



SEPARATION

OPTIMIZED VALORIZATION OF FUNCTIONAL NUTRIENTS

ANDRITZ TURBEX DISRUPTIVE
EXTRACTION PROCESS

ANDRITZ

ENGINEERED SUCCESS

Just an example: Just 10% of coffee beans will become a consumable product leaving 90% to remain as waste. But what if these wastes could become a real goldmine? As a source of vegetable proteins, dietary fiber, antioxidants, micro components and much more, used coffee beans can generate high nutraceutical value in an efficient and distributed way. Converting waste into value with ANDRITZ Turbex is not just about generating a circular economy. It is about creating a better world for tomorrow.



Get the most out of your natural products

Generating revenue out of natural by-products offers multiple benefits. ANDRITZ Turbex, an innovative extraction system, makes it easier to comply with environmental constraints, creates cash flow, and converts waste from natural products into functional nutrients. With ANDRITZ Turbex the extraction process itself can also be optimized to achieve maximum value in terms of product yield and quality.

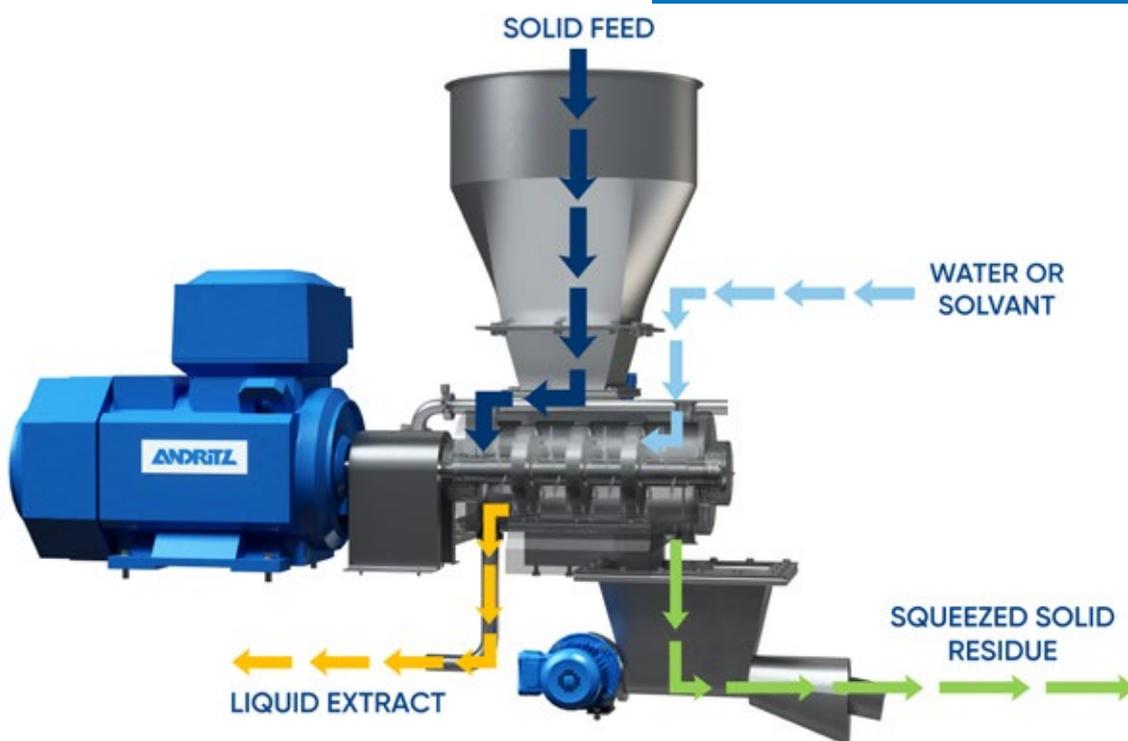
PRINCIPLE

Turbex is a patented solid/liquid extractor based on a disruptive process powered by cavitation in a counter-current flow. A sequence of rotors and stators causes thousands of events per second (turbulence, shearing, and cavitation), in order to:

- Obtain a higher yield in a shorter processing time
- Provide an extraction process whose performance is unequalled
- Improve product quality (as no oxidation is possible)
- Generate additional revenue by converting by-products into valuable food ingredients and nutritional supplements

YOUR BENEFITS*

- One step extraction, instead of multiple processes, allowing savings on costs such solvents
- Delivery of highest quality functional ingredients, active principle elements, and vegetable proteins due to low extraction temperatures that avoid oxidation
- Faster extraction compared to conventional processes due to cavitation, resulting in more production in less time
- Up to 50% higher yield for better profitability
- Reduced energy consumption by up to 30% compared to traditional processes and leading to a faster return on investment



Working principle of Turbex extractor

* Results proven by in-house and on-site tests

A comprehensive offer to satisfy your extraction needs

To extract substances from natural products such as vegetable proteins, polyphenols, essential oils, or fibers, ANDRITZ is offering its Turbex extractor in several configurations.

TURBEX PILOT UNIT

The Turbex pilot unit is equipped with a soaking/feed unit, a liquid recycling/solid dewatering system, and liquid extract filtration to facilitate the complete extraction cycle, including pre and post processing of inlet/outlet streams.

Features:

- Control panel for **full digitalization**
- **ATEX designed / certified** and thus, approved for tests with methanol, ethanol, and other organic solvents
- **Capacity:** 20-50 kg/hr of dry matter (capacity of the industrial unit is up to 200 kg/hr)
- **Available** for sale and for testing (Location: Waddinxveen – NL)



Turbex pilot unit



Turbex mobile unit

TURBEX MOBILE UNIT

In order to carry out tests to validate your specific process or simply to enjoy the benefits of punctually meeting your extraction needs, ANDRITZ can provide a skid-mounted rental unit. Fully equipped with inlet/outlet pumps, this unit is able to process pre-soaked materials.

Features:

- Control panel for **full digitalization**
- Designed for **ATEX certified deployment** and thus approved for use with methanol, ethanol, and other organic solvents
- **Capacity:** 20-50 kilograms dry matter/hour (capacity of industrial unit = Up to 200 kg /hr)
- **Available** for sales and for testing at customer site
- **Simple and easy set-up** with a forklift and a small footprint (only 3.0 x 3.9 and 2.2 meters high)

A large variety of substance extraction applications

PROVEN EXPERIENCE FOR THE FOLLOWING APPLICATIONS

- Botanicals and herbals (laurel, fennel, passion flower)
- Hops
- Fresh fruit peel (orange and others)
- Tea and coffee (yerba mate, green tea, Ready-To-Drink,...)
- Lemon balm
- Grape pomace
- Brewery spent grain valorization (BSG)
- Spent coffee grounds (SCG)
- ... and many more.

SUBSTANCES EXTRACTED FROM THESE NATURAL PRODUCTS

- Vegetable proteins
- Polyphenols
- Essential oils
- Fibers
- ... and many more.



Spent coffee ground: An example among many other of our world of possibilities

Teaming up to turn vision into reality

The ANDRITZ Food Innovation Xperience (FIX) center is an ultramodern technology and development hub for innovation-seeking producers in the food, pet food, and feed industry. It is the place to be if you are looking for a facility to test new applications or to improve existing production processes.

CREATE YOUR UNIQUE PRODUCT

In today's ever-evolving world, where food and feed producers face the challenge of adapting to rapidly changing market demands, it has become crucial to respond swiftly and develop innovative concepts in a sustainable and environmentally friendly way. If you want to increase efficiency and mitigate environmental effects such as freshwater usage and carbon emissions, it is essential to enhance current production methods. At the FIX center, ANDRITZ provides you with the opportunity to leverage cutting-edge technologies and production line solutions to identify the ideal manufacturing approach tailored to your specific requirements. ANDRITZ' portfolio holds everything you need to build a drying or dewatering line solution or a combination of the two.

LET'S SCALE UP TOGETHER

Moving from lab to industrial scale can be challenging, but if we combine your detailed product knowledge and specific requirements with ANDRITZ' long-standing technological expertise, you will be able to develop innovative products while at the same time achieving sustainable growth for your business. ANDRITZ offers full-line solutions, from raw material to food ingredient, with the highest value creation in the food, pet food, and feed markets and can handle everything from concept design, engineering, and project realization to ensuring optimal performance throughout the entire life cycle. The FIX center is equipped with ANDRITZ' foodgrade dewatering, drying, extracting, and milling technologies supported with filtration and cooking equipment from reliable partners. This enables you to conduct feasibility studies and pilot plant tests under food-grade or even ATEX conditions, and the facility will be tailored to your specific needs.

LET OUR KNOWLEDGE WORK FOR YOU

If you are looking for a reliable solution to ensure successful implementation of your industrial process, ANDRITZ strongly recommends that you avoid making a hasty decision. Since the processing characteristics of most products are not entirely predictable, we invite you to visit the ANDRITZ Food Innovation Xperience center to define the optimum process in a first step and then select the most efficient machine(s) and size(s) or complete process line(s) for your application. For more than 100 years of continuous operation, ANDRITZ has tested and developed solutions for a huge variety of applications and requirements. The results and experience gained can be used to meet your specific needs.

The ANDRITZ team looks forward to welcoming you and to discussing the possibilities and benefits. Let's IMAGINE – EXPLORE – CREATE together!



ANDRITZ Food Innovation Xperience (FIX) center



Your full-service provider

With ANDRITZ, you gain access to one of the world's largest OEM manufacturers for solid/liquid separation systems, including such well-known brands as 3Sys Technologies, Bird, Delkor Capital Equipment (Pty) Ltd., Escher Wyss dryers, Guinard Centrifugation, KHD Humboldt Wedag, Krauss-Maffei centrifuges, dryers, and filters, Lenser, Netzsch Filtration, Rittershaus & Blecher, Royal GMF Gouda, Sprout Bauer, and Vandebroek.

Whether you need spare parts, rentals, local service, repairs, upgrades, or modernization of your equipment, ANDRITZ is your true full-service provider. From initial consulting through to service agreements, process optimization, and training programs, we are always looking for ways to minimize downtime and increase

predictability in operations while raising your overall production efficiency. Wherever you operate, our network of 550 service specialists and global service centers ensures we'll always be there to support you for many life cycles to come. Let's sit down and see how we could take your operations to the next level.



LOCAL SUPPORT

Responsive local service centers and field service technicians



REPAIRS & UPGRADES

Optimization of machine and process performance, repair work, retrofitting, and modernization



SECOND-HAND & RENTALS

Certified second-hand and rental machines



TRAINING

Operator training and tailored seminars for operating and maintenance personnel



OEM SPARE PARTS

Filter cloths, spare and wear parts from OEMs or with OEM level quality, all readily available



SERVICE AGREEMENTS

Preventive maintenance, contracts for spare parts, maintenance, inspections, repairs, upgrades, operation, and equipment monitoring



PROCESS OPTIMIZATION

Automation tools and process expertise to boost your profit



LAB AND ON-SITE TESTS

Lab and testing capabilities for process optimization and machine upgrades





WHAT'S YOUR SEPARATION CHALLENGE?

ANDRITZ Separation is the world's leading separation specialist with the broadest technology portfolio and more than 2,000 specialists in 40 countries. For more than 150 years, we have been a driving force in the evolution of separation solutions and services for industries ranging from environment to food, chemicals, and mining & minerals. As the OEM for many of the world's leading brands, we have the solutions and services to transform your business to meet tomorrow's changing demands – wherever you are and whatever your separation challenge. **Ask your separation specialist!**

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