Q&A document

TissueTalk
The ANDRITZ Tissue Webinar

February 9, 2023, © ANDRITZ AG, tissue@andritz.com

ENGINEERED SUCCESS

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Q: Why use alternative fibers?

A: They offer some unique properties for final product quality optimization.

Q: Why do alternative fibers reduce CO_2?

A: It is difficult to show direct and measureable CO_2 reduction through ONLY the use of alternative fibers.

Q: Is it necessary to run pilot trials?

A: No. pilot trials are a useful tool to derisk projects through the evaluation of the relationships between process configuration, process consumables, and resulting pulp/paper/board/tissue quality.

Q: What about certification? FSC ecolabels for alternative fibers?

A: That would be an excellent start.

Q: How about scalability?

A: In general, wood and/or non-wood, processing can be scaled for specific parameters together with experiences from other projects.

Q: Alternative fiber versus water usage and consumption to growth such alternative fibers?

A: This is all dependent on the specific raw material, and the geographical location.

Q: Do we have a deep understanding of the impact of alternative fibres in tissue manufacture?

A: There was a lot of research, piloting, and application in the last few years. Many universities and research institutes, as well as machine and tissue producers, made a lot of investigations into alternative fibers. We have tested some alternative fibers in our Tissue Pilot Plant TIAC (Tissue Innovation and Application Center) as well as in our other fiber pilot plants. Based on that we can support you in designing a process or a product. Certainly, with increased use of alternative fibers, processes and handling will improve and , know how will increase.

Q: Are there fibers which can also add to product performances, so to give a competitive advantage, as well as a sustainability benefit in terms of CO2 emission reduction?

A: Yes, alternative fibers can be used to optimize final product performance, whereas the overall comparative advantage takes more than just the raw material selection. In some cases, the improved sustainability of alternative fibers comes from their ability to grow in locations where conventional trees might not be able to.

Q: Do you think that combining wood fiber and alternative fiber in the typical pulping process might work?

A: Yes, with sufficient care to the initial stages of the feeding process.

Q: How many percent maximum of alternative fiber ratio to maintain the quality of the pulp?

A: It´s hard to give a general answer. First it depends what kind of alternative fiber you are considering. Furthermore, the Tissue production technology, and your system, need to be taken into consideration. Water circuits and chemical dosage can play an essential roll. You have to define, which paper parameters you want to maintain and which ones you consider can be changed. Overall, I think the use of around 5 to 10% wouldn´t have much impact.

Q: Is it possible to achieve the desired strength level?

A: Absolutely.

Q: In India some of the mills are using bagasse and wheat straw for printing and writing grades. Does the agro-based pulping process vary for tissue grades?

A: Not necessarily, however the process operating conditions would need to be adjusted for the required intrinsic properties required for tissue production.

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Q: What is the advantage of RCF fibers?

A: There are several advantages of RCF fibers, like smaller CO_2 footprint, cheaper raw material, etc. The Pros and Cons have to be evaluated case by case.

Q: Can the fibers produced in the RCF pilot trial be used for tissue pilot trials?

A: Yes, enough fibers can be produced for tissue pilot plant trials.

Q: What availability of RCF fibers is expected in future?

A: As printing and writing paper consumption is decreasing and packaging paper consumption is increasing there will be less white RCF papers like MOW and more brown RCF papers like OCC in the future.

Q: What fibers have you been able to use outside of occ- what about paper cups and tetrapaks?

A: UBC (like Tetrapak) and paper cups can be a source for high quality fibers. Main challenge is the contamination with organic residuces which might result in high COD and bad smell.

Q: What is the acceptable range for brightness for a good tissue paper?

A: It greatly depends on the consumer perspective and the market. There are high quality tissue papers with as low brightness as about 45%ISO. Typical range is above 75%ISO.

Q: Please name a few tissue machines running with RCF

A: Essity, Wepa, Metsä Tissue, …

Q: A lower freeness will require more drying energy v's virgin fibre, how do combat this?

A: It is important to have a holistic view on the overall mill balance and performance. For sure, some of alternative fibres, and depending on the ratio used in your furnish, demand more drying energy. Depending on your target, for example reduction of CO_2 footprint it has to be evaluated if the CO_2 footprint could be reduced by replacing virgin fibre portion by alternative fibers.

Q: Can you specify which machine is running with 100% RCF around the world and what is the speed and gsm range?

A: See above

Q: How to compensate lower OCC strength in comparison to recycled virgin fiber?

A: Virgin fibre is standard for most applications, whereas in some mills MOW or OCC is used as alternative raw material source. All different fibre sources bring their own characteristics. It is not the case that the use of OCC necessarily brings less strength. OCC in general has a high amount of strong long fibers and can also increase the paper strength. Here, it depends

on the amount of OCC you use in your furnish, as well as the production technology and mill settings.

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Q: What and how much is the real benefit of using Bleached Wheat Straw (BWS) or Bamboo in tissue production?

A: In terms of the benefits of alternative fibres, this always needs to be investigated on a case-by-case basis. What kind of production technology do I have and which product do I like to produce? How close is the source of alternative fibres and what is the effort to generate fibres out of these raw materials? There will be cases out there where CO_2 fooprint and manufacturing cost could be reduced, BUT, there will be other cases where there is no benefit, or even others, where the situation could get worse. There is not “THE ONE” solution out there, it has to be customized, and ANDRITZ would be more than happy to support you with the expertise in this field.

Q: Does it make difference if I use Bleached Wheat Straw (BWS) for dry-crepe, textured, or structured (TAD)?

A: First of all, it is necessary to understand which product you are aiming for, and how much BWS you would like to add. ANDRITZ TIAC would be the perfect cooperation partner for product development. They are able to dive deeper into your specific production technology or make a comparison of different manufacturing processes.

Q: What is the main driver of CO_2 in Tissue mills?

A: In general, the thermal drying of paper accounts for a very large portion of the CO_2 footprint. With already well-established products like steel Yankees or shoe presses, the post press dryness could be increased and the CO_2 emissions thereby reduced. Other technologies, such as steam heated or electrically heated hoods, could further support the reduction of CO_2, depending on which technology the steam and electrical energy is produced.

New technologies under development would additionally reduce the CO_2 footprint of mills. From ANDRITZ point of view, we always have a holistic view of the manufacturing processes, through all the steps, from raw materials and sources, to consumer and recycling or disposal.

Q: Any other ways to reduce CO_2 in tissue production?

A: In general, all consumptions such as raw material, consumables, energy, etc. carry their own CO_2 footprint. From this point of view, in all sectors, CO_2 emissions could be reduced. ANDRITZ would be more than happy to support you in your investigations. As a best approach, we would initially recommend an overall mill audit to identify the areas of highest reduction potential, supporting you in priorization and providing solutions to bring your CO_2 emissions down. For example, a smart drying strategy could bring the CO2 footprint down easily. Alternatively, renewable energy would support here as well. Many companies have equipped their rooves with photo voltaic panels. There are a lot of possibilities out there. Not every solution suits every mill, but in this regard, a competent partner, like ANDRITZ, could support you.

Q: Why is CO_2 reduction important?

A: CO_2 is one of the key green house gases we need to reduce to a minimum, from an environmental and sustainability point of view. To keep our world in a habitibable condition we need to change our mindset, our behaviour, and our daily routines to stop global warming. We would be more than happy to be your strategic partner and help develop a vision and strategy to make our world healthier again.

Q: What is the biggest one item that can reduce CO2 footprint without quality compromise?

A: Drying energy is one of the biggest contributors to your CO_2 balance. Smart solutions such as ANDRITZ *Prime*Hood E, an electrical heating unit for your hot air hood, can support your CO_2 reduction. Well established products, like the ANDRIZ *Prime*Dry Steel Yankee Dryer and ANDRITZ *Prime*Press XT-Evo shoe press, can improve your CO_2 balance and increase the quality of your products at the same time. Many other ANDRITZ solutions could also support you here, and we would be more than happy to support you in your specific area of interest.

Q: Alternative fibers are ok but what about nonplant fibers future?

A: Synthetic fibers are most commonly used in nonwoven applications. In some specific areas, synthetic fibers or recycled fibers from old clothes, could get interesting. Here, what really needs to be investigated is:

a) What is your market and market expectation?
b) What is the product and the properties you are aiming for?
c) What sources of nonplant fibers are available?
d) What is the effort to gain such fibers and what is the advantage compared to organic fibers?
e) What would be the end-of-life impact of the product on the environment or sustainability

Q: What is the impact of the annual fibres in the runnability of the tissue machine, when we compare to when we use virgin fibre?

A: Thank you very much for this question. For sure it depends on the type and the amount of alternative fibers you are considering as a replacement for virgin fibers, in your furnish.

When using BWS we experienced, due to the high silica content, abrasion of our stock preparation equipment, as well as a 10 to 15% drying energy increase. The white water was heavily contaminated, which was noticeable in ZP, PCD and the low first pass retention.
Bamboo, by comparison, had a much better behaviour in the stock preparation and approach flow area. When replacing 100% of the virgin fibers by Bamboo, we experienced a drop in more or less all sheet properties and this has to be compensated somehow.

Q: Why has 100% bamboo lower softness while it has longer fiber than typical wood fiber?

A: In general, the short fibre contributes the most to softness. By replacing 100% of the virgin fibre with Bamboo, the paper characteristics are following the characteristics of Bamboo. Bamboo is a kind of long fibre, with smaller diameter and higher coarseness compared to conventional hardwood kraft pulp. Based on this, it is predictable that the softness of a 100% Bamboo product would be lower than a common mix of SW and HW fibres.
As the tissue properties also depend on the tissue production technology, different fibres may behave differently, in terms of handfeel characteristics. ANDRITZ TIAC (Tissue Pilot Plant) would be a perfect place to investigate product development and sustainability increase.

Q: What is the Bi product of Wheatstraw or Bamboo and how is it disposed off? Also, what is placed from the land if alternative fibres take off i.e. farmers lands, other forests etc.?

A: Depending on the pulping method, the by-products include, but are not limited to, chemical residuals, dissolved raw material solids, suspended raw materials - all very similar to conventional wood pulps. The further development of these streams is possible, but obviously case specific.
In regards of the second part of your question, we have to state that ANDRITZ does not get involved in the cultivation of raw materials.

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Q: What about the residue from using, wheat straw and bamboo- lignine etc.? And how do you have zero waste without a recycling stream?

A: In general, non-wood fiber has a slightly lower lignin content (20-25%) compared to wood fiber (HWD 20-25%, SWD 25-30%). Depending on the pulping process and raw material, some process solutions from conventional wood pulping could be used to capture and reuse the residuals.

Q: How to get nano cellulose from the recovered fiber?

A: Ideally, the recovered fibers should be re-used for paper production, as the aim is to keep as many fibers as possible in the paper. Nano cellulose is a stream you may be able to recover from your effluent. Depending on your raw materials, fiber processing line, production technology, first pass retention and the fibre recovery system an interesting amount of nano cellulose can be extracted. This needs to be investigated and analyzed case by case. We would be more than happy to support you with our experience.

Q: Wheat straw has typically been associated with a higher silica content. Any experience or comments on this as a potential issue in production process?

A: When using BWS we experienced, due to the high silica content, abrasion of our stock preparation equipment. Some of this can be reduced by optimizing process conditions and pulping process development. Depending on the size, some particles can be removed with cleaning equipment in similar ways to those in some integrated mills, when wood pulp is pumped directly from the pulp mill to the TM. Additionally, the drying energy required increased by 10 to 15%. The white water was heavily contaminated, which was noticeable in ZP, PCD and the low first pass retention.

Q: Is the refining strategy for wheat straw and bamboo significantly different vs virgin fibers to reduce fines and colloids?

A: The overall strategy for annual and virgin fibers is essentially the same, however, the refiner plates and the specific energy must be optimized for your process and product. Wheat straw already includes a lot of fines, but based on the production process, refining may help to improve the quality of the fibre desegregation and sheaves control.

Q: How about yield for option 1 and 2?

A: The yield in the RCF line depends on the material that must be removed. Main factors are plastic contamination and the ash. The line setup has a minor effect if the same tissue quality is targeted. Typical yield values are starting at <70% to about 80%.

For Tissue production, the primary feedstock of RCF is mixed office waste, MOW, due to the higher brightnesses of white tissue products. If lower quality RCF is selected, then the overall yield will be negatively impacted, together with the need for higher chemical usage and increased processing costs.