leiria. One sector that highlights this rich heritage is Natural Resin. Modern Natural Resin exploitation began in Portugal in the second half of the 19th century. It is an activity of extreme economic, environmental, and cultural importance, playing a fundamental role in the sustainability of the country's forestry industry.

In the past century, Portugal experienced its highest period of Natural Resin production growth, especially from the 1960s, reaching over 100,000 tons extracted in the 1980s, making it the world's second-largest producer after China. From the 1990s until 2010, the activity declined, followed by a modest resurgence to the present day.

Throughout the centuries, Natural Resin has played an active role in various civilizations, from Ancient Egypt and the Middle Ages to the present day. It has always been a natural resource of utmost importance to humanity, used in processes such as the mummification in Ancient Egypt, caulking ships, and today, in various everyday materials such as paint, glue, shoes, candles, car tires, medications, and even chewing gum, demonstrating its versatility and economic value. Natural Resin is a natural product with multiple applications that has helped promote civilizational development.

Resin tapping plays a crucial role in the Portuguese economy and culture. This forestry activity creates jobs in rural communities, providing a significant source of income for many families. Additionally, resin tapping contributes to forest maintenance by cleaning the area around pine trees and increasing human presence in the forest, reducing the risk of forest fires.

The tradition of resin tapping is also part of the



culture and identity of the regions where it is practiced. Festivals and celebrations related to resin tapping are held to honor this activity, creating a sense of community. The first transformation industry of Natural Resin is a vital part of the Portuguese economy. By transforming raw Natural Resin into added-value products, this industry generates direct and indirect jobs, contributing to the sustainability of rural communities where forestry activities are carried out.

The Natural Resin sector also has export potential, as products derived from Natural Resin are in increasing demand in international markets. This potential can be a valuable opportunity for the country's economic growth, expanding the reach and visibility of the industry.

Resin tappers and the first transformation industry of Natural Resin have been striving to embrace sustainable practices and technological innovations. Efficient use of raw materials and the implementation of low-impact environmental processes are priorities to ensure that Natural Resin exploitation is carried out responsibly. Research and development also play an important role in seeking new applications for products derived from Natural Resin and in the continuous improvement of production processes. The efforts in innovation and sustainability, carried out by both RESIPINUS

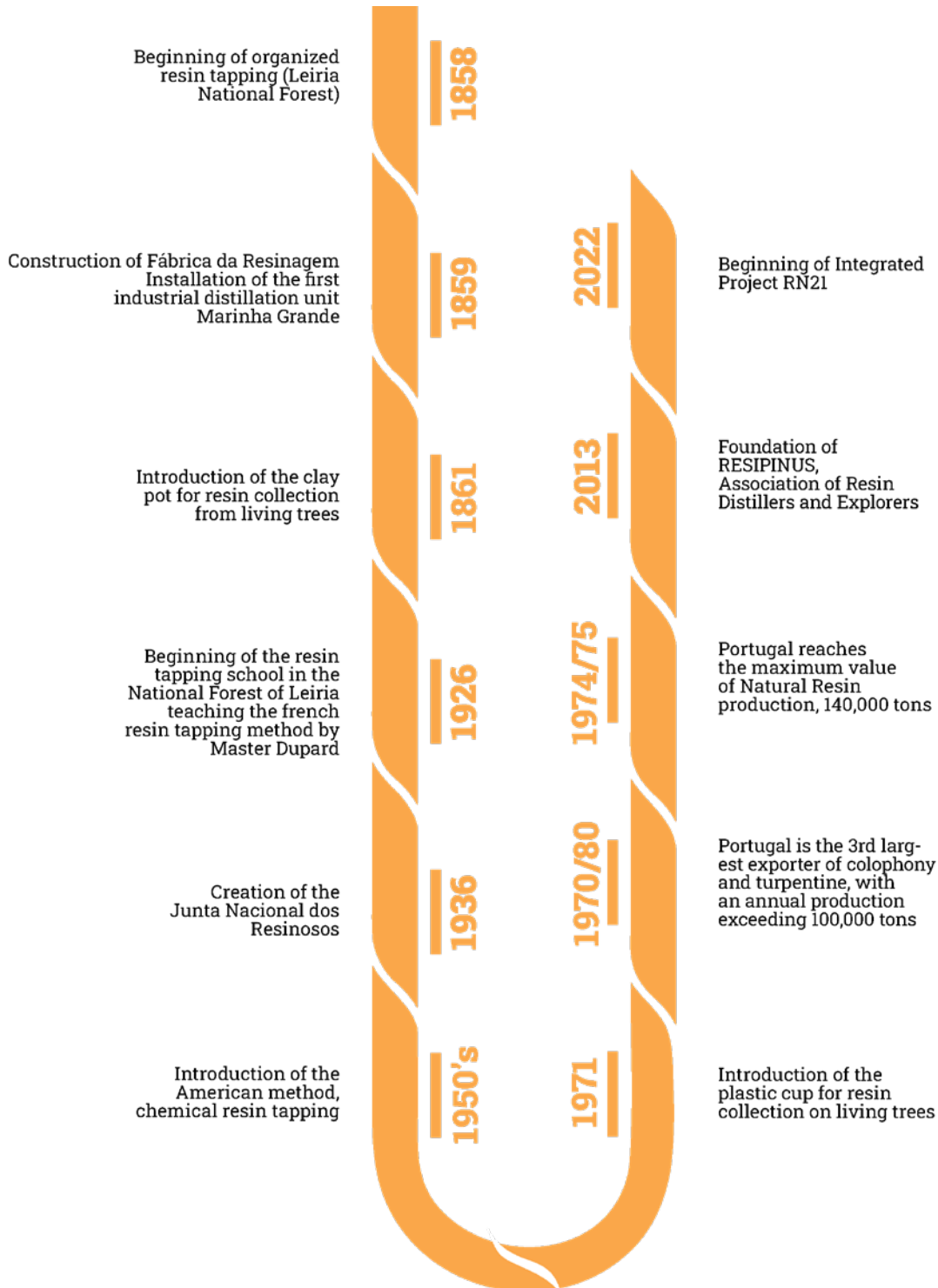
and the Natural Resin industry, coupled with the increasing promotion of natural and sustainable products, led to the sector being included in the Sustainable Bioeconomy Component of the Recovery and Resilience Plan (PRR), thus accessing an unprecedented investment in this sector. The sector believes that this investment can revitalize the activity and the industry.

The history of resin tapping in Portugal is a story of tradition, economy, and culture. This age-old practice remains relevant today, adapting to contemporary challenges and contributing to the sustainability of the Portuguese forestry industry. The resin tapping sector plays a fundamental role in forest preservation, job creation, and the country's economic development, keeping an important part of its historical heritage alive. With sustainable practices, innovation, and the preservation of traditions, Portugal can ensure that resin tapping continues to thrive, benefiting the economy, the environment, and the country's cultural identity.

Marco Silva e Marco Ribeiro



Main Historical Milestones of Resin Tapping in Portugal



CENTI

**RN21 IS PROMOTING NEW
APPLICATIONS FOR THE
NATURAL RESIN SECTOR**

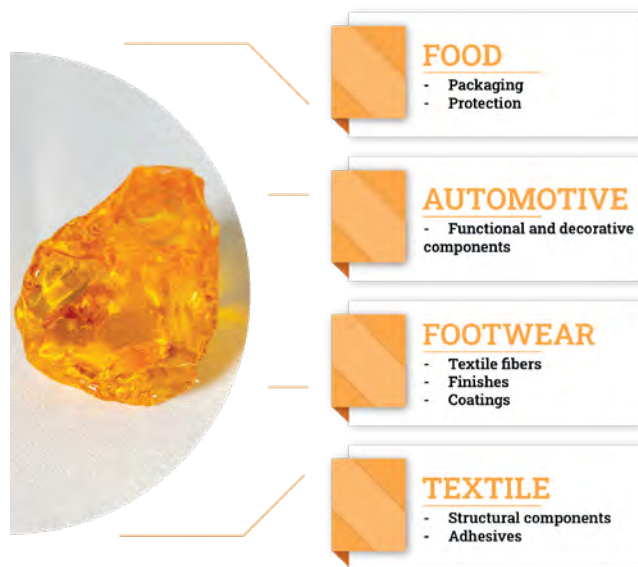
The transition to a more sustainable economy that aligns with the United Nations Sustainable Development Goals for 2030 sets the stage for embracing opportunities that contribute to the revitalization of various sectors in the global economy, with a particular focus on the national economy. Investing in natural and bio-based products, such as rosin distilled from natural pine resin, and employing innovative and transformative processes will significantly enhance the exploration, valorization, and productivity of this sector. This approach will lead to greater competitiveness compared to fossil-based resin derivatives, ultimately resulting in significant environmental and economic gains.

The Natural Resin sector was previously highly competitive both nationally and internationally, with Natural Resin and its first and second transformation derivatives being applied in different markets. However, the use of this raw material declined as more appealing fossil alternatives became more widely available and cost-effective. Nevertheless, the global urgency for an economic and environmental paradigm shift toward more sustainable solutions favors the use of rosin, a natural and renewable raw material.

Currently, products derived from rosin are applied in various areas, serving as active ingredients in products within the chemical, pharmaceutical, and cosmetic sectors. They are found in adhesives, paints, coatings, as well as in food products. Due to the distinctive characteristics of these resins, there are numerous unexplored application possibilities. In this context, the integrated project RN21 emerged from the joint ambition of key players in the sector to enhance and mobilize research and innovation on Natural Resin extracted from pine and its derivatives as a "bio" base raw material, marking the beginning of the 21st century as the vector for changing the current paradigm. This Project aims to significantly expand

the range of economically viable applications and invigorate the entire value chain of the Natural Resin exploration and transformation sector. It also anticipates the growth and expansion of the application of this raw material to new sectors that, due to a lack of awareness of the potential of these resins, have not yet considered the use of this natural resource in their value chain.

To achieve the outlined objectives, the Project has been divided into key measures that will result in products, processes, and services rooted in research and knowledge for resin producers, transformation industries, and the market. Among others, the food and agricultural sector, textiles, automotive, and footwear are new areas of exploration to be developed in this project.





FOOD AND AGRICULTURAL

Packaging materials and polymeric films designed for the storage of food products have undergone significant evolution in terms of aesthetics, design, and technical properties to actively contribute to food preservation. With the gradual increase in the consumption of packaged food products, there has been a growing concern to find more sustainable packaging solutions to replace the fossil-based options currently available in the market.

Biopolymers emerge as a sustainable alternative due to their biodegradable properties, positioning them as a viable option for producing protective films and food packaging. However, this choice still requires improvements to match the performance of current packaging solutions and conventional films, particularly concerning specific technical properties that enhance product quality and durability, thereby reducing food waste.

This challenge has driven the research focus of RN21 towards the food and agricultural sector, specifically in the realm of meat production. The goal is to promote the use of colophony and its derivatives, leveraging their unique characteristics as crucial agents in enhancing

functional properties while promoting the sustainability of packaging. This ensures the safe protection and handling of meat products.

AUTOMOBILE

The number of plastic materials in the automotive sector is significant, accounting for approximately 11% of the materials used. This results in the generation of 1 million tons of plastic waste annually. In this context, the automotive industry has increasingly invested in finding sustainable alternatives to the use of fossil-based polymers. Being one of the industries with a significant environmental footprint, it has become one of the most pressured sectors to adopt greener solutions while ensuring the quality and technical rigor of the materials. This demand has led to the exponential growth of the biopolymers market.

In this regard, rosin and its derivatives have been attracting interest as highly versatile and multifunctional natural additives for processing synthetic and biodegradable polymeric matrices. Due to their properties, such as thermal stability suitable for extrusion and injection molding processes, this raw material and its derivatives are being explored as agents for compatibilization/plasticization among different components of the polymeric formulation. Additionally, they contribute positively to the carbon footprint of the final parts.

TEXTILE

The textile sector has increasingly focused on the search for disruptive products through approaches that are more sustainable and applicable across its entire value chain. There is a growing interest among companies in the Textile and Apparel Industry (TAV) in using materials sourced from natural resources to develop biologically-based solutions with a lower carbon footprint, potentially substituting those derived from conventionally used petroleum. Rosin and its derivatives have garnered attention, both in the synthesis of biopolymers and in their use as

additives (stabilizers, plasticizers, rheological agents, among others) in the textile sector. Natural Resin, along with its derivatives, offers several advantages such as high availability, low cost, and a natural and renewable source of origin.

Therefore, the envisioned developments aimed at promoting Natural Resin in the textile sector seek to drive research into innovative solutions based on rosin and its derivatives. This includes the development of new biocolored yarns/textile structures and functionalized, differentiated textile products.

FOOTWEAR

In the footwear industry, the demand for a product that is not only innovative but also highly functional and high-performing, with technical features in line with market requirements, combined with comfort and the use of biodegradable materials and a positive ecological footprint, has become increasingly important in the development of solutions in the sector.

There are already solutions in the market for adhesive systems containing rosin-based resins, and these have a wide range of applications. In 2020, 45% of all rosin produced worldwide was used in the adhesive sector. However, with the increasing use of petrochemical-based resins in this sector, the use of rosin-based raw materials has decreased over the years.

Rosin-derived resins have intrinsic properties that are highly interesting for this type of application, such as tackifiers, promoters of hydrophobicity, with potential bactericidal activity, and sustainable/biobased character, proving to be alternatives to current fossil-based solutions.

On the other hand, footwear currently represents the second-largest application area for thermoplastic elastomers (TPEs), especially in sole production. This extensive use of thermoplastics is due to their excellent characteristics in terms of softness, lightness, flexibility, and abrasion resistance, among others. While there may not be major revolutions in this footwear sector in terms of using new polymeric bases, the development

of polymeric alternatives with a more sustainable and biologically sourced nature, with improved characteristics compared to currently used materials, is crucial. This is the strategic vision for this sector.

It is based on these premises that, within the scope of the Integrated Project RN21, work is being done on the inclusion of rosin and its derivatives in adhesive systems and structural components for footwear (such as soles), providing the market with solutions that are not only technically interesting but also environmentally friendly.

Lorena Coelho, Anabela Carvalho e Bruna Moura



@ Centi





OUTREACH

**At the forefront of sustainable innovation, RN21
shares knowledge and advancements, connecting
stakeholders in the Natural Resin sector towards a
greener and more prosperous future.**

Resina Natural, renovável naturalmente

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SOCIAL MEDIA

In early August, we officially launched our social media channels for the Integrated Project RN21 with the goal of strengthening our relationship with the audience and creating an informal mean of communication. This initiative reflects our commitment to keep all stakeholders updated on the latest developments of the Project, providing a space for closer interactions, sharing valuable information, and creating a community engaged around Natural Resin and our vision for a more sustainable future.



RN 360° PODCAST

In September, we introduced our podcast, Resina Natural 360°. In this podcast, the CoLAB ForestWISE Chief Technology Officer, Carlos Fonseca, takes on the role of host, offering listeners an in-depth insight into the Integrated Project RN21. This podcast serves as the perfect opportunity to explore fascinating details and inspiring goals of this innovative Project, led by CoLAB ForestWISE. Stay tuned for our podcasts, released every two months.



RN21 WEBINAR

On September 22nd, marking a significant milestone to RN21 outreach, we hosted our first webinar. We had the honor of having Miguel Pestana, a researcher at the National Institute for Agricultural and Veterinary Research IP, as speaker, who treated the participants to an engaging and enlightening lecture on 'The Natural Resin Industry: Past, Present, and Future.' The next webinar is scheduled for december 12nd.

