Broom (Genêt) in Perfumery

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The English name "Broom" is literally derived from a broom being made from the plant's twigs. There are several shrubs of the genus Genista (hence, the French name "Genêt" and "Ginster" in German). Of several species of Spartium (fam. leguminosae), known as broom, *Spartium junceum* L. is used in perfumery. It grows wild in the Mediterranean countries. According to Guenther,[1] the yellow-golden flowers possess an odor "reminiscent of orange blossoms and grape." Another source describes the genêt flower odor as "dusty-sweet, somewhat leathery and neroli-like."[2]

Mode of Production, Type of Oil, Yield

Natural broom flower oil is produced in the Grasse region of Southern France and Italy. In the past, enfleurage (cold fat) was the method used for obtaining the flower oil. Alcohol extraction produced infusions or extracts, which were numbered according to the concentration of the flower oil they contained. A more modern method is the extraction with volatile solvents, resulting in broom concrete, and on treatment with alcohol, in broom absolute. The absolute can be further treated to obtain a decolorized absolute.

About 1,200 kg of flowers are required to yield 1 kg of concrete which gives 0.30 to 0.35 kg of alcohol-soluble absolute. The absolute is viscous oil of a dark-brown color.[3]

Yields of the concrete ranging from 0.09 to 1.18 percent were reported by another source. The dark-brown solid waxy concrete gave 30 to 40 percent of absolute.[4] A steam distilled concrete yielded 2 percent of a volatile oil which is only used in analysis and research.[5]

Chemical Composition

An examination of the steam distilled oil from genêt concrete disclosed the following:[6]

Free acids (chiefly caprylic)
Phenols with a leathery and peppery odor
Aldehydes (chiefly aliphatic)
Terpenes with a pinene-like odor
Esters of formic, acetic and higher aliphatic acids and their alcohols which possess a green odor.

Practically nothing more was known about the chemical composition of broom (genêt) until 1980, when the results of a research work on broom were reported by Japanese researchers.[7]

A large percentage of free acids, including capric, caproic, caprylic, lauric, myristic, stearic, oleic, linoleic, linolenic and palmitic (the last two predominating), and their ethyl or methyl esters (chiefly ethyl palmitate and methyl linoleate) were found.

Among aromatics amounting over 0.5 percent were:

linalool	10.91%	methyl anthranilate	0.87
linalyl acetate	3.42	geraniol	0.64
1-octen-3-ol	3.27	limonene	0.56
phenyl ethyl alcohol	1.30	phytol	0.55
β-farnesene	1.73	α-farnesene	0.55
α-terpineol	0.97		

Among minor components were:

benzyl cyanide	0.23%	pentanal diacetal	0.05
trans-2-octen-1-ol	0.23	ethyl acetate	0.14
neryl acetate	0.17	ethyl formate	0.05
nerolidol	0.12	hexyl butyrate	0.03
dimethyl anthranilate	0.11	phenyl ethyl-2-methyl butyrate	0.02
cis-3-hexenyl nonanoate	0.09	hexanal	0.02
cis-3-hexenyl butyrate	0.07	nonanal	0.05
cis-3-hexenol	0.05	nonadecane	0.05
ethyl phenyl acetate	0.06	2-pentadecanone	0.25
phenyl ethyl butyrate	0.06	2-tridecanone	0.08
linalool oxide I	0.10	6-methyl-5-hepten-2-one	0.02
linalool oxide II	0.07	p-cymene	0.07
nerol	0.07	α-terpinene	0.05
tridecan-2-ol	0.08	myrcene	0.06
pentanol	0.05	caryophyllene	0.01
hexanol	0.04	tricosane	0.05
β-terpineol	0.07	ethyl pentadecanoate	0.07
lavandulol	0.03	ethyl hexanoate	0.02
eugenol	0.06		

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Table I. Restricted Genêt Components

	eliminated	pure or specially processed	limited percentage	used with quenchers
bergamot		*	2%+	
cinnamic alcohol			4%	
citral				*
musk ambrette			4%+	
lemon		*	10%+	
oakmoss			3%	
phenyl acetic acid	*			
ionones		2% of pseudo-ionones		
methyl ionones		2% of pseudo-methyl ionone		
styrax		*		

+for application on areas of skin exposed to sun

The presence of β-terpineol and of pentanal diacetal were considered as additives, or the latter could be an artifact formed during the alcohol treatment of the concrete.

Synthetic Compounds

Cerbelaud classifies genêt in the tuberose-narcissus group, and describes the odor of genêt absolute as "warm, harsh, very lasting, but a little too green, and therefore requiring the addition of sweeteners.[8]

Traditional synthetic genêt compounds were based on large amounts of linalool, rose alcohols and petitgrain combined sometimes with methyl naphthyl ketone or Aurantiol. Some compounds also contained terpineol and geranium.

Bergamot and linalyl acetate served as top notes. Verbena, citral and lemon were additional citrus notes.

Anisic aldehyde, benzyl acetate, p-methyl acetophenone, methyl anthranilate, ionone or methyl ionone, methyl phenyl carbinyl

Formula 1. Base No. 84[9]

	Parts
Linalool	180
Petitgrain	135
Linalyl acetate	85
Terpineol	72
Rhodinol	95
Lemon Messina	66
Geranium African	58
Phenyl ethyl alcohol	67
Phenyl ethyl acetate	30
Elecampane oil (Inula viscosa)	75
p-cresyl butyrate	10
Aurantiol (Givaudan)	40
Isobutyl salicylate	64
Musk ketone	20
Civet synthetic	3
	1000

Formula 2. Base No. 85[10]

	Parts
Genêt absolute	250
Linalool	200
Petitgrain	200
Linalyl acetate	80
Rose synthetic	175
Verbena French	45
Ethyl benzoate	10
Cinnamyl formate	20
Civet synthetic	3
	1000

Formula 3. Extract No. 86[11]

	Parts
Base No. 85	702
Rose absolute	35
Fleurs d'oranger absolute	40
Jasmin synthetic	65
Methyl ionone	70
Ylang	25
Vetiver Java	23
Resinoid opoponax	8
Musk ketone	20
Ambrette seed oil	12
	1000
Civet infustion 3%	250
Alcohol 94-96%	8750
	10000

Formula 4. Genêt 1[12]

	Parts
para-Cresyl methyl ether	20
Geranium African	150
Petitgrain	200
Jasmin absolute	10
Linalool	200
Bergamot	200
Genêt absolute	50
Phenyl ethyl acetate	10
Resinoid oakmoss	30
Resinoid benzoin	40
Civet infusion 3%	50
Rose absolute	10
Verbena oil	20
	1000

Formula 5. Genêt 2[13]

	Parts
para-Cresyl methyl ether	20
Geranium African	80
Petitgrain	100
Jasmin absolute	20
Linalool	150
Bergamot	100
Genêt absolute	100
Neroli oil	50
Ylang	10
Phenyl ethyl acetate	10
Resinoid benzoin	50
Civet infusion 3%	30
Rose absolute	50
Lemon oil	20
Cinnamic alcohol	90
Terpineol	50
Benzyl alcohol	70
	1000

Formula 6. Genêt (Ginster) No. 522[14]

	Parts
Jasmin synthetic	350
Orange flower synthetic	250
Orris liquid	150
Petitgrain	80
Dimethyl hydroquinone	40
p-Methoxy acetophenone	30
Geranium synthetic	10
Resinoid styrax	60
Musk ketone	30
	1000

acetate, methyl salicylate were used for the bouquet. p-Cresyl methyl ether with an additional of cinnamic alcohol, p-cresyl phenyl acetate and -butyrate were used as background notes.

Coumarin, heliotropin, musk ambrette, musk ketone, phenyl acetic acid, phenyl ethyl acetate and vanillin were added as sweeteners.

Among naturals, jasmin, jonquil, orange flower and rose absolutes, ambrette seed and neroli oils were used. Five to fifteen percent of genêt absolute was added to enrich the odor of more expensive compounds.

Resinoids benzoin, labdanum, oakmoss, styrax and tolu, orris concrete, vetiver, natural civet infusions 3% or synthetic civet and amyl- and isobutyl salicylates served as fixatives.

Some conventional illustrative genêt formulas are given here as examples (Formulas 1-3). Formula 1 is recommended as suitable in lotions. Formula 2 is an example of a more expensive base built on genêt absolute, which is used in the extract, exemplified in Formula 3. Few more variations of genêt formulas are given in Formulas 4 and 5, and a formula for soap is given in Formula 6. The soap is recommended to be colored yellow.

The following aromatics, identified recently as minor components in genêt absolute, may be applied in modernizing genêt compounds:

cis-3-hexenol
cis-3-hexenyl butyrate
cis-3-hexenyl nonanoate
hexanol
linalool oxides
phenyl ethyl-2-methyl butyrate
2-pentadecanone
trans-2-octen-1-ol

Among older aromatics are:

caryophyllene
p-cymene
eugenol
myrcene
nonanal
phenyl ethyl butyrate
phytol

The perfume materials described in Table I have to be eliminated or adjusted because of dermatological consideration. Presently, verbina oil has been eliminated.

Application

Genêt absolute imparts a special cachet to heavier fragrances, among them oriental types, and it can find application in today's semi-oriental fragrances. Genêt blends especially well with orange flower absolute. In fact, genêt absolute has been occasionally used as an adulterant of orange flower absolute.

Genêt absolute is useful in linden blossom compounds (up to 1%).

Genêt absolute has also been used in lipstick, brilliantine, hair oil, powder, and in smaller amounts, in cream perfumes.

Genêt compounds have found application in lotions, creams and soaps.

Natural genêt flower oil and synthetic genêt compounds have been used to a greater extent in perfumery until the middle of this century. Both genêt absolute and concrete of French and Italian origin are commercially available, and they remain valuable perfumer materials.

References

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