



sappi | Valida

About Sappi

Sappi is a global diversified woodfibre group, focused on dissolving wood pulp, paper-based solutions and high quality functional biomaterials.

Manufacturing operations can be found on 3 continents with sales to more than 150 countries. We are using our global leadership position and significant investment in Research and Development in coated graphic papers, speciality packaging grades, dissolving wood pulp and biorefinery processes to respond to the growing global demand for high quality functional biomaterials.

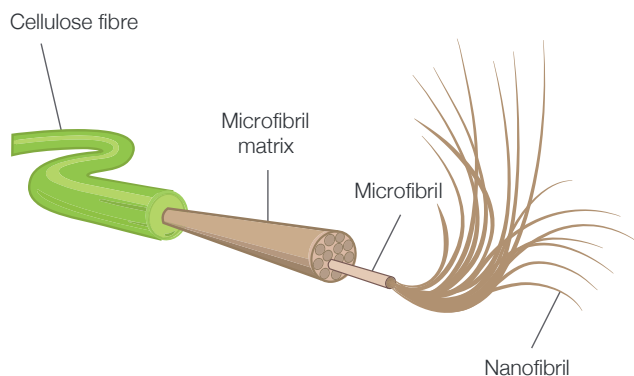
As we focus on creating value for our shareholders, we take cognisance of our impact on this planet and stakeholders to ensure that all benefit in the long term. Sustainability is not an add-on, but an entrenched part of the way we manage our daily business activities, mitigate risk, leverage opportunities and plan for the future. We hold ourselves accountable to global sustainability best practice standards by transparently measuring, monitoring and communicating our economic, social and environmental performance.



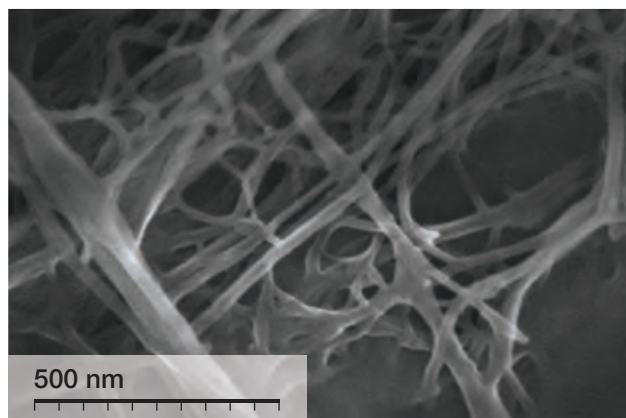
What is cellulose?

Cellulose, bound in the cell walls of plants and bacteria is the most abundant biological polymer on the planet. It consists of long chains of glucose (a sugar), linked together to form a polymer, a natural plastic-like material. It is the main component of plant stems, leaves and roots, and gives wood its remarkable strength. Traditionally, the main commercial uses for cellulose have been in producing paper and textiles. Nanocellulose, produced by separating cellulose fibres down to the smallest fibril component, dramatically increases the surface area of the cellulose and enhances the mechanical, optical, chemical and physical properties.

Microscopic schematic of nanocellulose



Adapted from Nutrition Resources, 2006



What is nanocellulose?

Nanocellulose is a lightweight, solid substance obtained from cellulosic fibres (plant materials). It is comprised of crystalline and amorphous regions and has a diameter of less than 100 nanometres.

Derived from the Greek word 'nanos', meaning 'dwarf'. One nanometre is one-billionth of a metre.

Sappi Valida

Sappi has developed a unique process for the manufacture of high quality nanocellulose, branded as Valida, which is easily dispersed into a variety of matrices. Valida, which is naturally hydrophilic can also be subjected to surface modification to suit hydrophobic and other specific applications.

Sappi Valida

Sappi Biotech is committed to investing resources to develop applications which progress the commercial realisation of the unique benefits which Valida has to offer. Project proposals are invited from customers and academic institutions who are committed to exploring and developing applications for this wonder material. Enquiries for samples or commercial quantities of Valida should be directed to Sappi Biotech. Contact details are available on www.sappi.com/nanocellulose.

sappi | biotech



What type of nanocellulose is Sappi focusing on?

Sappi has established a pilot-scale plant for the production of both aqueous and dry re-dispersible nanocellulose, at the Brightlands Chemelot Campus in The Netherlands. Although designed to produce cellulose nanofibrils (CNF), the plant will also be capable of producing micro fibrillated cellulose (CMF). Feedstock to the plant in the form of wood pulp will be obtained from various accredited and sustainable sources.



What are the properties of Valida?

Key features of Valida include:

- A renewable and recyclable natural organic polymer
- Non-toxic
- Biodegradable and biocompatible
- Film forming
- Shear thinning
- Lightweight with high stiffness
- Stable in a wide range of temperature and pH
- High viscosity



Our Valida manufacturing process is designed to **minimise energy** use and to **maximise the recycling of process chemicals** — respecting our environment.



Our pilot plant is focused on the production of **high quality** functionalised **nanocellulose fibrils**.



Valida is a lightweight, solid substance which is comprised of nano-sized fibrils — the **high strength building blocks** of **cellulose fibres**.

Applications for Valida



Valida can be used in a wide range of industrial and everyday products because of the way it can improve the properties of materials with which it is combined — for example, thickening water-based products such as coatings, paints, adhesives and concrete. Its thixotropic rheology profile and high storage modulus assure good sprayability and excellent anti-sagging performance. The extensive fibre network facilitates in-can stability and storage stability of finished products.



Because of Valida's low oxygen and grease permeability, Valida is a potential replacement for plastic films in the next generation renewable packaging. Valida may also contribute to properties required for flexible and rigid packaging such as strength, resistance to cracks as well as barriers.



Valida serves as a multifunctional additive with superior and cost-effective performance in foods, personal care and homecare products. Valida is effective in suspending and stabilising particles and pigments whilst providing creams and serums with a unique texture.



Other applications include additive manufacturing for 3D printing and containing-films in lithium batteries and touch-screens. As cellulose is inherently biocompatible and bioabsorbable, there is considerable potential in biomedical applications such as wound dressings and regenerative medicine.

Valida functions



Rheology modifier



Water retainer



Suspension stabiliser



Active ingredient carrier



Barrier



Reinforcer



Dimensional stabiliser





What benefits and advantages does Valida offer?



Valida is derived from cellulose — the most abundant polymer on earth — and most importantly a renewable resource.



Valida holds great potential in helping the world shift to materials that do not require petroleum as a feedstock.



Valida is biocompatible and biodegradable.



Valida does not impinge food supply as it is derived from woodfibre.



Producing lightweight, high strength biocomposites for new generation vehicles



Improve in-can stability of paint and coatings, disperse and stabilise pigments



Improving the mechanical properties of rubber, latex, thermosetting resins, soya protein and starch-based matrices



A powerful and natural rheology modifier in personal care products



An advanced excipient in medicines which facilitates drug delivery and active ingredient release



Enhancing barrier coatings on packaging materials to prolong shelf life of food



Thickening, stabilising and enhancing texture of food

Uses for Valida

Contact details

Sappi Biotech

www.sappi.com/nanocellulose