Leverabellista NordicBio

Medtech nonwoven applications

The challenges were to find the right combination of materials and then to test the materials in pilot scale by using the following technologies: foam-laid nonwoven, wet-laid, and carding/high-loft nonwoven. The whole value chain was represented for each of these technologies by engaging both Swedish and Finnish project participants as follows:

1. Post-consumer textiles (workwear) from Elis and Laundry Alingsås were sorted and prepared for shredding at Wargön Innovation (Sweden)
2. Shredding was performed at RISE IVF (Mölndal, Sweden), and sent to VTT (Jyväskylä, Finland)
3. Shredded textiles were shortened in a Rapid granulator at VTT (Jyväskylä, Finland).
4. Forming of nonwoven and paper web

    a. Foam laid in SAMPO pilot (Jyväskylä, Finland)
    b. Carding/high-loft in full scale operation at Sporda (Bredaryd, Sweden)
    c. Wet laid in pilot paper machine at Fiber-X (Markaryd, Sweden)
5. Lamination of foam-laid and high-loft rolls in full scale operation at Cellcomb (Säffle, Sweden)

Cleaning processes for post-consumer textile fibres for mechanical recycling

There is a lack of knowledge on how to clean used textile fibres before mechanical recycling, and how the cleaning operations affect the fibre properties for further use. This was a topic that many of the participating companies were very interested in. Cleaning tests were performed by using both lab trials and a pilot trial (VTT/Espoo, Finland), and a variety of different textile fibres were examined, both bio-based fibres like cotton and viscose, but also polyester-cotton blends. In addition, studies regarding discoloration and removal of micro-organisms were also carried out.

Yarn spinning by using mechanically recycled fibres

Yarn spinning trials has been made with up to 60% recycled garments in combination with fibres like e.g. viscose, hemp, rPET, and pre-consumer cotton.
The project resulted in the following deliverables:

- VTT Research report https://cris.vtt.fi/ws/portalfiles/portal/42412286/VTT_R_00923_20.pdf
- Medtech applications – materials for sheets or gowns, pilot volumes
    - Foam-laid nonwoven rolls were produced by using BSKP (bleach softwood kraft pulp), Bicomponent fibres, and shortened post-consumer textiles. The rolls were laminated by using a starch-based film. Runnability was good in machines. Higher grammage gave same strength as commercial material.
    - Wet-laid material was produced by using a mixture of softwood and hardwood kraft pulp, and same granulated post-consumer textiles as for foam-laying trials. The runnability on machine was very good and the material felt soft.

- Cleaning processes for post-consumer textile fibres
    - Literature review.
    - Processes in laboratory for five different cleaning agents were evaluated at different conditions (temperature and time) and for different textile fibres.
    - Processes in laboratory for both oxidative and reductive discoloration of textile fibres were evaluated.
    - Processes in laboratory for removal of micro-organisms were assessed for six different microbes.
    - Selected process for textile fibre cleaning was piloted
- Important knowledge, input and contacts for further development in the area for all partner organisations.