

Manufacturing Process of Rosin, Terpene, Tall Oil, Resin & Dimer Acids

(Oleoresin and Pine Chemicals)

**Terpenoids, Turpentine, Terpene based
Adhesives, Peroxides from Turpentine,
Terpene Resins, Terpene Derivatives**



Introduction

One of the oldest segments of the chemical industry, pine chemicals are a family of renewable, naturally occurring materials derived from the pine tree (genus *Pinus*). Pine trees originate from the northern hemisphere but are now found worldwide.

Pine chemicals are derived from the distillation of oleoresin or carbonization of wood. These chemicals are largely obtained from three sources: 1) living trees; 2) dead pine stumps and logs; and 3) as by-products of sulfate (or Kraft) pulping. Most distilled products are made from gum, stumps, logs, and sulfate pulp byproducts.



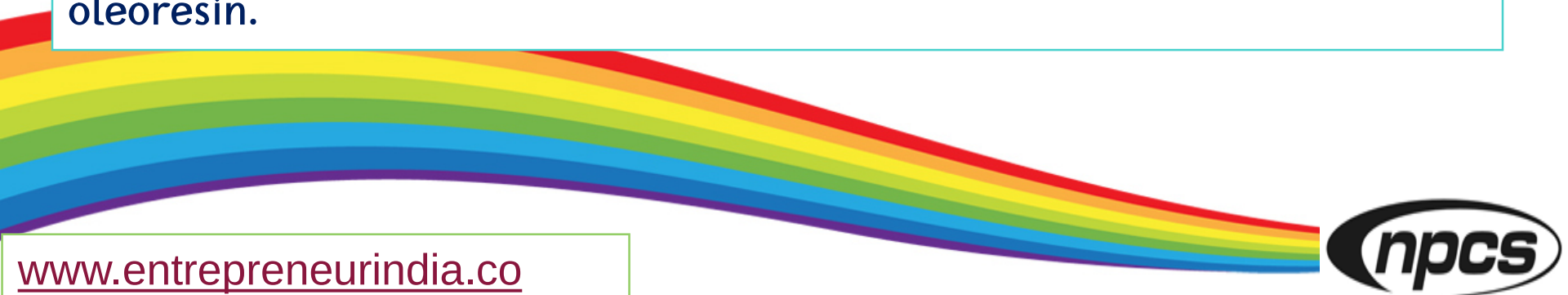
The pine tree, utilized through the centuries as a valuable natural resource, has many applications in our society. In early civilizations the pine tree was used as fuel and shelter. As societies developed, the pitch (or sap) from the tree found use in caulking seams between the boards of sailing ships and pine lumber could be used for building materials, paper, board and tissue. Pine Chemicals are environmentally friendly products that use natural, renewable resources as primary raw materials originating from sustainable forestry sources. For many years the pine chemicals industry has supplied bio renewable feed stocks to the \$130 billion dollar coatings industry. These products include tall oil fatty acids (TOFA) and tall oil rosin sourced from pine trees, making them renewable and sustainable solutions.



The largest producer of pine chemicals:

- 9 Greatest Crude Tall Oil distillation capacity in the world, 800 000 tons/year, 50% of total capacity
- 9 Largest integrated producer of resins from pine chemicals

Pine oleoresin is a complex mixture of volatile and nonvolatile terpenes. Terpenes constitute the largest group of secondary products (with more than 40,000 different metabolites). Global investments in new forest plantations have focused on fast-growing hardwood plantations over the past 15 years. But there is a growing interest in developing new pine plantations for production of oleoresin.



Turpentine is the volatile oil distilled from pine resin, which itself is obtained by tapping trees of the genus *Pinus*. The solid material left behind after distillation is known as rosin. Both products are used in a wide variety of applications. Turpentine, rosin and derivatives of these which have been obtained via tapping of living pine trees (whether natural stands or plantations) are known collectively as gum naval stores (and the turpentine and rosin as gum turpentine and gum rosin, respectively). This distinguishes them from turpentine and rosin which have been recovered as by-products from chemical pulping of pines and which are referred to as sulphate naval stores; and wood naval stores, which are similar materials obtained from aged pine stumps.



Dimer acids, or dimerized fatty acids, are dicarboxylic acids prepared by dimerizing unsaturated fatty acids obtained from tall oil, usually on clay catalysts. Dimer acids are used primarily for synthesis of polyamide resins and polyamide hot melt adhesives. They are also used in alkyd resins, adhesives, surfactants, as fuel oil additives, lubricants, etc. It is a light yellow or yellow viscous transparent liquid. It is non-toxic.

The pine-derived chemicals market is projected to reach USD 5.27 Billion by 2021, at a CAGR of 4.5% from 2016 to 2021.



Some of the fundamentals are pine oleoresin extraction methods, occurrence, formation and exudation of oleoresin in pines, processing of oleoresin, rosin derivatives and its potential, new developments in rosin ester and dimer chemistry, terpene based adhesives, effect of solvent, ozone concentration and temperature on yields were investigated, sylvestrene and some of its derivatives, homopolymers and copolymers of acrylates, polymers and copolymers of vinyl pinolate, base catalysed isomerisations of terpenes, components of pine roots, insecticides based on turpentine, the general characteristics of dimer acids, structure and properties of dimer acids etc.



The present book has been published having in views the important uses of pines. The book contains manufacturing process of different products extracted from pines like oleoresin, rosin, turpentine derivatives, tall oil, resins and dimer acids etc. This is the first book of its kind which is very resourceful for all from researchers to professionals.



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can provide Process Technology Book on
Oleoresin and Pine Chemicals
(Rosin, Terpene Derivatives, Tall Oil, Resin & Dimer Acids)

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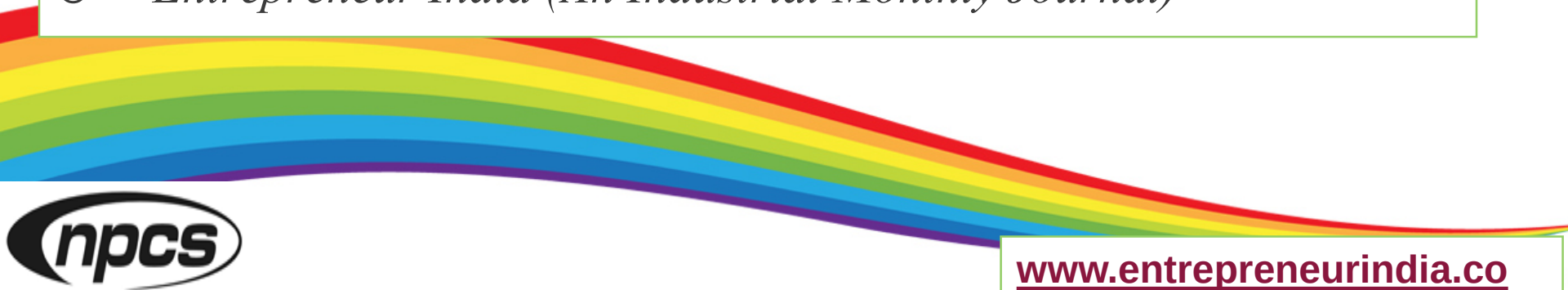


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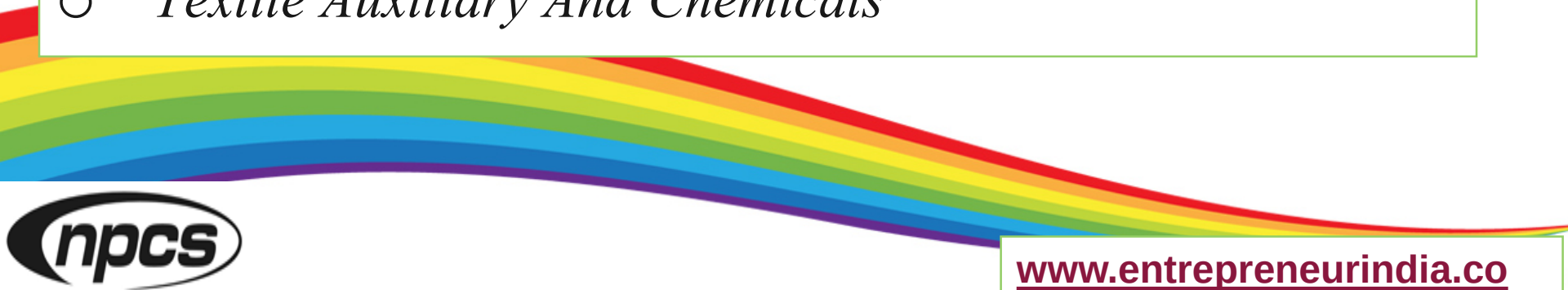
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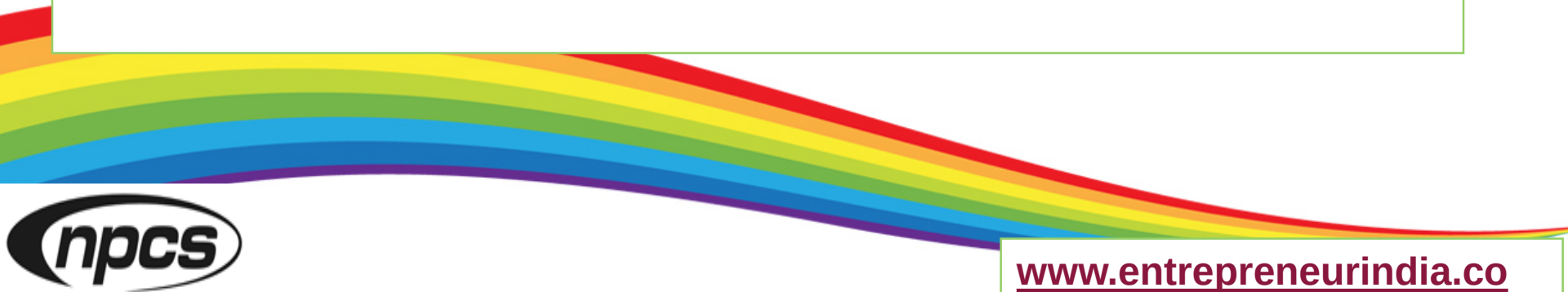
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