

## Amber Notes in Perfumery

# Amber Perfumes, Compounds and Specialties

By Danute Pajaujis Anonis, Consulting Chemist Perfumer, Rego Park, New York

In two previous articles on amber notes in perfumery, we have discussed amber odors of animal origin,<sup>1</sup> namely ambergris, and amber odors of vegetable origin, the main ones being labdanum and cistus.<sup>2</sup>

This article will discuss the development and applications of amber perfumes, synthetic amber compounds and specialties.

It can be said in general that every good perfume composition should include amber in at least a trace amount; or more, depending on the perfume type.

Ambergris was used as a base in perfumes in the early stage of perfumery, but played a more important role as a background note and a fixative in fragrances.

Later, when the demand for ambergris exceeded the supply, synthetic amber compounds were developed. Finally, research on natural fixatives identified new ambergris components. They were close in odor to natural ambergris, and they played a role in the development of amber specialties.

### Amber Perfumes

Early amber perfumes were based on natural ambergris infusions and flower pomade extracts, including flower absolutes. When aroma chemicals became available, alcohols and aldehydes were used to enhance the top note of the perfume extract. The following formula may serve as an example.

#### Amber Perfume HF<sup>3</sup>

ambergris infusion	100	cm <sup>3</sup>
musk Tonquin infusion	20	"
civet infusion	25	"
vanilla infusion	20	"
ambrette seed infusion	10	"
ambreine synthetic 5% solution	25	"
rose pomade extract No. 72	500	"
jasmin pomade extract No. 36	100	"
tuberose pomade extract No. 36	200	"
rose absolute	10	"
jasmin absolute	4	"
tuberose absolute	6	"
rose otto	15	"
alcohol C-9	2	g
aldehyde C-9	25	drops
aldehyde C-8	10	"

Extract No. 72 contains approximately 25 grams of the absolute. Extract No. 36 contains approximately 12.5 grams of the absolute.

Here is a later formula, from a time when flower pomade extracts were no longer used.

#### Amber Extract<sup>4</sup>

ambergris infusion	200
musk tonquin infusion	50
ambrette seed 5% in alcohol	50
vanilla Bourbon 10% in alcohol	50
rose otto	5
clary sage terpeneless	2
orris absolute	0.5
aldehyde C-9 10%	0.5
alcohol C-9	1
rose absolute	5
jasmin absolute	3
tuberose absolute partially decolorized	2
alcohol 90%	qs 1

The following amber perfume example uses labdanum.

#### Extract No. 277<sup>5</sup> (Ambre antique Coty type)

jasmin liquid S.A.	250
extrodor labdanum	150
rose liquid S.A.	100
methylionone	90
orris concrete	80
ambrette seed	90
bergamot	60
benzoin resinoid	50
vanilla resinoid	50
sandalwood E.I.	40
vetiver Bourbon	35
opoponax resinoid	25
tonka resinoid	10
	1,030
ambergris infusion	300
alcohol 94/96%	8,700
	10,030

As more aroma chemicals became available, they were used in amber perfumes. The following illustrates this.

**Table I. Perfume materials used in amber compounds**

For the top note	For the floral note	Other fixatives and contributors to the balsamic note	Trace components
alcohol C-8	citronellol		angelica root
alcohol C-9	nerol		ambrette seed
aldehyde C-9	phenyl ethyl alcohol	amyl benzoate	cardamom
aldehyde C-10	rhodinol	amyl cinnamate	celery
aldehyde C-11 (enic)	rose otto	benzoin resinoid	clary sage terpeneless
bergamot	cyclamen aldehyde	coumarin	hyssop
linalyl acetate	jasmin absolute	dimethyl hydroquinone	nutmeg
	jasmin synthetic	ethyl vanillin	tuberose (partially decolorized)
<b>For nuances</b>	neroli Bigarade	heliotropin	
eugenol	hydroxycitronellal	isobutyl cinnamate	
farnesol		oakmoss resinoid	
geranium	<b>For woody notes</b>	olibanum absolute	
methyl naphthyl ketone	cedarwood	olibanum resinoid	
$\gamma$ -methylionone	sandalwood	opoponax resinoid	
orris	patchouli	Peru balsam	
irone	patchoulol	tolu balsam	
	vetiver	vanilla resinoid	
	vetiverol	methyl cinnamate	
	<b>Animal fixatives</b>	musk ambrette	
	castoreum resinoid	musk ketone	
	civet synthetic	vanillin	

#### Amber 34<sup>6</sup>

rhodinol	150
bergamot	100
benzoin resinoid	80
farnesol	75
cinnamic alcohol	75
heliotropin	75
clary sage	75
methylionone delta	55
vetiver	65
sandalwood E.I.	45
labdanum resinoid	40
olibanum resinoid	30
ethyl vanillin	30
musk ambrette	20
jasmin absolute	15
rose absolute	10
rose otto	10
vanillin	10
musk ketone	10
	<hr/> 970

### Amber Compounds

Various amber compounds were developed. They were used as soap perfumes. They also served as background notes in lotion, cream and powder fragrances.

Labdanum forms the base of amber compounds.

Among earlier aromatics considered as having an amber odor tonality are aldehyde C-12 (MNA) and isobutylquinoline.

Other perfume materials used in amber compounds are listed in Table I.

A number of newer aroma chemicals of an amber odor tonality, obtained either from natural sources or derived from various chemicals, were developed. These were dis-

cussed in a previous article.<sup>1</sup> We may add trimethylacetyl octalines,<sup>7</sup> mixtures of which have a warm amber-tobacco odor of very good tenacity. Their advantage is odor stability and they are inexpensive to produce.

Here are two examples of synthetic amber compounds.

#### Amber No. 5

labdanum resinoid 50%	150
vetiver	50
citronellol	50
rose synthetic	15
vanillin	30
patchouli	5
solvent	<hr/> 200
	500

#### Amber No. 6

musk xylol	150
labdanum resinoid	125
vanillin	125
musk ketone	100
benzoin resinoid	40
tolu balsam	35
olibanum resinoid	25
oakmoss resinoid	15
rose synthetic	10
jasmin synthetic	8
civet synthetic	7
patchouli	5
clary sage	5
	<hr/> 650

The following is a conventional formula for amber soap perfume.

**Amber for soap No. 11**

heliotropin	175
labdanum resinoid	150
geraniol for soap	150
ionone	100
linalyl acetate	75
geranium	50
oakmoss resinoid	25
sandalwood E.I.	50
benzoin resinoid	50
tolu balsam	50
musk ambrette	50
vetiver	25
	<hr/>
	950

Here is a simple conventional amber perfume formula for soap.

**Amber No. 620<sup>8</sup>**

labdanum resinoid	300
vanillin	300
benzoin resinoid	200
tolu balsam	100
musk ambrette	50
methyl cinnamate	50
	<hr/>
	1,000

Amber was also used as a perfume for tobacco, as the following formula illustrates.

**Amber No. 12**

coumarin	60.0
labdanum absolute	40.0
tolu balsam	40.0
phenyl acetic acid	30.0
bergamot	20.0
phenyl ethyl acetate	20.0
methylionone	20.0
dimethyl hydroquinone	16.0
cistus absolute	8.0
rose synthetic	4.0
aldehyde C-14 (undecalactone) 1%	1.6
ethyl vanillin	0.4
solvent	<hr/>
	140.0
	<hr/>
	400.0

**Ambergris Substitutes and Specialties**

In earlier ambergris substitutes, labdanum and cistus played an important role. Infusions of labdanum at 20% concentration in alcohol 95% have been prepared. Synthetic amber prepared from gum labdanum, called Ambreine, was used in 5% solution in alcohol 95%. Other specialties, named Ambrene, Ambrarome, Grisambrene, to name a few, were usually used in 3-5% solutions in alcohol. Some synthetic ambers were solid. They contained stearic acid or cetyl alcohol.

Cerbelaud lists the following perfume materials for use as the base for reconstructing the ambergris odor:<sup>9</sup>

labdanum absolute or labdanum fractions  
 (in which the acrid and resinous odors of the  
 head fraction have been removed)  
 civet absolute  
 castoreum absolute  
 cypress oil ketones  
 decahydro naphthylformaldehyde  
 tetrahydro naphthylacetaldehyde  
 diisopropyl benzaldehyde  
 diisopropyl ethylglycidate  
 dibromobutyl metacresylmethylether  
 amyl cinnamate

Some ambergris substitutes were built on an olibanum and cistus base to which hydroxycitronellal and a small amount of eugenol were added. For the sweet, balsamic note, Peru balsam, benzoin resinoid and vanillin or ethyl vanillin were used.

Later, basic research on ambergris revealed new components of natural ambergris. They rendered truer natural ambergris notes, and were used in amber specialties.

Among the first specialties of this kind were Grisambrol by Firmenich, based on  $\alpha$ -Ambrinol (2-hydroxy-2,5,5-trimethyl octaline), and Fixateur 404 (Firmenich), in which Ambrox (dodecahydrotrimethyl naphtho furan) was used.

In the 1980s, Ambrinol and Ambrox became available per se. Other perfume houses began to produce Ambrox, using various processes. It became known under various trade names, such as Ambroxan (Henkel), Amberiff (IFF),

Amberlyn (Quest), to cite a few. Today, isomer mixtures of this furan derivative provide less expensive amber notes. This was discussed in greater detail in the first article on amber notes<sup>1</sup> (in which, inadvertently, the ending of the chemical name for Ambrinol was misprinted as "octanile").

### Dermatological Considerations

According to IFRA's Code of Practice, several components of traditional amber compounds cause sensitization or are phototoxic. Some of these components therefore have to be of high purity or specially processed. Others are to be used in limited percentage or are to be entirely eliminated. Among such perfume materials are the following:

- **Angelica root**—limited to 3.9% in any compound used in products applied to skin exposed to sun.
- **Bergamot**—limited to 0.4% in products used on skin exposed to sunshine. For the expressed oil with terpenes partially or totally removed, the limit depends on the concentration of terpenes.
- **Farnesol**—minimum 96% of farnesol isomers.
- **Hydroxycitronellal**—limited to 5% in fragrance compounds.
- **Cinnamic alcohol**—limited to 8% in consumer products.
- **Musk ambrette**—should not be used as fragrance component (as per 28th Amendment).
- **Oakmoss**—limited to 0.6% in consumer products.
- **Opoponax**—extracts and distillates only, limited to 0.6% in consumer products.
- **Peru balsam**—extracts and distillates only, limited to 0.4% in consumer products.

### Application

In the past, natural ambergris was used. Today, new ambergris derivatives and specialties are used in modern fragrances.

Natural ambergris is compatible with musk and civet odors, to which it contributes sweetness. Ambergris also refreshes and underlines rose odors. The same can be said of the new ambergris replacements.

While ambergris infusions were suitable for powder and hair lotion perfumes, they were of no value in soap. Labdanum or cistus resinoids or synthetic amber compounds were used in soap perfumes. Of the earlier types, *Amber*, *Chypre*, *Emeraude*, *Origan*, *Fleurs de Tabac* and *Chanel No. 5* may be mentioned. Among single flower soap perfumes are hyacinth, jasmin, lilac, and rose, to single out a few. Amber also blends well with patchouli, lavender and pine notes. Today's soap perfumes have more complex bouquets and contain fewer natural perfume materials than past soap fragrances.

Earlier jasmin-rose perfumes were based on soft amber backgrounds. Later, *Chypre* and *Origan* perfume types were underlined with amber notes. Amber is also used in

fougère, tobacco, *Cuir de Russie*, *Peau d'Espagne*,\* oriental and woody (light amber note) perfumes, as well as in many other fantasy bouquets.

Amber compounds and specialties also find application in fragrances with pronounced green notes, such as *Ma Griffe*, *Gardenia* and more modern green-type fragrances.

Some examples of older and more recent women's fragrances containing amber are: *Quelques Fleurs*, *Shalimar*, *Nuit de Noël*, *Cabochard*, *Silences*, *K de Krizia*, *J'ai Osé*, *Fleurs de Fleurs*, *Jardanel*, *Fidgi*, *Audace*, *Magie Noir*, *Jazz*, *Azzaro*, *Nocturnes*, *Calèche*, *Cristalle*, *Obsession*, *Balestra*, *Trésor*, *Poison* and *Samsara*.

Of the men's fragrances, *Gray Flannel*, *Halston 101*, *Halston Limited*, *Gentleman*, *Hero*, *Oleg Cassini* and *Versus* may be mentioned.

In the simpler age of men's fragrances, when clean odors were preferred, amber combined with lavender, bergamot and clary sage provided a base for shaving cream fragrances.

\*Originally leather was imbued with civet, woody and amber odors. This led to the names *Cuir de Russie* and *Peau d'Espagne* via *cuir* and *peau*, two French words for "leather."

Amber perfumes per se have lost their appeal in our time, but the amber note is indispensable in women's fragrances and in many men's fragrances. Amber remains both a valuable background note and a fixative in perfumery.

#### References

Address correspondence to Danute Pajaujis Anonis, 98-41 64th Road, #6F, Rego Park, NY 11374 USA.

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