

Peru Balsam: Getting to the Source, El Salvador^a

Pursuing sustainable sourcing for this crucial natural material.

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Peru balsam is a well-known, dark brown-colored, resinous, viscous, oleoresin exudate that possess a warm, rich, slightly spicy, sweet aroma and a bitter taste. Isolates of Peru balsam are readily used in perfumery and flavoring in order to deliver long-lasting, balsamic, sweet, rich, almost oriental notes.² It can be found in great classic perfume creations such as *Vol de Nuit* from Guerlain and *Youth Dew* from Estée Lauder.

Because El Salvador is the only country in the world in which large tracts of resin-producing Peru balsam trees exist, the raw material is limited and needs to be protected. Within this article the author will review where the material grows, how it is harvested, and how it is used in perfumery and flavoring, in addition to ways in which its sourcing could be made sustainable.

Limited Geography

Peru balsam comes from El Salvador, a small tropical country in Central America. The material's name is a reference to its historic transport route during colonial times. Everything originating from Central America had to stop first in the port of Callao in Peru and would therefore arrive in Europe with the stamp of the viceroyalty of Peru.

Peru balsam trees [*Myroxylon balsamum* (L.) Harms var. *pereirae* (Royle) Harms, syn. *Myroxylon pereirae* Koltzsch, a member of the Fabaceae family] are endemic to El Salvador, which is the only country in the world to have forests of this species (pictured). These forests exist in a mountain range in El Salvador called “Cordillera del Balsamo” (F-1). No other region in El Salvador has large, nearly monocultural tracts of this tree growing, which supports the unique concerted production of Peru balsam.

Creating Value in Local Peru Balsam Production

The Peru balsam tree grows to 30–40 m in height, possessing a wide, spreading crown and a trunk of up to 1 m diameter at breast height.^{3b} The tree can live for more than 100 years and does not start producing sufficient oleoresin exudate to warrant collection for more than 20 years.

^aAndrea Francés presented a separate text on this subject as part of the 2013 meeting of the International Federation of Essential Oils and Aroma Trades in San Francisco.¹

^bwww.osmoz.com/encyclopedia/raw-materials/balsamic/73/peru-balsam-myroxolon-pereirae

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El Salvador is the smallest and most densely populated country in Central America, and so land is scarce and very valuable. Starting or replanting Peru balsam plantations is not very attractive because of the large amount of time needed for the trees to become an economically viable source of the exudate. While the current population of trees is enough to meet the existing demand, it is necessary to give them an added value in order to ensure their subsistence in time.

For the survival of this species in its natural forests, it is important for Peru balsam to provide a higher financial return to the *balsameros*, the rural workers who manage and the forests and collect the exudate. To generate more money per acre and, thus, a more equitable return, a higher local value for Peru balsam is needed.^{4-6,c} To date, Peru balsam has never been

^cwww.cbd.int/abs/doc/protocol/nagoya-protocol-en.pdf

F-1. The shaded area of the map shows the location of the Peru balsam forests located in the Cordillera del Balsamo in El Salvador





A Peru balsam forest in El Salvador.

transformed within its country of origin into a usable ingredient for the F&F industry; it has always been exported raw.

Extraction from the Tree

The balsamero will first climb the Peru balsam tree in order to burn a piece of the exterior bark (pictured). When the balsamero returns to the same tree one month later, the bark that was subjected to the burn will have detached from the tree. The balsamero will remove the section of bark, which typically measures about 36 in x 6 in.

The exposed area is then covered with a piece of dry cloth. As the tree's wound exudes the oleoresin in response to the removal of the bark, it is absorbed by the cloth. About 1.5 months later, the cloth is recovered and the oleoresin is extracted from it by boiling it in water for many hours. Next, it is passed through a rustic wooden press to isolate the Peru balsam. The bark that was previously removed also has a high oleoresin content. Consequently, it is subjected to a similar isolation process.^d

The resulting product of this process is the Peru balsam crude resin. This is the raw material that has always been exported from El Salvador without any further treatment.

The fact that Peru balsam is exploited does not put the tree or the forests in danger because the tree is never cut down and the balsam, which is an exudate of the tree, does not cause the tree irreparable damage. Special attention is paid by the

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balsameros to ensure that overexploitation of any individual tree does not take place. In particular, the balsam is isolated at different heights of the tree each year.

Peru balsam is mainly produced during the summer months, when it does not rain in El Salvador. The preparation of the trees commences during the last weeks of November, depending on the climatic conditions during the previous winter. The summer crop will continue for the following six months, until May.

Not only is there a lower yield of exudate during the winter months, the wet weather makes it more dangerous for the balsameros to work at heights in the wet trees. As a result, there is less production of Peru balsam during that time. This break in production is used by the balsameros to cultivate food crops, as theirs is a subsistence agricultural system.

Processing

In its natural crude state, Peru balsam is a very viscous, semi-solid oleoresin exudate of a dark brown color, which has the capacity to absorb up to 20% of its weight in water. A traditional press is used to extract Peru balsam from the recovered tissues (pictured).

The balsam contains 25–30% of resin and 70–75% volatile compounds. Two market products that are made from Peru balsam are a rectified essential oil and a resinoid (an alcoholic extract from the balsam). In fact, a classical essential oil from hydrodistillation cannot be obtained since the Peru balsam's volatiles don't form an azeotropic mixture. **T-1** shows the GC/FID analysis of the volatile compounds within a standard market essential oil and a standard market resinoid. The main components are esters and their corresponding acids in a lesser amount. Those functional groups are characteristics from a balsam product. Finally, minor compounds like nerolidol and



A balsamero climbing a Peru balsam tree.

T-1. Relative percentage of volatiles in a standard market Peru balsam resinoid

Component	Relative Percentage of Volatiles	
	Essential Oil	Resinoid
benzyl alcohol	0.41	1.11
<i>trans</i> -nerolidol	5.28	4.64
benzoic acid	2.04	3.22
vanillin	0.26	0.47
benzyl benzoate	59.67	49.68
cinnamic acid	3.57	11.69
<i>cis</i> -benzyl cinnamate	1.32	1.03
<i>trans</i> -benzyl cinnamate	26.23	23.39

^dView a video of this process at www.youtube.com/watch?v=ZeZkE3337CM.



A traditional press is used to extract Peru balsam from the recovered tissues.

vanillin exhibit strong olfactive impression. Even if the volatile composition of the two products is rather similar, the aspects are totally different. The resinoid is like the crude state, very viscous and dark brown. On the contrary, the rectified essential oil is yellow and liquid.

Simple analytical tests that do not require significant amounts of technology can be performed *in situ* in order to estimate the content of benzyl cinnamate and benzyl benzoate. This mixture of the two major components is locally called *cinnamein* and is considered an export standard by some buyers around the world. Peru balsam natural crude resin will have from 50–66% of cinnamein.

Uses in Perfumery and Flavoring

Peru balsam is a balsamic ingredient possessing particularly attractive, warm, soft characteristics with some smoky and sensual bottom notes.^e Its character is confirmed by a strong and sweet, balsamic, cinnamic presence that fades away into a subtle woody background, thereby making it particularly useful in oriental and chypre-type perfumes. Other nuances of Peru balsam, such as its floral tendencies, can be explored due to its nerolidol content, which it shares with jasmine, lavender and neroli.

In examining the different types of finished products of Peru balsam that can be used in the fragrance industry, one can find different subtleties.

“Depending on the extraction technique, olfactive notes are more or less revealed,” says perfumer Pierre Bénard. “The essential oil extracted from this balm will have more cinnamic and balsamic dominant characters. According to the protocols of distillation, their smell will be slightly leathery, slightly between animal and smoke. The resinoid from a solvent extraction will have base notes. Its caramel texture will therefore be more vanilla and gourmand molecules. These natural raw materials

fix flowers into lasting longer, particularly in ‘florientals’ like a gardenia, a tuberose, or an oriental rose like in *Nahéma* by Guerlain. Great scented tool for the construction of amber accords, commonly called ‘oriental.’”

This ingredient has also traditionally been used to boost foods in order to help in the flavoring and consistency of products. Its presence is particularly evident for the vanilla-type of flavorings. The resinoid, oil or absolute can frequently be found as components of flavor formulations used in chocolates, liquors and tobacco products. As a result, the food flavor sector is the most important sector for Peru balsam applications.

Peru Balsam as Active Ingredient

Peru balsam is sometimes used in cosmetic or pharmaceutical applications as an active ingredient for its reported biological properties, including:

- Anti-inflammatory
- Antibacterial
- Antiparasitic
- Antiseptic
- Expectorant
- Skin cell regeneration
- Tonic

Peru balsam has typically been used in formulations to heal wounds, burns and ulcers, as well as treat laryngitis, tuberculosis, abscesses, dysentery and other health issues. Within El Salvador, traditional medicine will frequently recommend using Peru balsam diluted within a cream in order to heal bruises and treat rashes on babies’ bottoms.

Restriction on Use

Peru balsam is a resin that cannot be used in its raw state in cosmetics. It can only be used when it has been transformed into products such as the resinoid, distillates and extracts. However, there is still a restriction on the use levels of these products within a formulation. Information in these guidelines is readily available on the websites of the International Fragrance Association and Flavor and Extract Manufacturers Association (www.ifra.org; www.femaflavor.org).



A grinder is used to crush the bark of the Peru balsam in order to extract it.

^e<http://boisdejasmin.com/2011/02/perfume-vocabulary-tolu-balsam-benzoin-styrax-and-other-oriental-balsamic-notes.html>

In alcoholic perfumery for example, Peru balsam products can only be present at a 0.4% weight in the final formula. This would mean that the amount of a 20% alcoholic solution of Peru balsam should not exceed 2%. For an alcoholic perfume, 2% of a natural raw material is already at a very significant level that has a noticeable influence on the final product.

Sourcing Issues

The resin production areas are characterized by low income and a lack of resources and services due to their location in rural areas. Many of the younger generation that used to live in the rural areas are moving into the cities in order to search for better opportunities. It is calculated that, when taking into account all of the balsameros, there are only about 1,000 men in the field climbing the trees and collecting and isolating the balsam. For these families, the income they obtain through the sale of this resin is their main cash income, while they use subsistence agriculture in order to obtain their food throughout the year.

Historical Volumes and Prices

The official export data, according to the Salvadoran government, show that there have been important variations in prices and demand for Peru balsam throughout the years (T-2).⁴⁻⁷ High interest rates, combined with a high risk of investment reflected by this volatile demand and prices, has led many exporting companies into bankruptcy. As a result, exports have fluctuated slightly over the years due to a gradual decrease in production.

Supply Chain Management

Projects supporting high quality products transformed locally in El Salvador help in the retention of an added value within the country, hence making it easier to share the revenue

equitably between the interested parties and making the product more sustainable. Benefit-sharing conditions produce a win/win situation for everyone involved, and are the perfect opportunity to construct sustainable developments. By acquiring Peru balsam essential oils, resinoids and extracts developed through such initiatives aimed at transforming the crude resin within its country of origin, the formulator realizes the following benefits:

- **Sustainability:** There is a reduced cost of logistics and commerce if the final price is kept, and El Salvador retains more of the added value and local balsameros can be equitably paid.
- **Traceability:** Fewer hands have touched the product before it reaches the final formula, therefore making its trajectory of trade easier to trace.
- **Quality:** Decreases the risk of denaturing due to a simplified supply chain. The formulator has a higher assurance that the product is 100% natural.

Conclusion

Peru balsam is a highly geographically limited raw material coming from a tree growing in a single region of a single country. It is an exceptional ingredient within perfumery and flavor accords and needs to be protected to insure its use in perpetuity. In order for this to happen, projects allowing for a higher margin to be retained within the region need to be supported. It is important to absorb globalization with a respectful attitude toward what each entity is contributing. In order to do this, a harmony between the countries using a resource and the countries that produce it need to be reached.

A project is currently being installed in the region, affording local producers access to technology to transform Peru balsam into a finished ingredient at the source. By working collectively, a high-quality natural product can be produced in El Salvador, hence mastering the supply chain from the mountains of the Cordillera del Bálsamo to the *mouillette* in the perfumer's organ.

T-2. Official exports and average "free on board" (FOB) export prices for Peru balsam

Year	Tons exported	U.S.\$/kg (Brought to March 2013)
1994	143	15.62
1995	121	19.26
1996	89	22.88
1997	381	9.00
1998	133	18.88
1999	80	18.54
2000	69	15.59
2001	107	12.43
2002	69	13.35
2003	70	11.99
2004	71	13.91
2005	76	22.25
2006	95	28.17
2007	72	25.29
2008	85	18.39
2009	35	14.84
2010	67	14.42
2011	74	25.50
2012	105	27.17

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