

Perfume Formulation

THE ROSE GROUP

BY J. R. ELLIOTT PERFUME & FLAVOR CONSULTANT



Most people think of a rose as "a rose," without realizing that literally thousands of rose hybrids have been developed, each with its own special shape, color and particularly fragrance.

A fundamental scent is apparent in all rose blossoms, but there are more variations on this scent among the various species than in any other flower. The rose plus the odor inflections of lemon, raspberry, strawberry, jasmin, carnation, cinnamon, lavender, musk, tuberose, and soon, as well as their cross combinations, produces variations extending almost ad infinitum.

The world famous rose garden of the Jackson-Perkins Company, Newark, New York, with its acres of display roses of every conceivable kind, is a veritable hunting preserve for the perfumer in search of rose fragrances, especially during the June peak of the rose-blooming season.

The rose fragrance, the "sugar" of perfumery, is of immense importance to the perfumer because of its ability to introduce a sweet, flowery effect.

Rose compositions are the most extensively used group in perfumery for three reasons: analytically, because there is better knowledge of the chemical constitution of the rose fragrance than for any other flower; practically, because the rose group has the best assortment of synthetic materials available for the accurate reproduction of the rose fragrance; economically, because enough materials exist to allow the creation of a rose odor with a fair degree of fidelity, even in the low-priced range.

ROSE

The rose group is peculiarly fortunate in the availability of synthetic chemicals for the production of the rose fragrance. Rhodinol, citronellol and geraniol, and their esters, have been identified as prominent components of natural rose isolates. These three rose alcohols are readily obtainable from essential oils of non-rose origin. Phenylethyl alcohol is easily synthesized at a low cost. Esters of these products are, of course, conveniently made.

Synthetic research has developed other materials of considerable interest which have never been identified in natural rose products. Dimethyl octanol (made by hydrogenating geraniol or citronellol) and its esters have an excellent note of rose otto. Citronellyl oxyacetaldehyde (which has both an ether



and an aldehyde grouping) possesses a strikingly pungent rosaceous note very useful for "livening up" rose compositions. Hydratropyl alcohol (a substituted phenylethyl alcohol) provides a deep rose petal note actually much more attractive than phenylethyl alcohol in special rose effects. Research in the field of long, branched-chain alcohols and ketones is showing promise in the discovery of new rose-like odors that may eventually displace the conventional rose alcohols.

It is interesting to note that rose-like odors can be derived from such unusual and unrelated materials as benzophenone, tri chloromethyl phenyl carbinyl acetate, and phenyl dimethyl carbinol. Even the simple halide, chloroform, when diluted resembles the rose.

Chemically, it is interesting to compare the odor nuances produced by varying degrees of unsaturation in the three similarly odored rose alcohols, geraniol, citronellol and dimethyl octanol, which are structurally identically except in their degree of unsaturation. Dimethyl octanol, a branched-chain alcohol isomeric with normal decyl alcohol, is sweet and inclined towards the rose otto. The normal decyl alcohol (the perfumer's alcohol C-10) has an intense orange-like note entirely different from the branched-chain dimethyl octanol. This branched chain structure is associated with the rose odor when applied to aliphatic alcohols other than decyl.

Following are the principal rose components:

Basics. Rhodinol, citronellol, geraniol, dimethyl octanol, hydratropyl alcohol, phenylethyl alcohol, phenyl dimethyl carbinol, terpeneless oil of geranium (French, Algerian, or Bourbon).

Blenders. Oil of palmarosa, cinnamic alcohol, terpineol, guaiac wood resin, guaiac wood acetate, oil of lemon, oil of bergamot, oil of bitter orange, linalool, phenylethyl dimethyl carbinol, tolyl alcohol, phenylpropyl alcohol, phenylbutyl alcohol, isobutyl phenylacetate, hydratropyl dimethyl octyl ether, citronellyl methyl ether, nerol, methyl phenylacetate, ethyl phenylacetate.

Adjuvants. Rhodinyll, citronellyl, geranyl, neryl, dimethyl octanyl acetates, propionates, butyrates and formates, hydroxycitronellal, "Cumin" ketone, al-

pha ionone, methyl ionone, methyl cinnamate, ethyl cinnamate, terpineol, phenylacetaldehyde, paramethyl hydratropic aldehyde, ylang absolute, ylang extra Bourbon, orris concrete, eugenol, isoeugenol, aldehydes C-9, C-11, C-12 MNA, citronellyl oxyacetate, benzyl acetate, benzyl propionate, "Veronol" aldehyde, aldehyde C-14 (peach), phenylacetic acid.

Fixatives. Phenylethyl phenylacetate, phenylethyl salicylate, phenylethyl cinnamate, phenylethyl benzoate, the hydratropyl analogues of any of the foregoing phenylethyl esters, cinnamyl cinnamate, benzyl isoeugenol, Tolu resin, benzoin resin, styrax resin, citronellyl phenylacetate, citronellyl benzoate, patchouli oil, musk ketone, musk xylol, vertyvert oil, vetyverol, vetyvert acetate, sandalwood oil, santal acetate, "Dorisyl" (Dow), "Rosottone S" (Dow), "Rosaryl" (Dow).

Naturals. Rose absolute and rose otto are the principals. Jasmin, mimosa and ylang absolutes are used secondarily for special nuances. Actually, any of the floral absolutes can be used as long as they are compatible with the rose species type being designed.

Following are a few basic formulas that may be embroidered upon to create interesting rose effects:

BASIC ROSE E.022

10	Phenylacetic acid
10	Benzyl propionate
10	Isobutyl phenylacetate
15	Oil lemon California
15	Hydratropyl alcohol
20	Isoeugenol
20	Methyl ionone
20	Palatone 5% (in phenylethyl alcohol)
20	Citronellyl acetate
30	Phenylethyl phenylacetate
50	Cinnamic alcohol
160	Phenylethyl alcohol
350	Citronellol

The use of Palatone in this composition is arbitrary. It produces a candy-like nuance of considerable attractiveness especially useful if the rose effect is to be developed for lipstick.

This E.022 formula is nonspecific in type, since it is designed for variation. Some of the possible variations in E.022 would be:

(1) More alpha ionone and methyl ionone, with touches of orris concrete and methyl heptene carbonate to bring in a nuance of violet;

(Continued on page 808)





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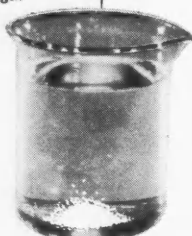
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creams are soft only within a definite range of temperature.

Among the many materials with which a product comes in contact during its preparation and storage, glass is not inert. In the new experimental technique by *Dr. G. E. Everts*, rinsed bottles are crushed and a definite particle size chosen for the analysis. This method also excludes errors introduced by a superficial, washable alkali film, which often adheres to bottles from the time they are manufactured.

Dr. K. Roth pointed out the value of mathematical statistics in evaluating cosmetic data

Biologicals

Proteins of the living skin are not static systems according to *Dr. P. Rovesti* but are in dynamic equilibrium with the amino acids from which they are formed. The formation of proteins in the skin can be encouraged by increasing the supply of essential amino acid units.

Protein hydrolyzates have shown particular biological value in treating the skin. To facilitate absorption, the water-soluble amino acids were converted into their lipide soluble ethyl- and isopropyl esters, purified by high vacuum distillation or through their N-acyl derivatives.

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All the amino acid esters referred to were absorbed completely by the skin. The protein hydrolyzates were derived, in decreasing order of importance and effectiveness, from connective tissue, plasma, blood, skin and keratin.

Dr. J. Cotte discussed various applications to cosmetics of the aqueous, glyceroglycolic and lyophilized extracts of organ tissue, "biostimulines," and described investigations of their composition.

It is possible according to *Dr. J. Nuesslein* to prepare organic phosphatides which show slight wetting and washing activity, but which possess excellent ability to bind water, to hold water and especially splendid properties of distribution and emulsification.

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PERFUME FORMULATION

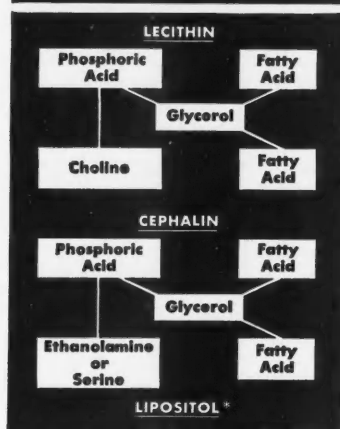
(Continued from page 729)

(2) Traces of estragon oil, sweet basil oil, and caraway seed oil for production of a delicate herb-like effect;

(3) Touches of phenylacetic aldehyde, paramethyl phenylacetic aldehyde, phenylacetaldehyde di-

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methyl, and hydroxycitronellal to create a hyacinth nuance;

(4) Isoeugenol, black pepper and ylang absolute to add a carnation effect;

(5) Benzyl acetate, amyl cinnamic aldehyde, isobutyl phenylacetate, and hydroxycitronellal to produce a wild rose touch;

(6) Guaiac wood acetate, for a tea rose effect;

(7) Cinnamic aldehyde and alpha methyl cinnamic aldehyde for a novel cinnamon touch;

(8) Labdanum absolute, cinnamyl isobutyrate, citronellyl isobutyrate, "Veronol" aldehyde, for a red rose shading;

(9) More lemon oil, traces of aldehyde C-9 (aldehyde C-14 (peach), oil patchouli, and guaiac wood resin for white rose nuances;

(10) Vetivert, oak moss, coumarin, vanillin, heliotrope for an oriental shading;

(11) Musk xylol, musk ketone, for a musk-like touch.

Any of the floral compositions can be used as modifiers for E.022. Jasmin and muguet are particularly attractive, but even lavender may be used to produce the effect of the spicy camphoraceousness found in the rare grey rose. Variations can be built around this simple E.022 composition to the extent that it becomes sublimated in an elaborate bouquet effect such as "An English Rose Garden" fantasy theme. The perfumer should not hesitate to use the rose note liberally, since it contributes a beautiful sweetness and high "recall" value to any composition.

Lipstick Rose. The rose fragrance is popular for lipstick both by itself and for blending in other compositions. The design of fragrances for lipstick use requires a special technique to avoid allergenic irritation. Fragrance oils for lipstick purposes should be tested in the lipstick base in which they will be ultimately incorporated, since there is a slight chance of a synergistic reaction between the fragrance oil and the base that might produce a reaction not shown by the materials when tested individually. Lipstick fragrances, in addition to their odor, must have a pleasing taste. The conventional method is to combine a compatible flavor effect with the fragrance. The following composition illustrates this point.

LIPSTICK STRAWBERRY ROSE E.023

25	Rhodinol
15	Phenylethyl alcohol
5	Phenylpropyl alcohol
3	Terpineol
10	Algerian geranium oil
5	Phenylpropyl acetate
10	Aldehyde C-16 100%
8	Alpha ionone
10	Methyl ionone
5	Musk ketone
10	Dimethyl benzyl carbinyl acetate
8	Dimethyl Phenylethyl carbinyl acetate
8	Isobutyl phenylacetate
8	Phenylacetic acid
20	Hydroxycitronellal dimethyl acetal

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- 4 Isoeugenol
- 5 Musk ambrette
- 1 Allyl cyclohexane propionate
- 4 Ethyl vanillin
- 5 Methyl cinnamate
- 1 Ethyl benzoate
- 1 Coumarin
- 6 Cinnamyl isovalerate

175

There are no free aliphatic or aromatic aldehydes with known irritating properties. Aldehyde C-16 is a pseudonym; it is actually a glycidic ester. Ethyl vanillin is an aldehydic body whose activity is very much modified by its structure. Liberal use is made of esters to intensify the flavor effect. The materials especially used to create the strawberry flavor are: Aldehyde C-16 100 per cent, Dimethyl phenylethyl carbonyl acetate, dimethyl benzyl carbonyl acetate, allyl cyclohexane propionate, ethyl vanillin, methyl cinnamate, ethyl benzoate, coumarin, cinnamyl isovalerate. To create a more powerful aroma, 1-2 per cent of Palatone may be added.

Rose Otto Type. Natural rose otto is prohibitive in cost for the moderate and lower priced fragrances which the perfumer is so often required to design. Therefore, he must have some imitation composition to use as a direct replacement, or as an "extender" of the natural rose otto. Following is the formula for such a composition:

ROSE OTTO TYPE E.024

- 40 Rhodinol
- 40 Geraniol ex Palmarosa
- 10 Geranium Algerian Terpenesless
- 10 Phenylethyl alcohol
- 5 Hydratropyl alcohol
- 6 Alpha ionone
- 3 Hydroxycitronellal
- 2 Aldehyde C-14 (Peach) 10% in DEP
- 7 Geranyl acetate
- 3 Dimethyl octanyl acetate
- 1 Aldehyde C-16 100%

Rose Absolute Type. The substitution or "extension" of the costly rose absolute is another problem encountered by the perfumer in making his moderate and lower-priced compositions. A simple formula for this purpose is:

ROSE ABSOLUTE TYPE E.025

- 50 Rhodinol
- 30 Phenylethyl alcohol
- 10 Hydratropyl alcohol
- 10 Algerian Geranium oil
- 5 Absolute immortelle 10% in DEP
- 1 Absolute cyste labdanum 10% in DEP
- 1 Eugenol USP
- 2 Mimosa absolute 10% in DEP
- 3 Benzyl propionate
- 1 Citronellyl oxyacetaldehyde
- 1 Ethyl Pelargonate 10% in DEP
- 5 Guaiac wood acetate
- 5 Citronellyl phenylacetate
- 2 Eugenyl phenylacetate
- 2 Geranyl benzoate
- 1 Isobutyl phenylacetate
- 2 Palatone 2% in phenylethyl alcohol
- 4 Phenylacetic acid
- 15 Diethyl phthalate

150

An Elaborate Rose Type. The fragrance of the following composition, an example of a fancy rose type, is patterned after the famous "New Yorker" rose hybrid developed by the Jackson-Perkins Company (Newark, New York State).

ROSE "NEW YORKER" E.026	
85	Rhodinol
40	Rhodinyl propionate
10	Phenylethyl alcohol
10	Hydratropyl alcohol
10	Methyl ionone
5	Alpha ionone
5	Aldehyde C-16 100%
5	Citronellyl oxyacetaldehyde
2	Methyl heptine carbonate 10% in DEP
2	"Veronol" aldehyde
5	Hydratropyl acetate
6	Cinnamic alcohol
2	Oil bergamot natural
20	"Golden Jasmin" E.004
15	"Muguet Extra" E.017
5	Oil lemon California
6	Musk ketone
10	Guaiac wood acetate
10	"Phantolid" (Palak Frutal Works)
6	Algerian geranium oil
10	Phenylethyl propionate
1	Aldehyde C-12 MNA 10% in DEP
10	Dimethyl octanol
5	Dimethyl octanyl acetate
5	Bulgarian rose otto natural
10	Diethyl phthalate

In this composition the perfumer should note the use of rhodinol propionate instead of the conventional acetate, as a variation. Aldehyde C-16 100 per cent gives a fruity strawberry tone. Methyl heptine

carbonate produces a violet leaf variation. "Veronol" aldehyde and citronellyl oxyacetaldehyde add pungency and freshness. Bergamot and lemon oils give a light citrus topnote. "Golden Jasmin" and "Muguet Extra" are floral adjuvants. Guaiac wood acetate produces a tea-rose touch. "Phantolid" gives the musk-like richness found in the natural New Yorker rose blossom. Dimethyl octanol and dimethyl octanyl acetate serve as modifiers of the rhodinol and rhodinol propionate, giving them a fruity nuance closer to the true rose.

CARNATION

From the perfumer's viewpoint the carnation is merely a rose spiced with a clove-like note. The latter may be derived from clove oil itself, its principal isolate eugenol, or the latter's isomer isoeugenol. Although these three materials may often account for 50 to 60 per cent of the total of a carnation formula, they still do not perfectly reproduce the desired effect. Apparently other spicy chemicals exist in the carnation flower which have not yet been identified. To simulate this missing spicy effect, use is made of such diverse materials as: the essential oils of birch tar, black pepper, cardamon, nutmeg, mace, pimento and bay; the synthetics methyl hexyl ketone, ethyl amyl ketone, methyl eugenol, isoeugenol and methyl formate. The latter has an odd, lively odor, quite interesting but for some unknown reason not well

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recognized by perfumers in general.

One of the noteworthy new research chemicals applicable to carnation work is the so-called "Ethyl" isoeugenol (3-ethoxy, 4-hydroxy benzaldehyde) which bears the same relation to isoeugenol as ethyl vanillin does to vanillin. Its odor is somewhat deeper than isoeugenol but much more flowery. Because it is presently synthesized from ethyl vanillin in rather poor yield, its cost is so high that its use is very limited.

The carnation fragrance encounters an unusual degree of sales resistance. A fragrance product clearly designated as "carnation" or "pink" (or a similar name suggesting the carnation to the public) is presently one of the poorest promotional risks. It is believed that this situation stems from the unhappy psychological association with the flower created during World War II, when the carnation was one of the most common funeral flowers because it could be grown most prolifically with the minimum use of the then war-scarce labor.

In apparent contradiction of this statement there is "Bellodgia" (Caron) an exquisite French carnation bouquet with aldehydic nuances. It has been in existence for more than 25 years and is still popular.

It should be carefully noted that the product has been clearly dissociated from the carnation in both name and presentation. Apparently the association with the carnation itself is more of a handicap than the actual fragrance.

The carnation fragrance, however, has immense utility as a base and adjuvant for fantasy creations. "L'Origan" (Coty) is a brilliant play between the carnation and methyl ionone. "Tabu" (Dana) contrasts the spicy carnation with an elaborate, geranium-musk, and vanilla combination in a most appealing manner. Carnation may be employed in almost any floral effect or fantasy as an "enlivener."

Following are the "purpose" classifications for the carnation components:

Basics. Clove oil, eugenol, isoeugenol, pimento oil, "Ethyl" isoeugenol, amyl salicylate, hexyl salicylate.

Blenders. Phenylethyl alcohol, tolyl alcohol, hydratropyl alcohol, cinnamic alcohol, linalool, methyl isoeugenol, methyl eugenol, "Rosottone S" (Dow), eugenyl formate, blackpepper oil, "Dorisyl" (Dow), cardamon oil, isoamyl phenylacetate, isobutyl phenylacetate, nutmeg oil, "Prentalin" (Dow), oil of bitter orange, oil bergamot, terpineol, heliotropine Clary sage oil.

Adjuvants. Ylang absolute, ylang Bourbon Extra, "Floralizer #12" (Shulton), orris concrete, methyl isopropyl acetophenone, tolyl aldehyde, "Veronol" aldehyde, citronellyl oxyacetaldehyde, paracresyl caprylate, paracresyl isovalerate, dimethyl octanyl

acetate, citronellyl propionate, oil of mace, oil of bay, oil of birch tar, phentylacetaldehyde, paramethyl hydratropic aldehyde, alpha naphthyl propionaldehyde, hydroxycitronellal, "Alpine Violet," "Cumin" ketone, citronellyl acetate Alpha ionone, methyl ionone, phenylethyl propionate, hydratropyl propionate, oil of petitgrain.

Fixatives. Eugenyl phenylacetate, benzyl isoeugenol, benzyl salicylate, vanillin, ethyl vanillin, musk xylol, musk ketone, Tonquin musk tincture, civette natural, various amber type compositions.

Naturals. Absolute of rose, jasmin, orange blossoms, tuberose, mimosa, and otto of rose.

The following formula illustrates the general approach to the compounding of a carnation fragrance. It may be modified in an almost unlimited number of ways, with adjuvants selected from other floral groups, and with actual compositions. Compositions of the same odor type as the natural absolutes indicated are most successful.

CARNATION E.027

2	Amyl cinnamic aldehyde
2	Phenylethyl propionate
2	Methyl ionone
2	Musk xylol
2	Rosottone "S" (Dow)
10	Musk ketone
5	Heliotropine
4	Ylang Bourbon extra
4	Benzyl acetate
1	Benzyl propionate
3	Hydratropyl alcohol
6	Diethyl hydroquinone
8	Terpineol
8	Phenylethyl alcohol
6	Anisic aldehyde
4	Anisic alcohol
10	Geranyl acetate
3	Dimethyl octanyl acetate
12	Citronellol
12	Cinnamic alcohol
3	Hydratropyl propionate
15	Hydroxycitronellal
2	"Cumin" ketone
1	Oil birch tar 5% in DEP
1	Oil of bay
1	Citronellyl oxyacetaldehyde
5	Paracresyl caprylate
15	Eugenyl phenylacetate
3	Ethyl vanillin
1	Methyl isopropyl acetophenone 10% in DEP
25	Eugenol
20	Isoeugenol

The following is a carnation type of base that is useful as a building block or adjuvant. It should be regarded and handled as a source of a spicy clove note for basic work, and not as a finished carnation composition.

DIANTHUS PINK E.026

175	Isoeugenol
35	Eugenol
5	Oil of bay
20	Oil ylang extra
5	Rose otto
15	Oil black pepper
3	Oil cardamon
1	Citronellyl oxyacetaldehyde

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- 15 Cinnamic alcohol
- 5 Hydratropyl alcohol
- 15 Phenylethyl alcohol
- 15 Orris concrete
- 5 Methyl ionone
- 2 Alpha ionone
- 1 "Veronal" aldehyde 10% in DEP
- 3 Heliotropine
- 25 Benzyl salicylate

350

HONEY

Honey, better known as "miel" is primarily a working base, liberally constructed with rose materials, and used like a rose composition for sweetening purposes but generally considered to be more intense. It is used extensively in the ultra-fancy Chypre types, in which there are heavy Oriental characteristics. The following two formulas demonstrate the basic construction of a cheap and expensive miel composition.

MIEL POUR SAVON E.029

- 18 Phenylacetic acid
- 22 Hydroxycitronellal
- 5 Ethyl phenylacetate
- 2 Isobutyl phenylacetate
- 12 Phenylethyl alcohol
- 3 Rosotone "S" (Dow)
- 3 Musk ambrette
- 4 Amyl cinnamic aldehyde
- 5 Methyl ionone
- 3 Isoeugenol
- 5 Terpineol
- 2 "Veronal" aldehyde 10% in DEP
- 4 Methyl acetophenone
- 4 Benzyl propionate
- 2 Benzyl acetate
- 20 Citronellol
- 6 Dimethyl octanyl acetate
- 2 Alpha ionone
- 2 Methyl phenylacetate
- 5 Benzophenone
- 15 Benzyl salicylate

150

If costs will allow it, more Rosotone "S" (Dow) can be added for an enriched effect. The addition of 2-3 per cent of "Cumin" ketone (Verona) will produce an interesting variation appreciated in soap work.

MIEL SUPRA POUR PARFUM E.030

- 200 Methyl anthranilate—Hydroxycitronellal Schiff's base ("Aurantol")
- 25 Phenylacetic acid
- 50 Musk ambrette
- 10 Ethyl phenylacetate
- 4 Skatole 10% in DEP
- 20 Anisic aldehyde
- 20 Terpineol
- 10 Citronellyl oxyacetaldehyde
- 20 Amyl cinnamic aldehyde
- 10 Hexyl cinnamic aldehyde
- 20 Tuberyl acetate
- 10 Hydratropyl alcohol
- 40 Isoeugenol
- 5 Eugenol
- 50 Phenylacetaldehyde 50% in benzyl alcohol
- 1 "Veronal" aldehyde 100%
- 40 Bulgarian rose otto natural
- 5 Phenylpropyl alcohol
- 5 Phenylpropyl acetate
- 50 Methyl ionone
- 70 Hydroxycitronellal
- 10 "Cumin" ketone (Verona)
- 150 Basic rose E.022
- 15 Dimethyl octanyl acetate

850