

This report on **gum turpentine** is the tenth in a series of reports being produced by the IFEAT Socio-Economic Sub-Committee on the importance of specific naturals to the livelihoods of those involved in their production. This report, along with all the previous socio-economic reports, can be found on the IFEAT website, under the tab "Publications".

## AN OVERVIEW OF SOME IMPORTANT ESSENTIAL OILS AND OTHER NATURALS

# TURPENTINE

*Gum (not CST or Wood Turpentine)*

Turpentine is the volatile oil obtained from pine trees by three manufacturing processes which yield respectively gum turpentine, crude sulphate turpentine (CST) and wood turpentine. Turpentine obtained by distillation from the oleoresin collected via the tapping of living trees of the genus *Pinus* is known as gum turpentine. This distinguishes it from turpentine recovered as a by-product from chemical pulping of pinewood in the pulp and paper process, which is referred to as sulphate turpentine. Wood turpentine is extracted from aged pine stumps. Due to the characteristics of the production areas, we are going to focus on gum turpentine for this socio-economic impact study.

Gum turpentine is mainly used as a solvent for paints and in numerous household products including shoe polish and furniture care products. In folk medicine, it was used as a chest rub to treat colds and flu and is still used as an ingredient in contemporary pharmaceutical products of that kind today. This use is limited now due to the sensitising properties of peroxides which are easily formed when the product is stored in contact with air. The addition of antioxidants can solve the problem. Content of peroxides should not exceed 10 millimoles per litre, as advised by IFRA. It can be used against parasites, and has antiseptic and diuretic properties. It was the principal medicament used by the Magellan fleet on its pioneering journey from Europe to Asia in the sixteenth century. Certain components of gum turpentine (pinenes) are used in pharmaceutical applications for treatment of gallstones and kidney stones.

Gum turpentine is also a very important raw material for the synthesis of terpene-based aroma chemicals.

**Impact category:** High impact, many people involved.

**Relevant site location:** China.

The main production regions are located in the southern part of China. Traditionally the principal areas are located in the southern coastal provinces; ie Guangdong, Guangxi and Fujian. These areas are rich in *Pinus massoniana*. Next in importance with regard to gum turpentine production are Yunnan and Jiangxi Provinces, which have unique forests of *Pinus kesiya*, *Pinus yunnanensis* and *Pinus elliottii* respectively. These five provinces dominate the total production in China, although production is steadily increasing in several inland provinces, including Hunan, Hubei, Guizhou and Sichuan. There is currently a gradual shift of pine tapping from traditional crop regions towards less developed regions in the North. This trend is mainly driven by regional differences in wage rates.

### Farmed or foraged

Pine gum resin is collected by tapping living trees. The approximate annual yield of pine gum resin is 2-3 kg per tree. This accumulated pine gum resin is distilled to obtain two products; gum rosin (GR) and gum turpentine (GT) in an approximate ratio of five parts GR to one part GT.

### Harvest timing/cropping

Tapping may proceed all year round, although seasonal heavy rains may interrupt its collection (Coppen and Hone, 1995). The predominant tapping season is generally six months from around June to November in the southern coastal provinces, while in Yunnan Province it can be as long as nine months.

### Location of processing

Over 800 GR/GT distillation plants are spread over the production area (Zheng, 2012).

### Distinguishing characteristics

Pine gum tapping in China is still a labour-intensive industry. It is estimated that the labour needed (as a median of all farming areas in the world) for the production of three MT of pine gum resin is one person. Since 2000, the number of farmers involved in tapping has been greater than 250,000. Most activities are still done in the traditional way, which is hard work. In total there are around 400,000 people relying on the GR/GT industry for a living, including farmers, crude gum collectors, dealers and gum rosin processing operators (Zheng, 2012).

### Volumes

In 2015, the Chinese output of GT was approx. 100,000 metric tonnes of which less than 3,000 metric tonnes were exported. Regarding GR, the output was around 590,000 metric tonnes of which approximately 90,000 metric tonnes were exported. China's output was 70% of the total, followed by South America (14% and growing) and Indonesia (11%). Minor producing areas are found around the Mediterranean (5%) and Central America (5%).

It is interesting to note that due to the global economic slowdown, farmers have commenced pine resin collection again in countries where it was no longer considered to be economically feasible, as illustrated by Spain's increased tapping activities in recent years.

In 2016, the Chinese output of GT is estimated to be 90,000 metric tonnes and for GR, the estimated output will be between 500,000-550,000 metric tonnes.

The GT produced in China is one of the most important raw materials supporting the sustainable development of the aroma chemicals industry (Chen Doing Xia, 2007; Wimberley, 2008; Zheng, 2012).

Gum turpentine, like crude sulphate turpentine, provides mankind with alpha- and beta- pinenes, which are key raw materials for various industries including fragrance, flavours and resins. The chemical uniqueness of pinenes enables such industries to produce renewable perfumes, renewable flavours and renewable resins from pine trees, and create (at an affordable cost) consumer products that could not exist otherwise.

The amount of pinenes from both main types of turpentine (GT and CST) exceed 230,000 metric tonnes, therefore turpentine is one of our industry's highest contributors to socio-economic welfare.

Turpentine production in Brazil is estimated to be 21,000 MT/year. Indonesia also produces about 13,500 MT per year in a cultivated area of 87,000 ha, of which only 36% is tapped. Approx. 24,000 people are involved in the industry according to Perhutani, the state owned company.



A distillation plant



Tapping trees is a labour-intensive job



Bags are attached to trees for gum collection



Crude gum

## CONCLUSION

Gum turpentine is a key raw material for the aroma chemicals industry. In China, around 400,000 people rely on the GR/GT industry for a living, including farmers, crude gum collectors, dealers and gum rosin processors. A large number of people are also involved in production in other countries around the world including Brazil and Indonesia.

## REFERENCES:

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