

# Chemicals and Products from Trees

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The forest industry has made great strides in using the entire tree. Lumber, plywood and paper are essential products made from the wood fiber in trees. But up to half – or even more – of a tree is **lignin**, the complex natural chemical that binds the **cellulose** fibers in the tree together. This and other **silvichemicals** from trees are used in thousands of products important to people. The best part about silvichemicals is that we will never run out of them, because trees – unlike coal and petroleum sources of chemicals – are endlessly renewable with good management practices.

Turpentine and tall oil are resinous materials reclaimed from the paper pulping process. They are important ingredients in paint, varnish, adhesives, asphalt, lube-oil additives, resins, menthol, lacquer, camphor, printing inks, fungicides, rubber and latex products, soaps, disinfectants and polishes. Synthesized essential oils are used in chewing gum, mouthwash, peppermint candies and toothpaste, lime aftershave, detergents, soaps and shampoo.

Wood flour and melamine resins using cellulose filler are principle components of dinnerware, electrical receptacles and parts, toys, caster wheels, toilet seats, handles for cooking utensils, washing machine impellers, composite decks and roofs, and appliance housings. Wood flour and resins are also used as adhesives in the paper industry.

Ethyl cellulose and other chemical based cellulose are used in making tool handles, packaging films, glasses frames, molded packages, combs, brush and mirror backs, sponges, acetate filament yarns, sausage casings, cellophane, knobs and handles, luggage, gunstocks, fishing floats, toothbrushes, plastic pens, football helmets and hard hats, electrical tape, coatings, lampshades and a variety of other products. Acetate filament yarns from cellulose include rayon fiber and other textile products such as clothing, drapes and rugs. Nitrocellulose is used in making solid rocket propellants and other explosives. It is also a key ingredient in nail polish and car paint.

Torula yeast is a high-protein product made from wood sugars spent in the pulping process. It has 17 nutritional trace elements, including 4-5 times the amount of iron found in uncooked spinach or raisins. Type S Torula is used in baby foods, cereals, imitation bacon, baked goods, beverages, vegetarian food and dietary preparations. Type F Torula is used in feed supplements for cattle, hogs, fish, chickens and mink, and Type FP Torula goes into pet foods. Torula has been found to make bees and lobsters grow faster.

Lignosulfonates from spent sulphite pulping liquor are used in cleaning compounds, insecticides, cement, ceramic products, oil well drilling muds, cosmetics, artificial vanilla flavoring, gummed tape, deodorants, hair spray, pharmaceuticals such as Aldomet and Aldoril for hypertension and L-Dopa for Parkinson's Disease, fungicides, fertilizer, grouting, tanning agents for leather and a static remover for laundry. Spent sulphite liquor is also used as a binder for animal feed pellets, as an extender for molasses for liquid animal feeds, for linoleum paste, road binder and as a binder for foundry cores and ore briquettes.

From 13 to 21 percent of a cord of wood may be bark. Much of it is used as fuel in forest industry mills. Bark is also a source of chemicals such as resins, fatty acids, tannins, waxes, vitamins and tall oil. Large amounts of bark are used as mulches, soil conditioners and bedding for poultry and livestock. Other uses of bark include plywood adhesives, plastic fillers, lacquers and varnishes, molded products and oil-spill control agents.



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