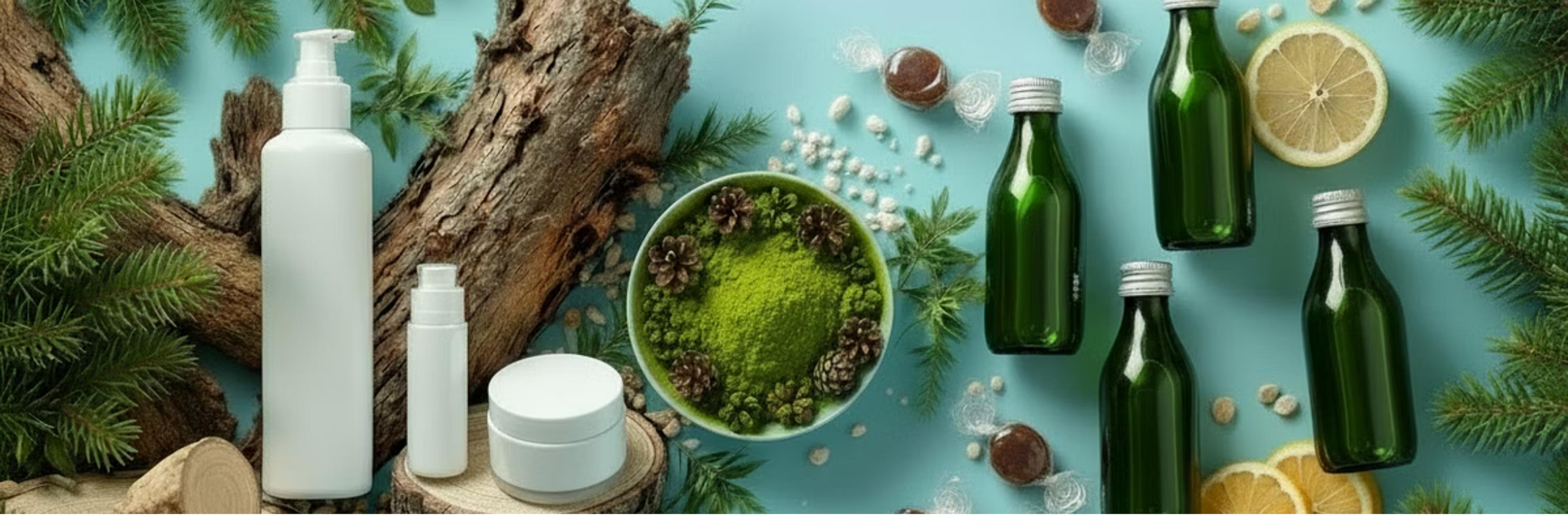


The hidden gold of the forest: how forest "leftovers" become feel-good products

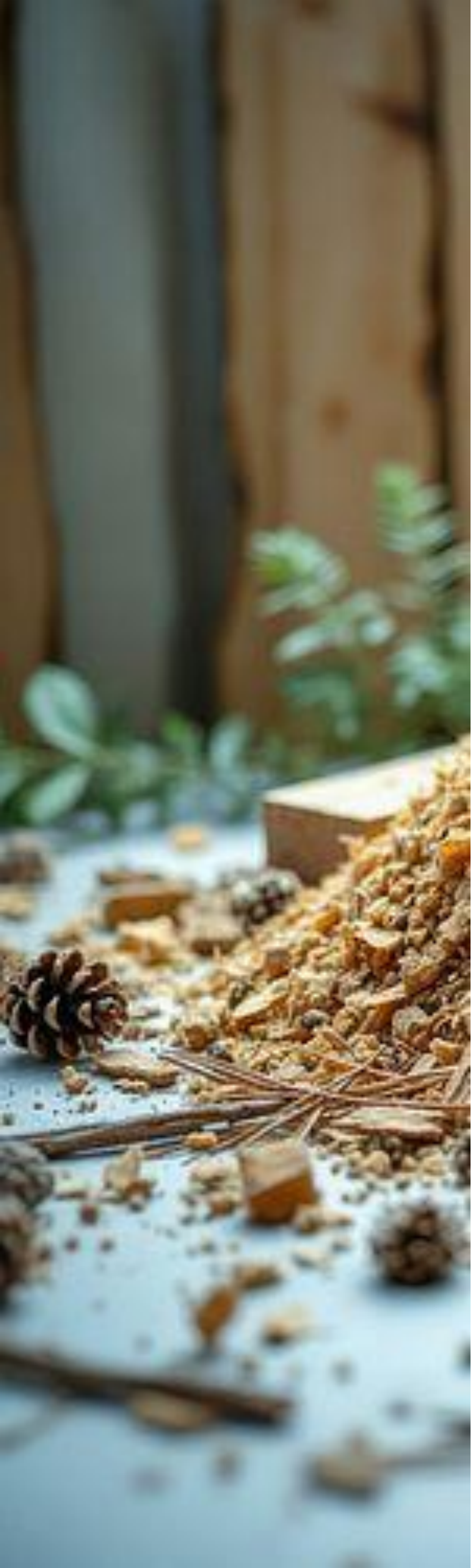
Biolat & the CEforestry project giving forest side streams a second life

Interreg Baltic Sea Region

Co-funded by the European Union

CIRCULAR ECONOMY CEforestry

biolat®



From forest leftovers to future products

When we think about forests, we usually imagine tall trunks and straight boards – not bark dust, cones, needles and sawmill sludge. Yet these "leftovers" are quietly becoming the raw material for tomorrow's cosmetics, health drinks and smart materials.

Within the Interreg Baltic Sea Region project CEforestry (2023-2025), Baltic Sea Region companies and research institutions have been testing how to turn forestry side streams into products that people actually want to buy – without cutting a single extra tree.

This brochure tells that story in plain language:

- what forest side streams are,
- why they're interesting for business and climate,
- what we learned from real products like conifer health drinks,
- and how small companies can surf this new "green wave" instead of being drowned by it.

Forest side streams: from problem to superpower

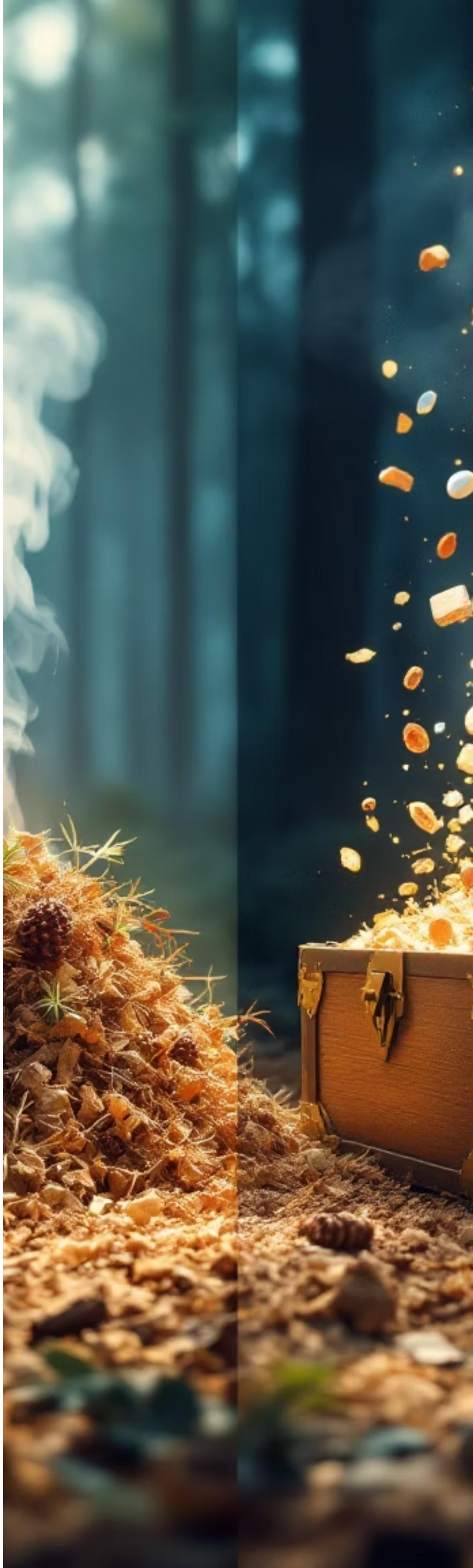
What on earth are forest side streams?

Every time a log is cut, a whole cloud of "invisible" biomass appears: bark, needles, cones, sawdust, off-cuts. In the Baltic Sea Region this adds up to millions of tonnes of material every year – almost a shadow forest made of residues.

Traditionally, most of this ends up as low-value energy: it's chipped and burned. Useful, yes – but not exactly exciting. At the same time, sawmills and forest owners are under pressure: wood prices jump up and down, costs rise, and new felling quotas mean less timber can be harvested. All this squeezes margins and forces the sector to look for smarter, higher-value uses of what is already cut.

CEforestry sees this as an innovation window. We can treat bark and needles as a treasure chest full of natural molecules – antioxidants, tannins, chlorophyll, polyprenols – that can go into cosmetics, food supplements, drinks or industrial applications. With realistic extraction yields, regional bark and sawdust could provide tens of millions of kilograms of tannins every year for things like water treatment, coatings or biobased adhesives.

In other words: the forest is already doing the hard work of growing biomass. Our job is to waste less and imagine more.



Meet Biolat: forest chemists with dirty boots

Who is Biolat and what are we actually doing?

Biolat is a Latvian biotech company founded back in 1993 – long before "circular bioeconomy" became a buzzword. Our speciality is taking compounds from conifers and turning them into standardized ingredients for cosmetics, nutraceuticals and pharma: things like sodium chlorophyllin used in health drinks, conifer polyprenols for supplements, and Silbiol® for antimicrobial and skin-care applications.

In CEforestry, Biolat acts as the bridge between forest residues and real markets.

Our tasks in CEforestry

Map demand - asking companies in cosmetics, food supplements, pharma and industry what they actually need from forest-based ingredients.

Identify barriers - from tricky extraction technology and certification costs to strict health-claim rules and consumers who may not be ready to "drink a tree".

Develop business concepts - e.g. co-located extraction hubs next to sawmills to save transport, or certified ingredient lines ready for export.

Share the know-how - via webinars, market reports and brochures that translate lab language into something SMEs and the public can use.

Think of us as forest chemists with dirty boots: comfortable in the lab, but also standing on a muddy sawmill yard asking, "What if this pile of bark could become a premium anti-ageing serum instead of smoke?"

Would you drink a tree? Conifer health drinks

From needles to wellness shots

One of the most fun parts of CEforestry was comparing two real products that already use forest ingredients in drinks:

- Ho-Fi® Original – a Latvian drink based on spruce needle sodium chlorophyllin.
- Havupuu-uutejuoma Metsämustikka – a Finnish drink combining pine extract with wild forest blueberries.

Both belong to the booming world of functional beverages: drinks that promise not just hydration, but extra benefits such as antioxidants, detox support or immune balance. Pine and spruce extracts are rich in polyphenols and tannins – plant compounds known for their astringent taste and strong antioxidant properties. They can neutralise free radicals, bind metals and interact with proteins, which is why they're interesting for health, food and even materials.

Threats – the plot twists

- Crowded shelves: conifer drinks compete with kombucha, vitamin waters, protein shakes and countless other "health" beverages.
- Strict health-claim rules: in the EU, you can't just say "anti-ageing" or "detox" without serious data, which takes time and money.
- Trendy today, gone tomorrow: wellness trends move fast; brands must keep innovating in flavour, format and communication.

The conclusion? Conifer drinks can be stars of the circular bioeconomy stage – but only if companies invest in good science, clear messaging and patient brand building.

Conifer drinks: potential and hurdles

In practice, that means a conifer drink can:

- deliver a lot of natural antioxidants in a small dose,
- carry a powerful "Nordic forest" story that consumers love,
- and reuse parts of the tree that would otherwise be burned or discarded.

At the same time, these drinks are not magic potions. Their taste can be unusual (some people say "spa water", others say "Christmas in a bottle"), they live in a crowded wellness market, and any health claims have to pass strict scientific and regulatory tests. That's exactly why we studied them: to understand what helps such products succeed – and where they still hit a wall.

Conifer drinks: superpowers, weak spots & plot twists (SWOT)

SWOT – but make it drinkable

Strengths – the superpowers

Real forest inside

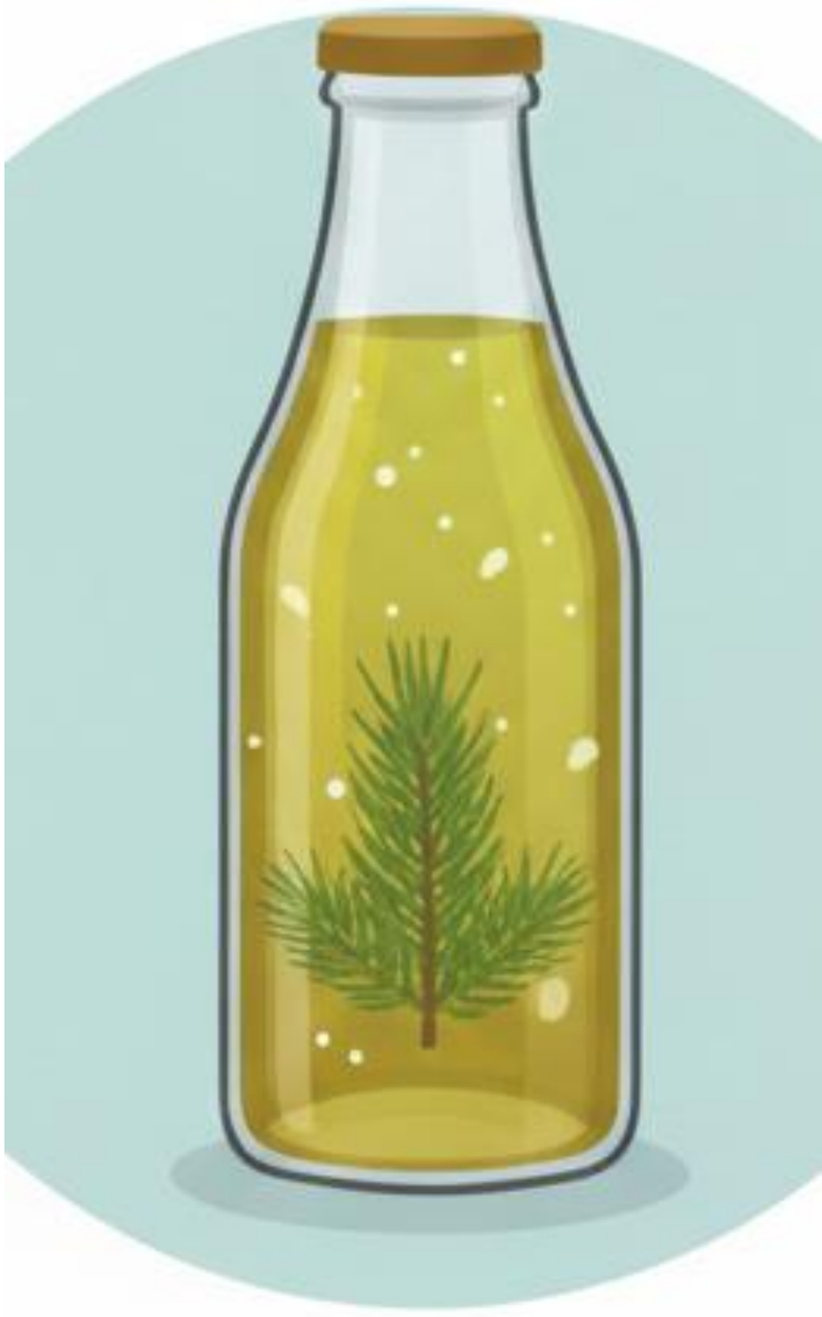
Pine and spruce extracts plus berries bring a unique Nordic flavour and a strong "close to nature" image.

Antioxidant fireworks

Rich in chlorophyllin and polyphenols that support the body's own defence systems.

Upcycling heroes

They can use needle or bark fractions that would otherwise become waste or just energy.



Weaknesses – the quirks

- Taste is… specific: resinous, slightly bitter, very "green" – perfect for some people, off-putting for others.

- Niche audience & low awareness: outside Finland and the Baltics, few people know what conifer drinks are or why they should care.

- Education needed: the science behind antioxidants and tannins is not obvious from the bottle; brands must explain without over-promising.

Opportunities – the big chances

- Functional beverage boom: consumers are actively looking for natural immunity, gut and brain support in their drinks.

- Storytelling goldmine: forest origin, circular use of side streams, Nordic wild berries – this ticks many sustainability and lifestyle boxes.

- Digital channels: online sales and social media allow small brands to find their tribe of forest lovers worldwide.

Spruce tannins: the ‘brown gold’ hidden in bark

Picture a sawmill yard: piles of bark that look like yesterday's leftovers. Yet in a circular bioeconomy, bark transforms into a treasure chest. Spruce bark (*Picea* spp.) naturally contains condensed tannins - plant polyphenols that trees use for protection. In Norway spruce bark, typical tannin levels reach 10 - 15% of dry weight, varying with season and extraction conditions.

Understanding Tannins

Tannins are the reason some drinks feel 'dry' or 'puckery'. Chemically, they're experts at binding things: proteins, minerals, and other molecules, which is exactly why people have used them for centuries. Leather tanning is literally named after tannins.

From Residue to Resource

01

Massive Regional Volumes

Bark and sawdust residues from forestry operations represent huge untapped potential

02

Conservative Extraction

Even standard yields translate into tens of millions of kilograms of tannins annually

03

Industrial Applications

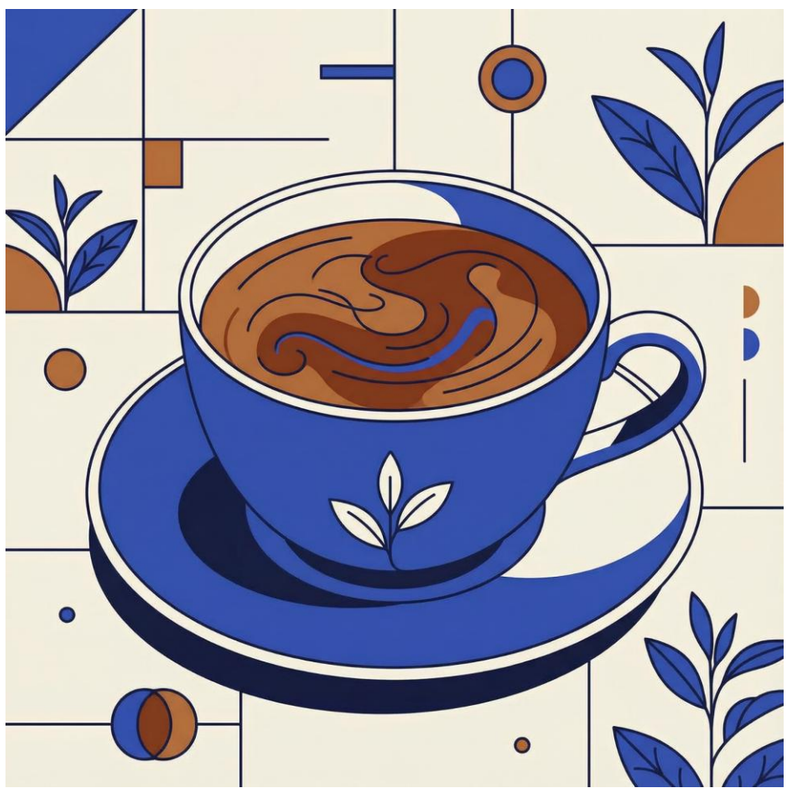
Upgrading what is already cut into higher-value ingredients for water treatment and beyond

Extraction Methods

The classic approach is hot water extraction - simple, scalable, and widely used. Studies report hot-water yields for spruce bark in the 6–12% range under standard conditions, but this can be significantly enhanced through controlled temperature and pressure.

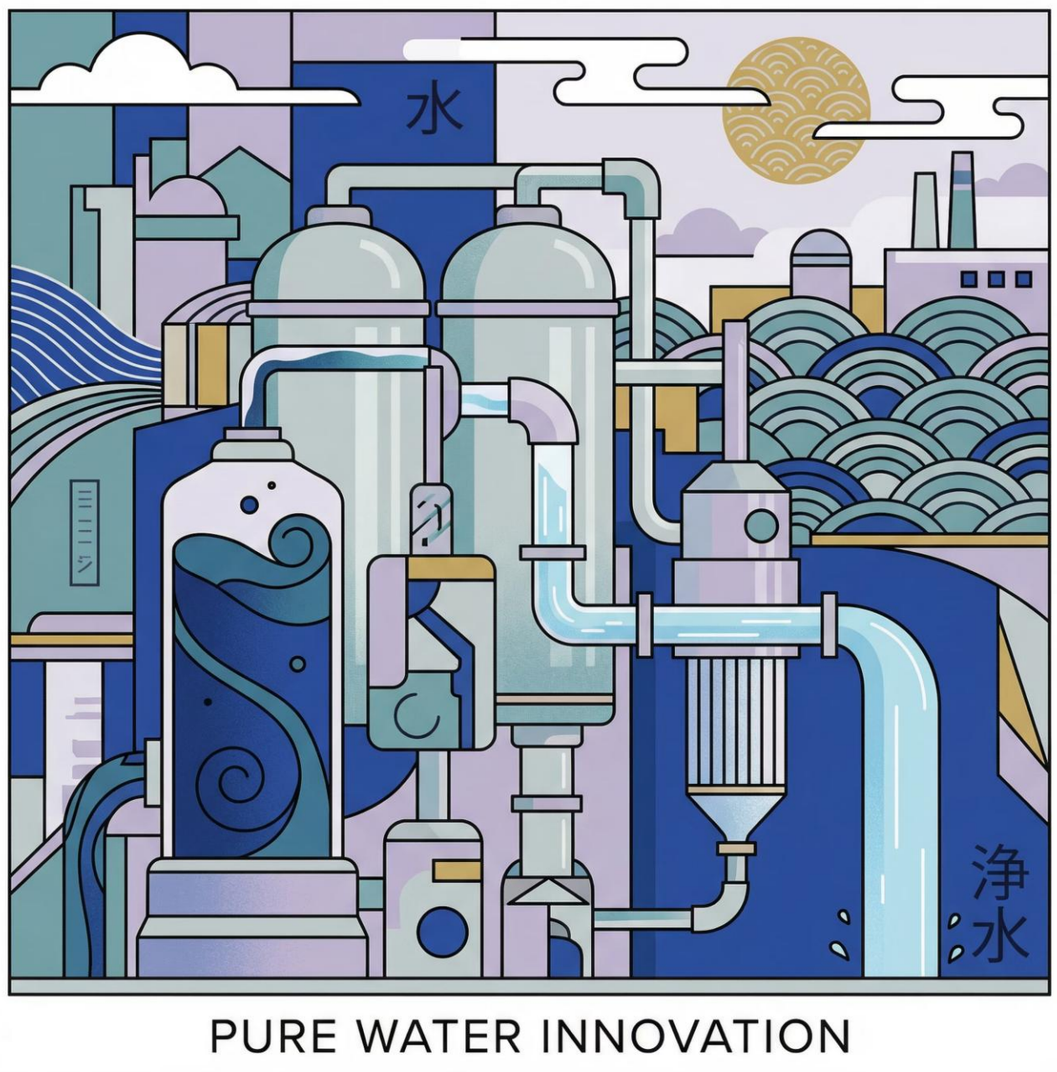
Think of it like an **espresso machine** compared to a standard drip brewer; by forcing the water through the bark under pressure, you "pull" a much richer concentration of tannins from deep within the fibers.

This pressurized "shot" not only speeds up the process but ensures you aren't leaving the best compounds behind, pushing your yields well beyond the standard limit.



Nature’s molecule magnets: tannins in water treatment

If tannins had a superhero skill, it would be this: they grab onto molecules that cause trouble. Two properties matter enormously for water and wastewater applications, making tannins nature's own 'molecule magnets'.



The Science behind the binding power

Protein binding

A hallmark feature: tannins bind and precipitate proteins, the same effect causing 'dry mouth' with tannic foods. In industry, this locks onto protein-rich materials and forms larger clumps for easier removal.

Metal ion chelation

Tannins chelate metal ions (iron, copper, aluminium) thanks to their phenolic group arrangement. This metal-binding behaviour is well documented historically and technologically.

Applications in Wastewater Treatment

In plain language: tannins act as bio-based 'molecule magnets'. This opens doors to innovative water treatment concepts that address real industrial challenges.

- **Particle Flocculation**
  Helping particles clump together for easier settling and filtration
- **Contaminant Binding**
  Binding certain dissolved contaminants directly from solution
- **Metal Removal**
  Supporting processes where metal binding is particularly useful

The Circular Economy Advantage

Some industries struggle with difficult wastewater streams and strict discharge expectations. In leather processing, for example, wastewater challenges and pollution control pressures are significant, and plant-based tannin approaches are often discussed in the 'cleaner chemistry' toolbox.

The circular twist: Instead of burning bark as low-value fuel, you can cascade it - extract useful polyphenols first, then still use the remaining biomass for energy or other purposes. That's the 'waste less, imagine more' thinking CEforestry champions.

A Sip of the forest: spruce tannins in nutraceuticals

Tannins aren't only 'industrial chemistry' - they also live in the world of foods and functional products. People already consume tannins daily in tea, berries, grapes, cocoa... and manufacturers have turned that into a booming market for polyphenol-rich supplements and functional beverages.

Why tannins in supplements and drinks?

Antioxidant Activity

Many tannins as polyphenols are valued for their potent antioxidant properties

Anti-inflammatory Effects

Potential anti-inflammatory and antimicrobial benefits supported by research

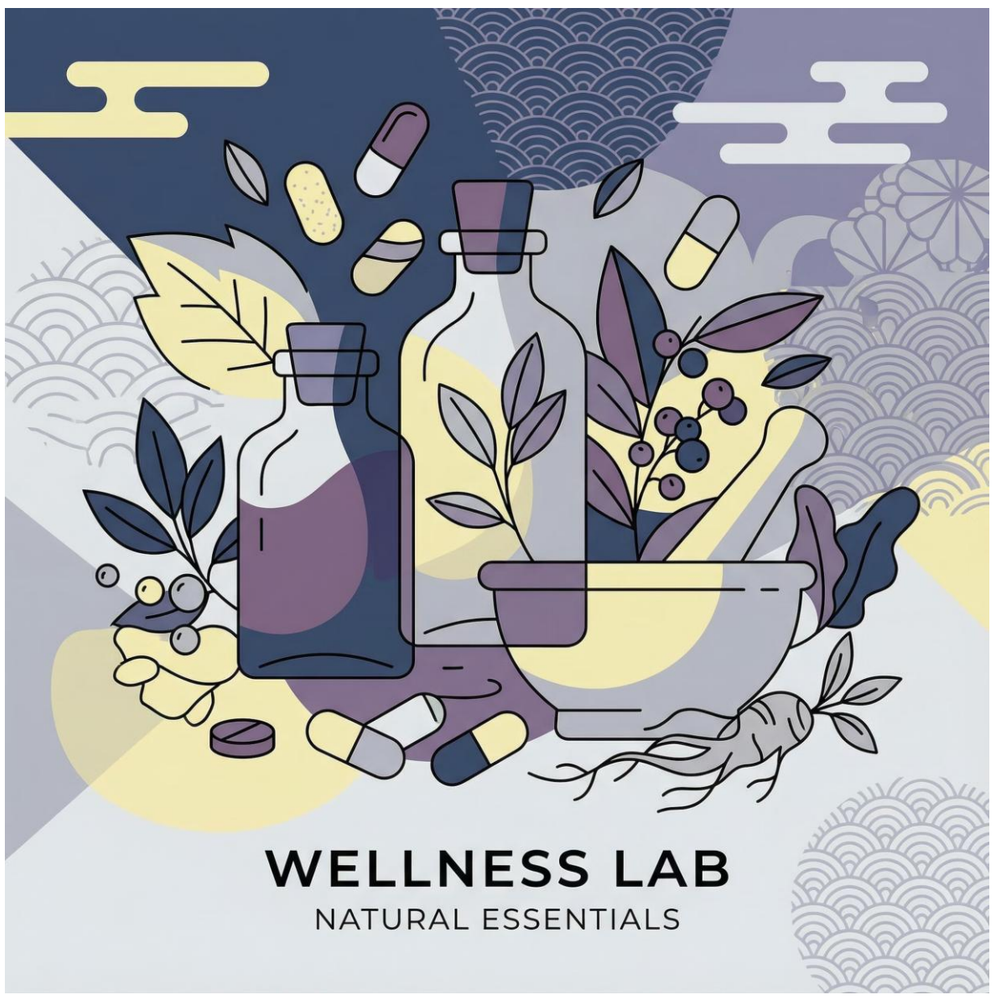
Clean-Label Appeal

Natural, plant-derived story that fits current clean-label consumer trends

The formulation challenge

Tannins are powerful - but they're also famous for bitterness and astringency. Dose matters enormously: too much tannin can backfire with unpleasant taste, reduced nutrient absorption, and digestive discomfort. Formulation is everything.

There's also a real-world constraint: you can't casually promise health effects (especially in the EU) without strong evidence and compliant claims language. Even for exciting 'forest-based' drinks, health-claim rules can be a major barrier.



A Smarter Storytelling Approach

Instead of 'magic' claims, a public-friendly and compliant angle focuses on authenticity and craftsmanship.

Circular sourcing

Made from forestry side streams, transforming waste into value

Sensory experience

A tiny tannin bite for character and authentic forest flavour

Ingredient craftsmanship

Controlled extraction, rigorous quality standards, and proven safety

Forest-to-product story

Compelling narrative that people actually enjoy reading and sharing

From side-stream to bestseller: what SMEs can learn

Practical lessons from the CEforestry journey

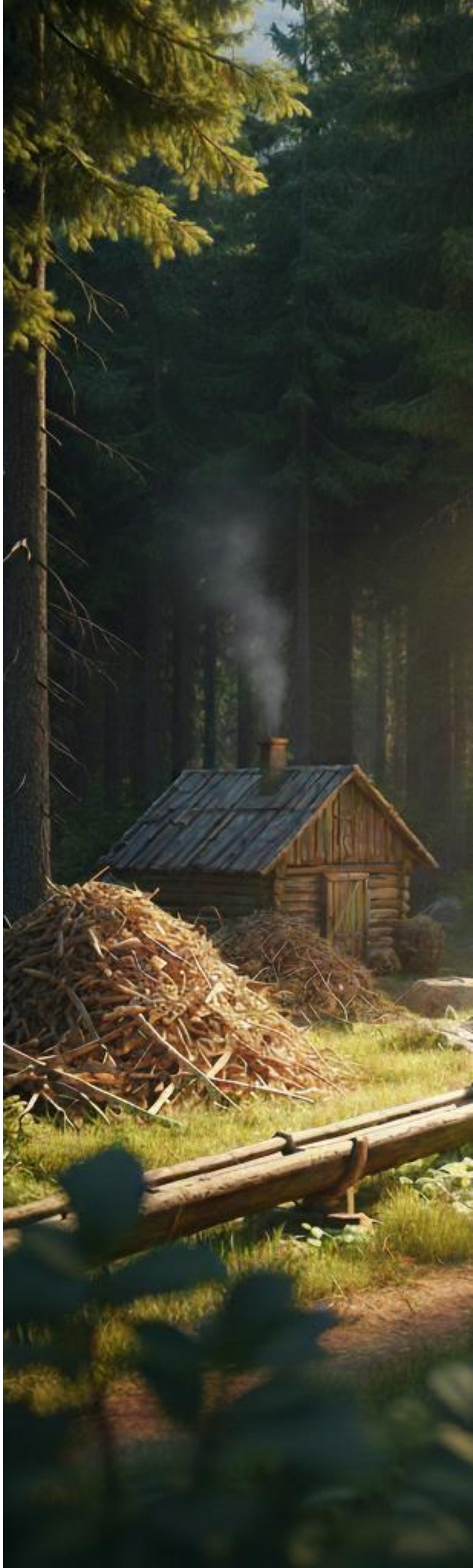
01

Plan for the long haul

A realistic roadmap from first idea to first sale is about 12–18 months, including pilot extraction, stability tests, certifications and building relationships with early customers.

If we succeed, forests will keep their main role: storing carbon and providing high-value timber, but their side streams will quietly power new jobs, healthier products and a more circular economy. Or, to put it simply:

use what is already cut – and let the forest breathe a little easier.



From side-stream to bestseller: what SMEs can learn

Practical lessons from the CEforestry journey

Working with CEforestry partners, surveys and case studies, Biolat distilled a few simple rules for any SME dreaming about forest-based products:

02

Partner early

Team up with a research institute and an "anchor" brand. This gives you credible data, access to testing, and a realistic route to the shelf.

03

Lead with the story, back it with data

"Upcycled forest side streams" sounds great – but add real antioxidant tests, toxicity data and the right certificates (like COSMOS/ECOCERT) so buyers can trust you.

04

Make life easy for formulators

Provide clear specifications, stability info and labelling/INCI suggestions so your ingredient drops smoothly into a cream, capsule or drink.

05

De-risk the technology

Monitor extraction yields, costs and energy use from day one. Greener methods (like water- or ethanol-based extraction or carefully chosen advanced techniques) can improve both sustainability and marketing value.

06

Focus your first bet

Choose one residue (for example, spruce needles) → one standardized active → one target segment (e.g. cosmetics or food supplements) and do it really well before expanding.

Get in Touch

Curious about how forest "leftovers" can become tomorrow's bio-ingredients? Want to collaborate, explore product ideas or learn more about Biolat's work in the CEforestry project?

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CEforestry project:
https://interreg-baltic.eu/project/ceforestry/

Follow our journey toward a more circular forest bioeconomy one needle, bark chip and idea at a time

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