Vegetable fibers sheet

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Institute of Natural Fibres & Medicinal Plants

Cotton *(Gossypium)*

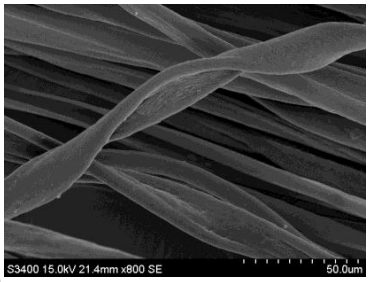
Plant

Source:
http://www.edenproject.com/visit-us/whats-here/plant-a-z/cotton

Fiber

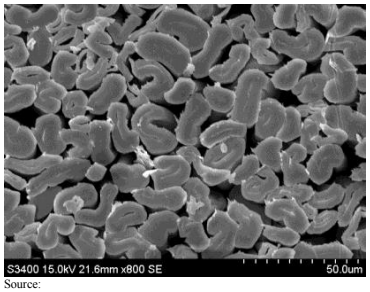
Source:
INFMP

Longitudinal view



Source:
INFMP

Cross- section



Source:
INFMP

Information

Country of origin: Central, North, South America, Asia, Europe, Australia, Africa
Applications: textiles (clothing, decorative fabric), cosmetics
Linear density [tex]: 0.15– 0.4 [4]
Length [mm]: 10–50 [3]
Density [g/cm^3]: 1.52–1.56 [3]
Breaking tenacity [cN/tex]: 17–38 [1]
Diameter [µm]: 14–21 [3]
Thermal stability [^{o}C]: 150 degradation:175–205 [1]
Young's Modulus [GPa]: 30 [10]
Chemical composition [%][3]**:**

Cellulose	Hemicelluloses	Pectin	Lignin	Fat /wax
92-95	5.7	1.2	0	0.6

Flax *(Linum usitatissimum)*

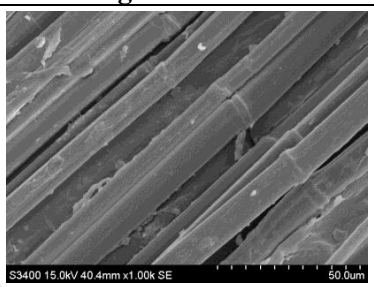
Plant

Source:
http://500px.com/photo/7943014/flax-flower-%28linum-usitatissimum%29-by-vendenis-

Fiber

Source:
INFMP

Longitudinal view



Source:
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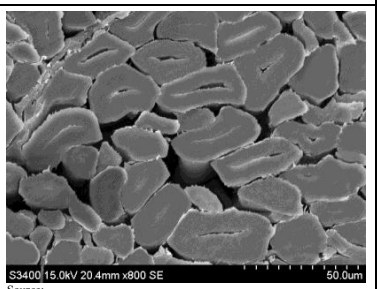
Cross- section



Source:
INFMP

Information

Country of origin: Europe, Asia
Applications: textiles, production of particleboards, thermo insulating materials, paper, composites, food (oil), used in cosmetics industries
Linear density [tex]: 0.2–2.0 [3]
Length [mm]: 13–40 [2]
Density [g/cm^3]: 1.50 [2]
Breaking tenacity [cN/tex]: 40–80 [1]
Diameter [µm]: 17–20 [2]
Thermal stability [^{o}C]: 150 degradation:175–205 [1]
Young's Modulus [GPa]: 100 [3]
Chemical composition [%][3]**:**

Cellulose	Hemicelluloses	Pectin	Lignin	Fat/wax
62-71	16-18	1.8-2.0	2.0-2.5	1.5

Hemp *(Cannabis sativa)*

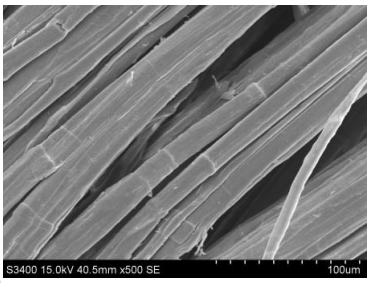
Plant

Source:
http://www.medicaljane.com/2013/07/22/cannabis-sativa-as-explained-by-medical-jane/#

Fiber

Source:
INFMP

Longitudinal view



Source:
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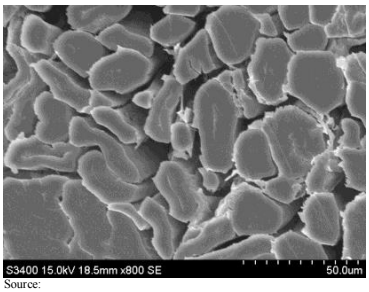
Cross- section



Source:
INFMP

Information

Country of origin: Europe, Asia
Applications: rope production, textiles, composites, food (hempseed oil), cosmetics industries
Linear density [tex]: 3.0–2.2 [3]
Length [mm]: 15–25 [2]
Density [g/cm^3]: 1.48–1.49 [2]
Breaking tenacity [cN/tex]: 47–80 [2]
Diameter [µm]: 15–30 [2]
Thermal stability [^{o}C]: 150 degradation:175–205 [1]
Young's Modulus [GPa]: 96 [3]
Chemical composition [%][3]**:**

Cellulose	Hemicelluloses	Pectin	Lignin	Fat/wax
67-75	16-18	0.8	2.9-3.3	0.7

Jute *(Corchorus capsularis)*

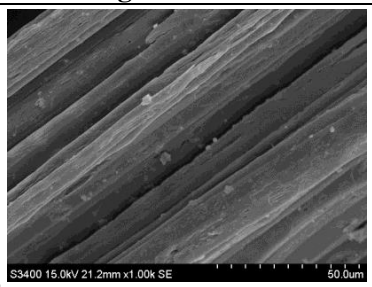
Plant

Source:
http://nakedflooring.wordpress.com/2014/02/11/what-is-jute/

Fiber

Source:
INFMP

Longitudinal view



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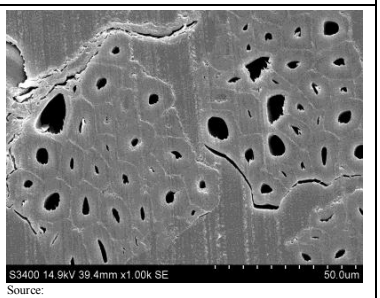


Source:
INFMP

Information

Country of origin: Asia, South America, Europe, Brazil
Applications: sacks and all kind of dressing materials, packing, conveyor belts, upholstery, decorative fabrics, floor covering materials, composites, geotextiles and paper pulp
Linear density [tex]: 1.4–3.0 [3]
Length [mm]: 2–3 [15]
Density [g/cm^3]: 1.44–1.49 [15]
Breaking tenacity [cN/tex]: 23.9–27.6 [14]
Diameter [µm]: 14–20 [2]
Thermal stability [^{o}C]: 150 degradation:175–205 [1]
Young's Modulus [GPa]: 64 [3]
Chemical composition [%][3]**:**

Cellulose	Hemicelluloses	Pectin	Lignin	Fat/wax
59-71	12-13	0.2-4.4	11.8-12.9	0.5

Sisal *(Agave sisalana)*

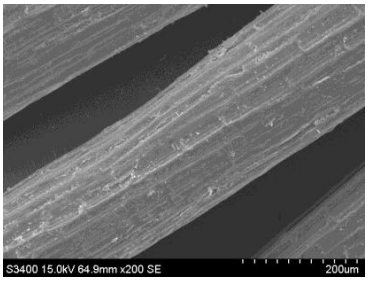
Plant

Source:
http://www.westafricanplants.senckenberg.de/root/index.php?page_id=14&id=2181

Fiber

Source:
INFMP

Longitudinal view



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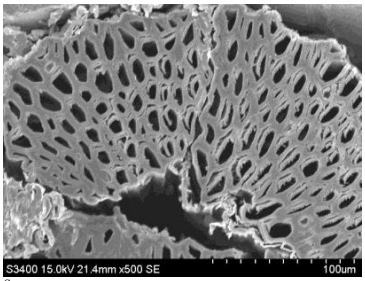


Source:
INFMP

Information

Country of origin: South and Central America, Eastern Africa
Applications: ropes, strings, bags fabrics, plaiting, mats, dart targets, fishnets
Linear density [tex]: 28.6–48.6 [2]
Length [mm]: 0.8–8 [2]
Density [g/cm^3]: 1.2 [2]
Breaking tenacity [cN/tex]: 57.2 [3]
Diameter[µm]:7–47 [2]
Thermal stability [^{o}C]: 150 degradation:175–205 [1]
Young's Modulus [GPa]: 9.4–22 [2]
Chemical composition [%][3]**:**

Cellulose	Hemicelluloses	Pectin	Lignin	Fat/wax
66-73	12-13	0.8	9.9	0.3

Ramie *(Boehmeria nivea)*

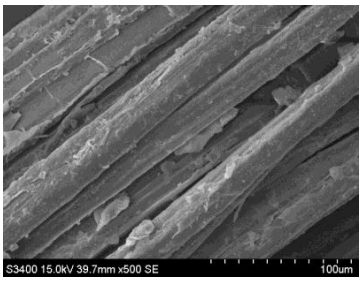
Plant

Source:
http://www.henriettes-herb.com/galleries/photos/b/bo/boehmeria-nivea.html

Fiber

Source:
INFMP

Longitudinal view



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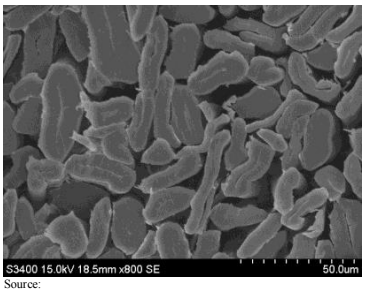
Cross- section



Source:
INFMP

Information

Country of origin: China, Japan, Australia, Africa, Indonesia
Applications: textiles (tablecloth), production of banknote (only short fibers)
Linear density [tex]: 0.500 [2]
Length [mm]: 120–150 [2]
Density [g/cm^3]: 1.51–1.55 [2]
Breaking tenacity [cN/tex]: 47–67 [1]
Diameter [µm]: 40–60 [2]
Thermal stability [^{o}C]: 150 degradation:175–205 [1]
Young's Modulus [GPa]: 59 [3]
Chemical composition [%][3]**:**

Cellulose	Hemicelluloses	Pectin	Lignin	Fat/wax
68-76	13-14	1.9-2.1	0.6-0.7	0.3

Kenaf *(Hibiscus cannabinus)*

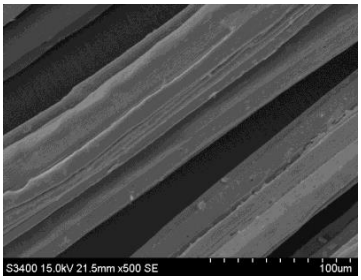
Plant

Source: http://www.henriettes-herb.com/galleries/photos/b/bo/boehmeria-nivea.html

Fiber

Source: INFMP

Longitudinal view



Source: INFMP

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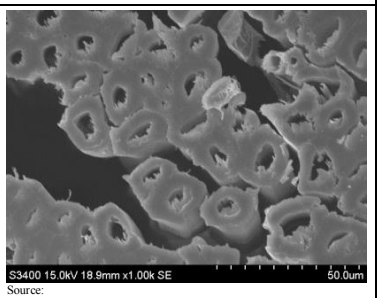


Source: INFMP

Information

Country of origin: Asia, Africa, America, Europe
Applications: rope production, paper production, thick wound dressing fabric
Linear density [tex]: 1.9–2.2 [3]
Length [mm]: 1.5–11 [2]
Density [g/cm^3]: 1.2 [2]
Breaking tenacity [cN/tex]: 25.4 [9]
Diameter [µm]: 14–33 [2]
Thermal stability [^{o}C]: 150 degradation:175–205 [1]
Young's Modulus [GPa]: 53 [2]
Chemical composition [%][3]**:**

Cellulose	Hemicell uloses	Pectin	Lignin	Fat/wax
44-57	-	-	15-19	-

Abaca *(Musa textilis nee)*

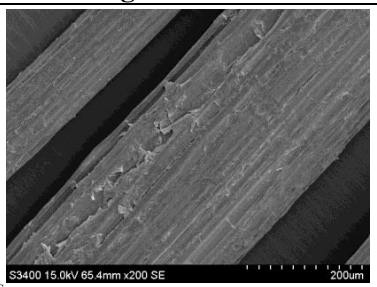
Plant

Source: http://pinoytrees.blogspot.com/2010/08/distinguishing-abaca-from-banana.html

Fiber

Source: INFMP

Longitudinal view



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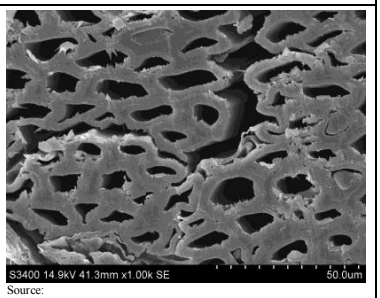
Cross- section



Source: INFMP

Information

Country of origin: Philippines, Java, Sumatra, Borneo, Central and South America
Applications: plaiting, thick fabrics, fishnets, sails, ship ropes, paper, boards used in construction
Linear density [tex]: 4.2–44.4 [3]
Length [mm]: 6 [2]
Density [g/cm^3]: 1.5 [2]
Breaking tenacity [cN/tex]: 54–72 [4]
Diameter [µm]: 10–30 [2]
Thermal stability [^{o}C]: 150 degradation:175–205 [1]
Young's Modulus [GPa]: 12 [2]
Chemical composition [%][3]**:**

Cellulose	Hemicell uloses	Pectin	Lignin	Fat/wax
63-68	19-20	0.5	5.1-5.5	0.2

Coir *(Cocos nucifera)*

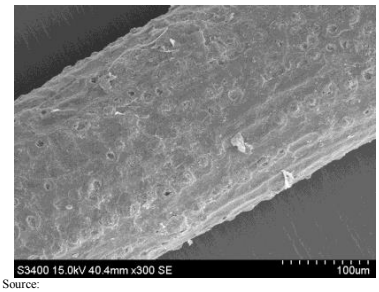
Plant

Source:
http://mauimike.smugmug.com/keyword/cocos%20nucifera/i-KHBvxMT/A

Fiber

Source:
INFMP

Longitudinal view



Source:
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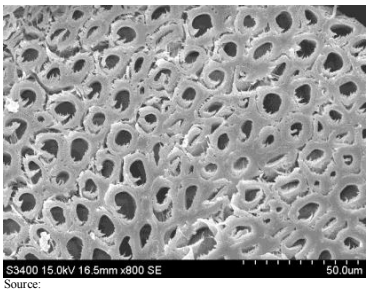
Cross- section



Source:
INFMP

Information

Country of origin: Western, Central and Southern Africa, India, The Ivory Coast
Applications: brushes, mattresses, bags, ropes, upholstery, automotive industry
Linear density [tex]: 50 [3]
Length [mm]: 0.3–3 [2]
Density [g/cm^3]: 1.2 [2]
Breaking tenacity [cN/tex]: 397 [7]
Diameter [µm]: 7–30 [2]
Thermal stability [^{o}C]: 150 degradation:175–205 [1]
Young's Modulus [GPa]: 3.7 [8]
Chemical composition [%][3]**:**

Cellulose	Hemicelluloses	Pectin	Lignin	Fat/wax
36-43	0.2	3-4	41-45	-

Pineapple *(Ananas comosus)*

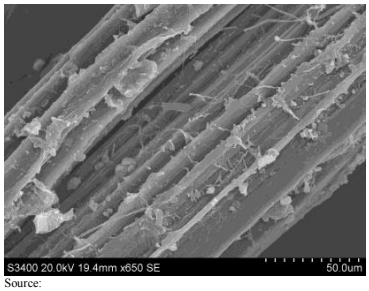
Plant

Source:
http://mgonline.com/articles/pineapple.aspx

Fiber

Source:
INFMP

Longitudinal view



Source:
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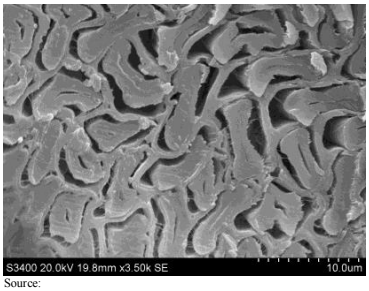


Source:
INFMP

Information

Country of origin: South America
Applications: production of clothes, tablecloths, bags, mats
Linear density [tex]: 1.5–2.3 [3]
Length [mm]: 3–8 [3]
Density [g/cm^3]: 1.44 [3]
Breaking tenacity [cN/tex]: 30–40 [3]
Diameter [µm]: 25–40 [3]
Thermal stability [^{o}C]: 150 degradation:175–205 [1]
Young's Modulus [GPa]: 60–82 [10]
Chemical composition [%][3]**:**

Cellulose	Hemicelluloses	Pectin	Lignin	Fat/wax
55-68	15-20	2-4	8-12	4-7

Kapok *(Ceiba pentandra)*

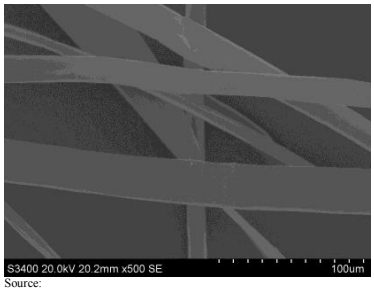
Plant

Source:
http://www.panoramio.com/photo/78604407

Fiber

Source:
INFMP

Longitudinal view



Source:
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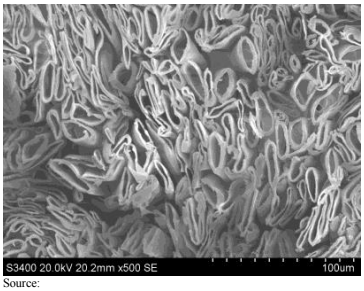


Source:
INFMP

Information

Country of origin: Asia, Africa, America
Applications: life vests, insulating materials, packing materials for pillows and quilts
Linear density [tex]: 0.068 [11]
Length [mm]: 15–35 [5]
Density [g/cm^3]: 0.37 [12]
Breaking tenacity [cN/dtex]: 2–3[13]
Diameter [µm]: 15–43 [5]
Thermal stability [^{o}C]: 150 degradation:175–205 [1]
Young's Modulus [GPa]: 4 [10]
Chemical composition [%][10]**:**

Cellulose	Hemicelluloses	Pectin	Lignin	Fat/wax
13	-	-	-	-

Nettle *(Urtica dioica L.)*

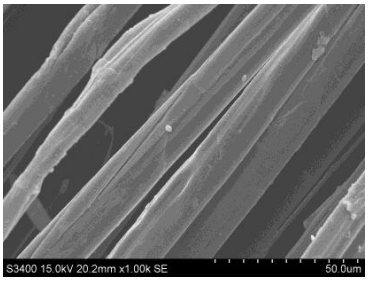
Plant

Source:
http://survival.strefa.pl/r/index_rja_wi_pokrzywa.htm

Fiber

Source:
INFMP

Longitudinal view



Source:
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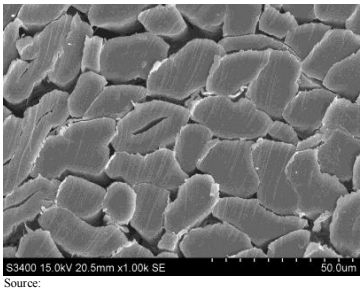
Cross- section



Source:
INFMP

Information

Country of origin: Europe
Applications: nowadays nettle fiber is not used on an industrial scale. It was traditionally used in the production of thick fabrics, ropes and strings.
Linear density [tex]: 0.5 [2]
Length [mm]: 5.5 [2]
Density [g/cm^3]: 1.51 [2]
Breaking tenacity [cN/tex]: 17–38 [1]
Diameter [µm]: 20–80 [2]
Thermal stability [^{o}C]: 150 degradation:175–205 [1]
Young's Modulus [GPa]: 38 [2]
Chemical composition [%] [3]**:**

Cellulose	Hemicelluloses	Pectin	Lignin	Fat/wax
53.0-82.6	-	0.9-4.8	0.5	-

References:

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