

# **Tall Oil Extraction, Refining and by-Products Processing and Utilization**

**Tall Oil Rosin Production, Pine Chemicals,  
Pine-Derived Chemicals**

***(Tall oil fatty acids (TOFA), Tall oil rosin  
(TOR), Sterols, Pitch)***

# Introduction

Tall oil, also known as 'tallol' or 'liquid resin', has three major components: resin acids, fatty acids and unsaponifiabiles (also known as "neutral compounds"). Tall oil is a mixture of mainly acidic compounds found, like turpentine, in pine trees and obtained as a by-product of the pulp and paper industry. It is used as a resin in many different industries, including mining, paper manufacture, paint manufacture and synthetic rubber manufacture.

Tall oil is one of the two commercially important by-products of the paper making process, the other being turpentine. It is produced by coniferous trees, and put to a wide variety of end uses. In the fuel crisis much research was done into the use of tall oil as an alternative fuel, and hormones were developed that made young trees produce 5 to 10 times their normal tall oil yield.

Tall oil, a by-product of kraft pulping of pine wood, is formed by acidifying black liquor soap skimmings. It consists of resin acids or rosin, fatty acids, and neutrals. Crude tall oil is an excellent source of rosin and tall oil fatty acid, an industrial-grade oleic and linoleic acid blend. The bulk of the neutrals, largely esters of fatty acids, sterols, resin and wax alcohols, and hydrocarbons, boil at either lower or higher temperatures than the boiling range of the fatty and resin acids.

Tall oil itself has a variety of uses in industry. It is used as a frothing agent in the flotation process for reclaiming low grade copper- lead- and zinc-bearing ores, and as a solvent or wetting agent in a variety of textile and synthetic fibre manufacturing processes. The distilled fatty acids are used in soaps, detergents and disinfectants and as a base for lubricating greases, textile oils, cutting oils and metal polishes. They are also used as drying agents in paint, although synthetic substances are widely used.

The fatty acids are unsaturated and on exposure to air undergo autoxidation and polymerization to form resin-like materials which form a tough protective coating. Resin acids are used in rubber polymerization and compounding, as size to impart water resistance to paper, and in adhesives and printing inks. Resin acids are the major component of a substance known as rosin, which is used by musicians to improve the grip of bows used for string instruments.



The book contains production details of different products like recovery of crude tall oil, Composition and properties of crude tall oil, Lab. Scale fractional vacuum distillation, tall oil soap acidulation, purification of sulphate soap, hydrodynamic separation of CTO, dimerization of tall oil fatty acid, black liquor soap recovery methods, tall oil in asphalt products and petroleum uses, tall oil in liquid soaps, tall oil in rubber, paper and printing inks etc. This book is very useful for scientists, scholars, consultants and technical institutions.

The pine-derived chemicals market, in terms of value, is projected to reach \$4.8 Billion by 2020, at a CAGR of around 4.7 % from 2015 to 2020. The gum rosin segment is projected to be the largest and the fastest-growing in the next five years owing to its high benefits and uses. Gum rosin finds application in adhesives, paints & coatings, ink, rubber, paper, and gum-based candy. The segment is projected to grow considerably at a CAGR of 5.5 % between 2015 and 2020.



The tall oil fatty acids segment accounted for the second-largest share in the global market in 2014 and is projected to follow the same trend for the next five years.

The pine-derived chemicals market is highly fragmented with the key market players driving the growth using strategies such as agreements, expansions, acquisitions, and new product launches to mark their presence. The market is competitive with leading players being involved in the research & development of new pine chemicals and their applications.

## Applications:

As a component of adhesives, rubbers, and inks, and as an emulsifier. The pitch is used as a binder in cement, an adhesive, and an emulsifier for asphalt. TOFA is a low-cost and vegetarian lifestyle-friendly alternative to tallow fatty acids for production of soaps and lubricants. When esterified with pentaerythritol, it is used as a compound of adhesives and oil-based varnishes. Tall oil is also used in oil drilling as a component of drilling fluids.

The market has been segmented in the following regions:

North America

Europe

Asia-Pacific

Latin America

Middle East

Africa

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## **TALL OIL IN PIGMENT DISPERSANTS**

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- *Organic Farming, Neem Products Etc.*

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- *Perfumes, Cosmetics And Flavours*
- *Power Generation Based Projects & Renewable Energy Based Projects*
- *Pharmaceuticals And Drugs*
- *Plantations, Farming And Cultivations*
- *Plastic Film, Plastic Waste And Plastic Compounds*
- *Plastic, PVC, PET, HDPE, LDPE Etc.*

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- *Real Estate, Leisure And Hospitality*
- *Rubber And Rubber Products*
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- *Stationary Products*
- *Spices And Snacks Food*
- *Steel & Steel Products*
- *Textile Auxiliary And Chemicals*



- *Township & Residential Complex*
- *Textiles And Readymade Garments*
- *Waste Management & Recycling*
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