

## Bamboo Clothing – Why we use bamboo to make our clothing

### Bamboo Viscose

Bamboo is a type of viscose (1). It is a regenerated cellulose fibre.

- 1) Bamboo leaves and the soft, inner pith from the hard bamboo trunk are extracted using a steaming process and then mechanically crushed
- 2) The crushed bamboo is soaked in sodium hydroxide to produce cellulose. A common misconception is that sodium hydroxide is a harmful chemical. If used in a responsible manner sodium hydroxide has absolutely no effect on the environment and health of workers. It is routinely used in the processing of organic cotton into fibre and is approved by the Global Organic Textile Standards (GOTS) and the Soil Association (2). Sodium hydroxide does not remain as a residue on clothing as it easily washes away and can be neutralised to harmless and non-toxic sodium sulphate salt.
- 3) The bamboo cellulose is forced through spinneret nozzles (like a sieve) and hardened to convert the cellulose into bamboo fibre threads
- 4) The fibre threads are spun into bamboo yarn and rolled onto spools.

The processing of the cellulose pulp into fibre is more sustainable than the processing used for conventional viscose because the closed loop process captures and reclaims all the solvents used in the manufacturing.

The resulting bamboo viscose fibre is extremely soft to the touch.

### Bamboo Litrax

Litrax bamboo is different to bamboo viscose as it is processed naturally. Litrax use a newer way of processing the bamboo into fibre that is completely natural. The woody part of the bamboo is crushed mechanically before a natural enzyme retting and washing process is used to break down the walls and extract the bamboo fibre. This bast fibre is then spun into yarn (3). In fine counts the yarn has a silky touch. The same manufacturing process is used to produce linen fabric from flax or hemp. Bamboo fabric made from this process is sometimes called bamboo linen. The natural processing of litrax bamboo allows the fibre to remain strong to produce an extremely high quality product. This process gives a material that is very durable.

### Benefits of using bamboo for clothing

Naturally Organic - bamboo is grown without pesticides or fertilisers, unlike conventional cotton which uses 25% of all the worlds' pesticides less than 10% of the agricultural land mass.

Luxuriously soft - bamboo feels like silky cashmere.

Sustainable - Moso bamboo is one of the world's fastest growing plants, growing up to a metre in a day. Bamboo is a grass, so once cut it will regenerate quickly without the need for replanting (in the same way as your garden lawn). It grows very densely and so the yield per acre is excellent in comparison to cotton.

Eco-friendly - one of the most positive things about bamboo is that it absorbs 35% more carbon dioxide than equivalent stands of trees. More bamboo would help to cut the globally rising levels of carbon dioxide and help in the fight against global warming.

Absorbent - bamboo absorbs up to 60% more water than cotton. This makes it an excellent choice for towels and bathrobes.

Breathable - the porous nature of the fibre makes it breathable and extremely comfortable against the skin.

Thermo-regulating - keeps the wearer warm in cool weather.

Hypoallergenic - bamboo's organic and natural properties make it non-irritating so perfect for extra sensitive skin (4).

### The raw bamboo canes

Most of the bamboo used to make bamboo fibre and bamboo clothing is grown in China by Hebei Jigao Chemical Fiber Company (5). They hold the patent on the process for turning bamboo into fibre. This facility produces most of the bamboo viscose on the market. To strictly control the quality of raw material, Hebei Jigao Chemical Fiber Company has built its own bamboo plantation in Sichuan Province, China and keeps strict control over it. The proof of the ecologically sound methods behind bamboo production is the fact that all of the fibre produced at the facility in China is Oeko-Tex 100 certified (7). This certifies that the finished fibre has been tested for any chemicals that may be harmful to a person's health and has been found to contain no trace chemicals that pose any health threat whatsoever.

### Ecological reasons for using bamboo as a raw material for textiles and clothing

**Growth:** Bamboo has many advantages over cotton as a raw material for textiles. Reaching up to 35 metres tall, bamboos are the largest members of the grass family (8). They are the fastest growing woody plants in the world. One Japanese species has been recorded as growing over 1 metre in a day (9). There are over 1600 species of bamboo (10) found in diverse climates from cold mountains to hot tropical regions. About 40 million hectares of the earth is covered with bamboo, mostly in Asia (11). The high growth rate of bamboo and the fact that bamboo can grow in such diverse climates makes the bamboo plant a sustainable and versatile resource. The bamboo species used for clothing is called Moso bamboo. Moso bamboo is the most important bamboo in China, where it covers about 3 million hectares (about 2% of the total Chinese forest area). It is the main species for bamboo timber and plays an important role for the ecological environment (12).

**Harvesting:** Once a new shoot emerges from the ground, the new cane will reach its full height in just 8-10 weeks. Each cane reaches maturity in 3-5 years. Bamboo can be continually re-harvested with no damage to the surrounding environment. It is a grass and so regenerates after being cut just like a lawn without the need for replanting. This regular harvesting is actually of benefit to the health of the plant – studies have shown that felling of canes leads to vigorous re-growth and an increase in the amount of biomass the next year (13).

**Yield and Land Use:** Land use is of global importance as the world's six billion people compete for water, food, fibre and shelter (14). Sustainable land use practices provide both economic and environmental advantages. Bamboo can be used as food, fibre and shelter and due to its ease of growth and extraordinary growth rate it is a cheap, sustainable and efficient crop. Bamboo grows very densely, its clumping nature enables a lot of it to be grown in a comparatively small area, easing pressure on land use. Yields of bamboo of up to 60 tonnes per hectare (15) greatly exceed the yield of 20 tonnes for most trees and only 1-2 tonnes per hectare for cotton (16) with a one-time planting for bamboo and little care and maintenance needed. In a time when land use is under enormous pressure, bamboo's high yield per hectare becomes very significant.

**Greenhouse gases and global warming:** Human activity is not only producing more carbon dioxide, but it is also severely damaging the ability of the planet to absorb carbon via its carbon sinks – the forests. Growing forests absorb CO<sub>2</sub> but deforestation results in fewer trees to soak up rising levels of CO<sub>2</sub>. Bamboo minimises CO<sub>2</sub> and generates up to 35% more oxygen than equivalent stands of trees (17). One hectare of bamboo sequesters 62 tonnes of

carbon dioxide per year while one hectare of young forest only sequesters 15 tonnes of carbon dioxide per year (18).

**Deforestation:** Bamboo planting can slow deforestation, providing an alternative source of timber for the construction industry and cellulose fibre for the textile industry (19). It allows communities to turn away from the destruction of their native forests and to construct commercial bamboo plantations that can be selectively harvested annually without the destruction of the grove. Tree plantations have to be chopped down and terminated at harvest but bamboo keeps on growing (20). When a bamboo cane is cut down, it will produce another shoot and is ready for harvest again in as little as one year. Compare this to cotton – harvesting organic cotton requires the decimation of the entire crop causing bare soils to bake in the sun and release carbon dioxide into the atmosphere. Before replanting next years crop the cotton farmers till the fields which releases yet more CO<sub>2</sub> (21).

**Water Use:** Very little bamboo is irrigated and there is sound evidence that the water use efficiency of bamboo is twice that of other trees (22). This makes bamboo more able to handle harsh weather conditions such as drought, flood and high temperatures. Compare bamboo to cotton which is a thirsty crop – it can take up to 20,000 litres of water to produce 1kg of cotton and 73% of the global cotton harvest comes from irrigated land (23,24). Some estimates indicate that cotton is the largest user of water among all agricultural commodities.

**Soil Erosion:** Yearly replanting of crops such as cotton leads to soil erosion. The extensive root system of bamboo and the fact that it is not uprooted during harvesting means bamboo actually helps preserve soil and prevent soil erosion. The bamboo plants root system creates an effective watershed, stitching the soil together along fragile river banks, deforested areas, and in places prone to mudslides. It also greatly reduces rain run-off (25). Conventional cotton growing also causes a severe reduction in soil quality through the impact of constant use of pesticides on soil organisms.

**Pesticides and Fertilisers:** Only 2.4% of the world's arable land is planted with cotton yet cotton accounts for nearly 25% of the world's insecticide market and 11% of the sale of global pesticides (26). Many of these pesticides are extremely hazardous and toxic:

Aldicarb, a powerful nerve agent, is one of the most toxic pesticides applied to cotton worldwide and the 2nd most used pesticide in global cotton production. Just one drop of aldicarb, absorbed through the skin, is enough to kill an adult.

Endosulfan is widely used in cotton production and is the dominant pesticide in the cotton sector in 19 countries. In a single province of Benin, at least 37 people died from endosulfan poisoning in just one cotton season.

Monocrotophos Despite being withdrawn from the US market in 1989, it is widely used in developing world countries. In 1997, Paraguay's Ministry of Health and Welfare identified it as being responsible for causing paralysis in children living in cotton growing areas.

Deltamethrin a nerve agent is applied in over half of the cotton producing countries. Medical analysis in a community in a South African village located on the edge of a major cotton production area found traces of deltamethrin in human breast milk.

An estimated 1 million to 5 million cases of pesticide poisoning occur every year, resulting in 20,000 reported deaths among agricultural workers and at least 1 million requiring hospitalisation (27). Even organic cotton farming uses pesticides in the form of copper and copper salts which can cause environmental problems. (28).

Fertilisers are also applied to cotton fields to increase growth rate and crop yields. A huge benefit of using bamboo as the organic base for textile fibres is that there is no need for pesticides or fertilisers when growing bamboo. Bamboo grows so rapidly there is no need for fertiliser. It also contains a substance called bamboo-kun – an antimicrobial agent that gives the plant a natural resistance to pest and fungi infestation (29). However, it is no longer believed true that the finished bamboo fabric retains this antibacterial property (30).

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