

USA *Pinus taeda* vs. Portuguese *Eucalyptus globulus*



Names

Pinus taeda

- Common names:
 - Oldfield pine
 - North Carolina pine
 - Shortleaf pine
 - yellow pine
 - Southern pine
 - Arkansas pine

Eucalyptus globulus

- Common names:
 - Tasmanian Blue Gum
 - Southern Blue Gum
 - Blue gum Eucalyptus
- Subspecies:
 - Subsp. *globulus*
 - Subsp. *maidenii*
 - Subsp. *pseudoglobulus*
 - Subsp. *bicostata*

Physical Properties

Pinus taeda

- Evergreen
- Softwood
- Height: 100-115 ft tall
- Climate:
 - Humid, warm-temperate with long summers and mild winters
 - Annual rainfall 40-60 inches

Eucalyptus globulus

- Evergreen
- Hardwood
- Height: 98-180 ft tall
- Climate:
 - Mild, temperate- high, cool elevations in tropical areas
 - Annual rainfall 35 inches

Bark and Leaves

Pinus taeda

- Bark:
 - Red-brown to grey brown
 - Scaly
- Leaves:
 - 6-9 inches long, yellow-green needles
 - Usually three needles per fascicle

Eucalyptus globulus

- Bark:
 - Outer Bark:
 - Grey, brown and greenish or bluish
 - Peels in long strips
 - Grey, shaggy and thick at base
- Leaves:
 - Juvenile leaf
 - 6-15 cm long
 - covered with a blue-grey bloom
 - Mature:
 - Narrow
 - Sickle -shaped
 - Dark shining green

Bark and Leaf Photos

Pinus taeda



Eucalyptus globulus



Flowers and Fruit

Pinus taeda

- Flowers:
 - Male:
 - Long cylindrical
 - Red-yellow
 - Cluster at branch tips
 - Female:
 - Long cylindrical
 - Yellow-purple
 - Cluster at branch tips
- Fruits:
 - Ovoid- cylindrical
 - 3-6 inches red-brown cones

Eucalyptus globulus

- Flowers:
 - Cream-colored
 - Borne singly in leaf axils
 - Produce honey flavored nector
- Fruits “Gum nuts”:
 - Woody
 - 1.5-2.5 cm diameter
 - Seeds are shed through valves on top

Wood Chemical Composition

Pinus taeda

■ Lignin	30%
■ Cellulose	42%
■ Hemicellulose	15.3%
■ Xylans	3.8%
■ Galactoglucomannan	12-14%
■ Mannan	4.7%
■ Extractives	4.4%
■ Ash content	0.4%

Eucalyptus globulus

■ Lignin	21.9%
■ Cellulose	51.3%
■ Hemicellulose	
■ Xylans	27.8%
■ Glucomannans	1.3%
■ Extractives	0.8%

Calorific Value-amount of heat given off upon burning

Pinus taeda

- Stemwood 4780^{kcal}/kg
- Bark 5178^{kcal}/kg

Eucalyptus globulus

- Leaves 3070^{kcal}/kg
- Thick branches 1871^{kcal}/kg
- Thin branches 1821^{kcal}/kg
- Bark 1412^{kcal}/kg
- Seeds 2763^{kcal}/kg

Fatty Acids

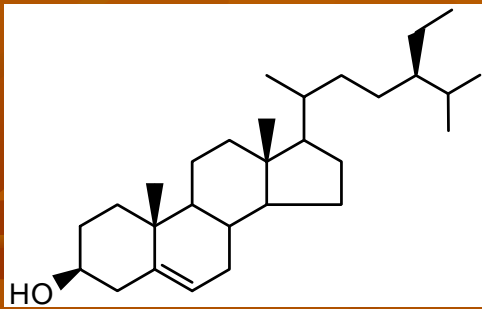
Pinus taeda

- Hexadecanoic acid 8.0^{mg}/_{kg}
- Octadecanoic acid traces
- Eicosanoic acid traces
- Docosanoic acid traces
- Tetracosanoic acid traces

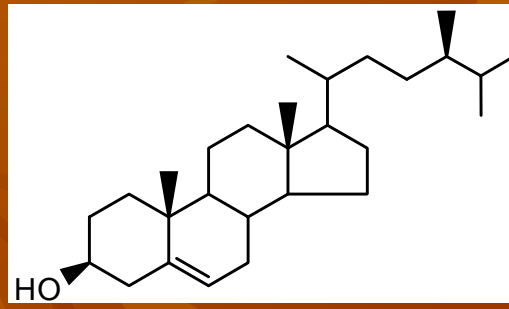
Eucalyptus globulus

- Hexadecanoic acid 76.1 ^{mg}/_{kg}
- Octadecanoic acid 17.6 ^{mg}/_{kg}
- Eicosanoic acid 7.39^{mg}/_{kg}
- Docosanoic acid 36.6 ^{mg}/_{kg}
- Tetracosanoic acid 50.4 ^{mg}/_{kg}

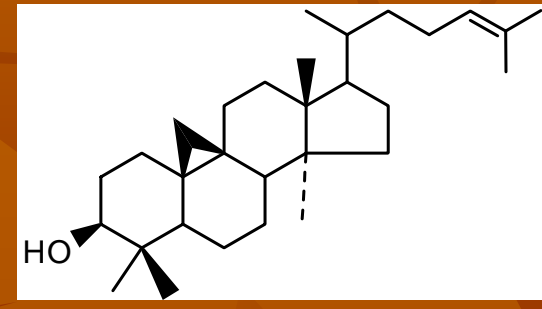
Sterol Structures



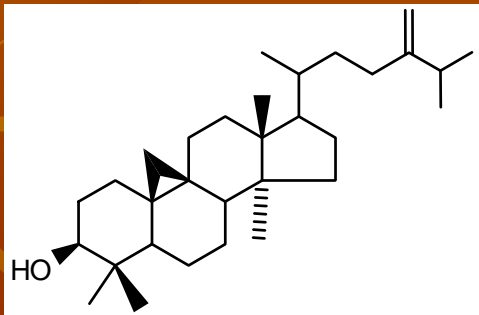
Sitosterol



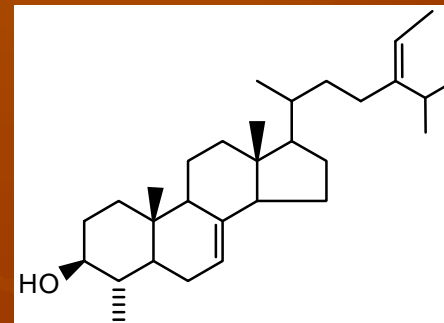
Campesterol



Cycloartenol



24- methylene cycloartenol



Citrostadienol

Sterols Percentages

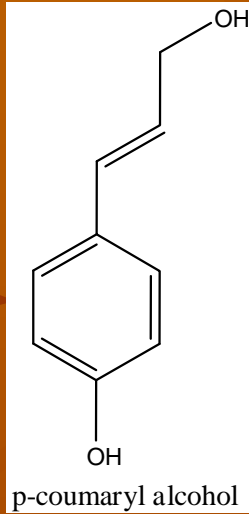
Pinus taeda

- Campesterol 26.0 mg/kg
- Sitosterol 277.0 mg/kg
- Cycloartenol Traces
- 4-methylene cycloartenol 2.0 mg/kg
- Citrosteradienol 1.0 mg/kg

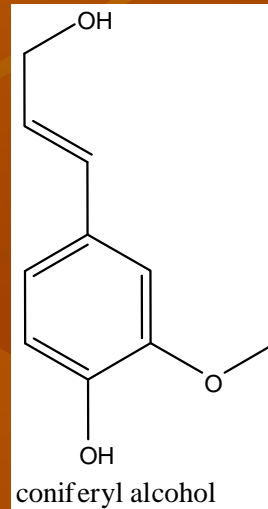
Eucalyptus globulus

- Campesterol 8.02 mg/kg
- Sitosterol 346.7 mg/kg
- Cycloartenol Traces
- 24-methylene 9.24 mg/kg
- Citrosteradienol 24.9 mg/kg

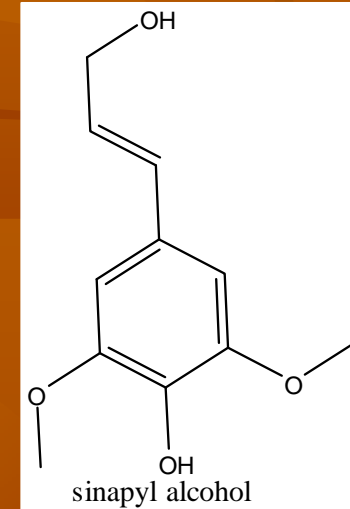
Present Monolignols



H
Pinus taeda



G



S

Eucalyptus globulus

H:G
14:86

H:G:S
2:36:62

Lignin Functional Groups abundance (/100 C-9 units)

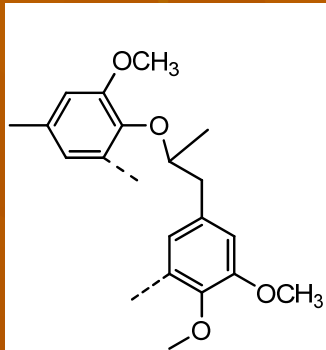
Pinus taeda

Eucalyptus globulus

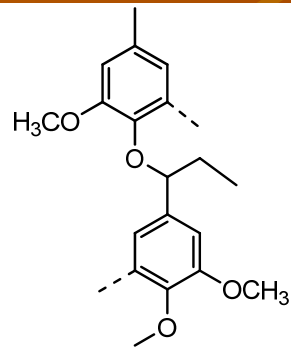
- Methoxy 90-95
- Phenolic Hydroxyl 20-30
- Aliphatic Hydroxyl 115-120
- Benzylic Hydroxyl
- Carbonyl 20

- Methoxy 160-164
- Phenolic Hydroxyl 19
- Aliphatic Hydroxyl 125
- Benzylic Hydroxyl 54
- Carbonyl 17-24

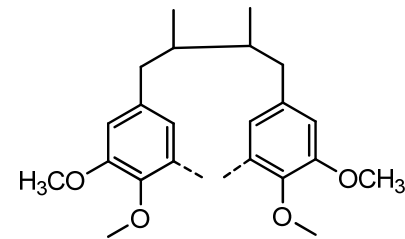
Lignin Linkages



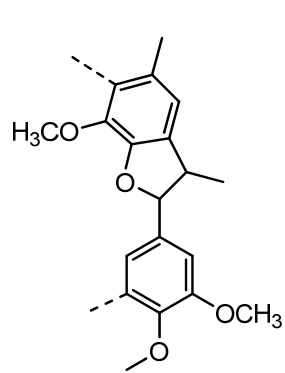
β -O-4



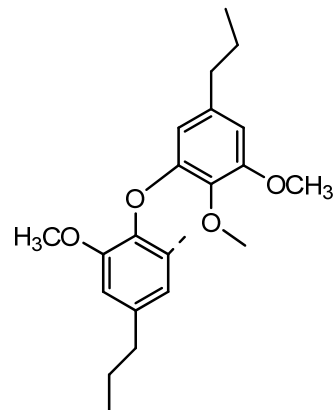
α -O-4



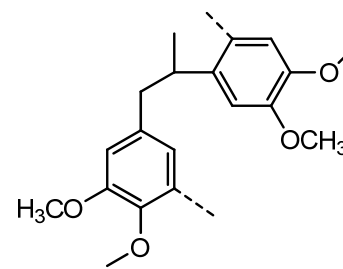
β - β



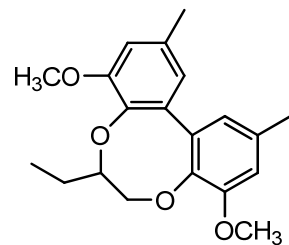
β -5



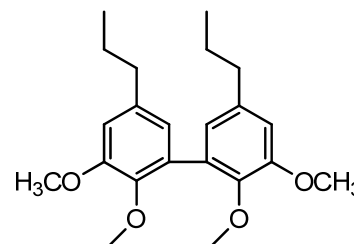
4-O-5



β -1



Dibenzodioxocin



5-5

Pulping Types and Paper

Pinus taeda

- Asplund pulping
 - Roofing felts
- Groundwood pulping
 - Fiberboard
- Kraft pulping
 - High-grade papers

Eucalyptus globulus

- Bleached sulphate pulping
 - Printing and writing paper
- Unbleached sulphate pulping
 - Packaging paper
- Sulphite pulping
 - Tissue and special paper

Bleached Kraft Pulping Fibers

Pinus taeda

- Length 2.4 mm
- Curl Index 0.095
- Coarseness 24.0 mg/100 m
- Population 2.58 million fibers/g

Eucalyptus globulus

- Length 0.752 mm
- Curl Index 0.099
- Coarseness 8.60 mg/100 m
- Population 20.0 million fibers/g

Applications

Pinus taeda

- Wind, sight, and noise barrier on highways
- Habitat for game and nongame wildlife
- Soil stabilization and erosion control
- Timber
- Pulpwood

Eucalyptus globulus

- Wind, sight and sound barrier on highways
- Fuel wood
- Timber
- Oils extracted from leaves: fragrance, insect repellent, and antibiotics
- Pulpwood

References

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