Perfume Formulation

THE LILAC GROUP

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The lilac is one of nature's most fragrant flowers. Its hauntingly sweet springtime fragrance, which is known and beloved by everyone, may be exquisitely reproduced in perfumery. In spite of these favorable factors, lilac as a "solo" fragrance is rapidly declining in popularity on the American market, because of its increasing use as a mask for foul odors.

Lilac effects for this kind of masking work must obviously be made as cheaply as possible. The majority of them are simply shabby caricatures of the lilac fragrance. But, shabby or offensive, they are all plainly recognizable as lilac odors. The constant contact with these cheap lilac odors, and their association with such distasteful masking situations as public rest rooms, hospitals, vulcanized rubber and sanitary products, has spoiled the public's acceptance of an otherwise fine fragrance. Lilac, like pine, has become degraded to the point where it is synonymous with tawdriness.

Lilac fragrance oils, cheap or fine, are based on terpineol, which is inexpensive in even the finest quality. It is this price factor which enables the production of a cheap, but still recognizable, lilac odor. Phenylethyl alcohol and cinnamic alcohol are intimately associated with terpineol in the creation of the basic lilac note. In fact, a mixture of equal parts of terpineol, phenylethyl alcohol and cinnamic alcohol is a conventional starting point for the design of a lilac fragrance. Following these three chemicals, a lily background (linalool, hydroxycitronellal, ylang, etc.) and a jasmin effect (amyl cinnamic aldehyde, benzyl acetate, indole, etc.) are introduced to round out and "flower up" the composition. The principal determinant of the quality of a lilac effect is the quantity of jasmin absolute and rose otto that are used in the finished composition. Both of these materials are expensive.

In spite of its lack of popularity as a solo fragrance, lilac finds immense use in perfumery as a floral adjuvant and blender. Medium-priced lilac fragrance oils find wide application in almost every fantasy fragrance and in such unexpected situations as the lavender-fougere-chypre group. Depending upon the extent of their use, they serve to blend together the rough edges of a mixed fragrance, or to provide a smooth floral background.

The interrelation of the other flowers in the lilac group is quite apparent. Acacia is based on the anisic aldehyde note familiar in lilacs, combined with a sweet neroli effect. The single chemical body, Acaciol (the Schiff's base of anisic aldehyde and methyl anthranilate), strikingly demonstrates the acacia fragrance. The sweet pea is basically a "greened up" lilac with rose and neroli nuances. The single—but not too familiar—chemical, hydratropylidene acetone, made from hydratropic aldehyde and acetone gives an excellent representation of the sweet pea. Unfortunately this chemical is almost as irritating as its analogue, benzylidene acetone, and therefore is limited in use. The heliotrope is merely a lilac overshadowed with heliotropine, which by itself is highly characteristic of the heliotrope flower. Hyacinth is quite obviously an extremely heavy version of lilac with a deep jasmin and tuberose sweetness. Hyacinth compositions are often used to shade fancy lilacs.

LILAC

Following are the purpose classifications of the lilac components.

Basics. Terpineol, anisic aldehyde, anisic alcohol, para benzyl anisole, methyl ethyl hydroquinone, hydroxycitronellal, cyclamen aldehyde, anisalacetone, para methyl anisalacetone.

Blenders. Phenylethyl alcohol, hydratropyl alcohol, phenylpropyl alcohol, benzyl dimethyl carbinol, phenyl dimethyl carbinol, benzyl alcohol, tolyl alcohol (paramethyl benzyl alcohol), lauryl alcohol, linalool, amyl cinnamic aldehyde, Schiff's base of amyl cinnamic aldehyde and methyl anthranilate, benzyl acetate, benzyl propionate, tolyl acetate, tolyl propionate, anisyl formate, benzyl dimethyl carbinyl acetate.

Adjuvants. Aldehyde C-14 (Peach), paracresyl methyl ether, heliotropine, paramethyl cinnamic aldehyde, octyl isobutyrate, tolyl aldehyde, acetophenone, amyl salicylate, phenylpropyl acetate, civette absolute, indole, phenylpropyl aldehyde, "Syringa" aldehyde (paramethyl phenylacetaldehyde), alpha ionone, methyl ionone, ylang Bourbon, ylang absolute.

Fixatives. Paracresyl phenylacetate, cinnamic alcohol, musk ketone, musk xylol, vanillin, coumarin, benzyl salicylate, benzyl isoeugenol; the resins of Peru, benzoin and tolu.

Naturals. Jasmin, tuberose and rose absolutes; rose otto, neroli.

The perfume literature repeatedly quotes 7-methyl quinoline and tetrahydro 2-methyl quinoline, as having a "fine lilac note." The author has synthesized these two quinoline derivatives and has been unable to verify the claims of the literature. These chemicals show only a pentrating, peculiarly unpleasant odor, even on high dilution. Nothing in them could be even remotely described as "lilac."

LILAC E.037

45	Hydroxycitronellal
40	Terpineol
25	Cinnamic alcohol
15	Anisic alcohol
20	Phenylethyl alcohol
5	Hydratropyl alcohol
27	Indole 10% in DEP
8	Isoeugenol
3	Oil styrax
8	Linalool
15	Benzyl acetate
3	Benzyl propionate
3	"Cumin" ketone
2	Ylang absolute
5	Tolyl alcohol
1	Amyl salicylate
10	Benzyl alcohol
15	Benzyl salicylate

This E.037 is illustrative of a typical blending lilac used extensively in fantasies to provide a smooth floral background and erase "sharp edges," particularly where aldehydes have been used.

The following is a fancy lilac composition used in expensive fragrances.

LILAC ROYALE E.038

3	Linalool
15	Terpineol
12	Heliotropine
3	Phenylacetaldehyde
12	Benzyl acetate
9	Ylang absolute
18	Hydroxycitronellal
12	Cinnamic alcohol
15	Phenylethyl alcohol
1	Rose otto
5	Rose absolute natural
1	Tuberose absolute
2	Isoeugenol
5	Tolu concrete
5	Tincture ambergris
2	"Cumin" ketone
5	Jasmin absolute
125	

Shown below is a lilac suitable for cosmetics and other situations where discoloration is a problem. Note that it contains no indole or skatole.

LILAC FOR COSMETICS E.039

14	Hydroxycitronellal
4	"Cumin" ketone
40	Terpineol
1	Isoeugenol
22	Phenylethyl alcohol
10	Benzyl acetate
1	Phenylacetaldehyde
4	Heliotropine
4	Amyl cinnamic aldehyde
2	Hexyl cinnamic aldehyde
4	Anisic aldehyde
1	Benzyl dimethyl carbinyl acetate
2	Paramethyl acetophenone 10% in DEP
14	Cinnamic alcohol
3	Oil styrax
4	Linalool
10	Paracresyl caprylate
10	Benzyl isoeugenol
150	

A medium-priced and a very cheap lilac for soap are shown below.

MEDIUM-PRICED SOAP LILAC E.040

600	Terpineol
140	Amyl cinnamic aldehyde
100	Benzyl acetate
100	Linalool
75	Anisic aldehyde
35	Paracresyl phenylacetate
10	Isoeugenol
5	Paracresyl acetate
35	Phenylethyl alcohol
100	Benzyl salicylate
1200	

CHEAP LILAC FOR SOAP E.041

40	Linalool
40	Ionone AB for soap
40	Bromstyrol
50	Benzyl acetate
200	Heliotropine
10	Aldehyde C-14 10% in DEP
10	Paramethyl benzaldehyde
110	Terpineol
500	

Concerning lilac for industrial masks, the chemical indole, which possesses a thoroughly foul and nauseating odor by itself, acquires a remarkably floral and pleasant nature when it is incorporated in a lilac formula. Indole is practically indispensable in the creation of a good lilac reproduction. A surpris-

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and in other parts of the body which undoubtedly play a role in both normal and abnormal brain function. Certain drugs such as lysergic acid diethylamide produce a temporary psychotic state in man, but this state is not identical with any of the natural psychoses. The artificial psychosis which may thus be induced in volunteers could be used to test new experimental drugs.

Serotonin, a natural hormonelike substance, is closely related to a common protein component, tryptophan. There is reason to believe that failure to control natural break-down in the body may produce abnormal psychic states. The same is true of a break-down product of adrenalin. These substances are amines. They are normally destroyed at a reasonable rate by a biological catalyst or enzyme known as monoamine oxidase. It is known that reserpine hastens the break-down of these amines, thereby lowering the blood pressure and quieting nervous tension, while many drugs, including iproniazid, can be classified as monoaminooxidase inhibitors, tending to raise blood pressure and induce a more optimistic, less depressed psychic state.

The facilities and personnel required to conduct research programs of the type which might give us answers to some of these problems are extremely expensive. The problems which face the research worker in his attempt to develop new and better compounds are great indeed.

Chemical laboratories are synthesizing new derivatives of previously known medicaments and also following clues turned up by pharmacologists, based on earlier observations on experimental animals. As fast as these newer chemical compounds are available for pharmacological study, their effects on animals are systematically explored. This requires vast knowledge and experience, much time, elaborate equipment and great ingenuity.

Different species of animals often react differently to identical experimental drugs, and failure of a drug to register the hoped-for reaction in one or more species does not exclude the possibility in another species of the drug's showing an effect that may carry over to humans. However, animal reactions are accepted only tentatively and require adequate confirmation in man before any new drug can be marketed.

PERFUME FORMULATION

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ingly large quantity of this foul smelling chemical (indole) can be tolerated in the makeup of a lilac fragrance. This phenomenon of high tolerance has recently acquired great importance in industrial perfumery, in the creation of "masks" for disagreeable fecal-like odors of the indole type. For this work a very cheap lilac-type odor is made up without any

notes of the indole type. Then when this product is applied as a mask to a disagreeable odor situation, the unpleasant odor becomes part of the lilac fragrance and is transformed into a more pleasant effect. Technically, this is known as "masking by inclusion." Some industrial odor situations where this procedure is effective are: mercaptan odors associated with rubber vulcanizing, butyric odors from fermentations, indoloid odors from protein decomposition, and the effluent odors from sewage operations.

INDUSTRIAL LILAC MASK E.042

600	Terpineol
200	Phenylethyl alcohol soap grade
100	Benzyl acetate
5	Paracresyl acetate
5	Paracresyl methyl ether
10	Ionone AB soap grade
80	Amyl cinnamic aldehyde
1,000	

ACACIA

There are many species of acacia trees, all bearing fragrant flowers, but the *robinia pseudacacia*, commonly known as the "locust" tree, is the only one of importance in North America. The pale white-yellow blossoms hang like wisteria flowers from the tree branches, and produce an intensely sweet fragrance somewhat reminiscent of hawthorn. The acacia fragrance is classified in the lilac group because its formulation requires a large amount of the lilac chemical, anisic aldehyde. For some unknown reason the acacia fragrance does not seem to have much popularity as a "solo" fragrance, but it does find considerable use as a floral base in the creation of fantasies, and as an adjuvant in floral situations where lilac might be used.

Following are the "purpose" classifications of the acacia components.

Basics. Anisic aldehyde, paramethyl acetophenone, phenylacetic acid, methyl anthranilate, dimethyl anthranilate, geranium oil Algerian, Acaciol (Schiff's base of anisic aldehyde and methyl anthranilate).

Blenders. Linalool, rhodinol, citronellol, geraniol, benzyl acetate, terpineol, phenylacetaldehyde, paramethyl hydratropic aldehyde, dimethyl octanol, tolyl alcohol.

Adjuvants. Alpha ionone, heliotropine, ylang Bourbon, phenylethyl alcohol, hydratropyl alcohol, isobutyl benzoate, amyl salicylate, isobutyl salicylate, isobutyl phenylacetate, paramethoxy acetophenone, paraethoxy acetophenone, nerolin, yarra yarra, methyl heptine carbonate, amyl cinnamic aldehyde, hexyl cinnamic aldehyde, phenylethyl propionate, hydratropyl acetate, cinnamic alcohol.

Fixatives. Musk ketone, musk xylol, Peru Resin, vetyvert, methyl naphthyl ketone, benzoin resin, benzyl

salicylate, benzyl isoeugenol.

Naturals. Absolutes of jasmin, rose, orange blossom, jonquille, neroli, French petitgrain natural and terpeneless, rose otto.

ACACIA BLOSSOMS E.043

45	Anisic aldejude
40	Methyl anthranilate
3	Paramethyl acetophenone
6	Cinnamic alcohol
6	Isobutyl phenylacetate
3	Benzyl acetate
8	Citronellol
4	Linalool
4	Hydroxycitronellal
8	Hydratropyl alcohol
6	Phenylacetaldehyde 50% in benzyl alcohol
3	Vanillin
3	Phenylacetic acid
2	Methyl naphthyl ketone
10	Heliotropine
2	Aldehyde C-16 100%
4	Musk ketone
1	Aldehyde C-14 10% in DEP
4	Benzophenone
5	Petitgrain South American
2	Rose otto
2	Coumarin
10	Benzyl salicylate
22	Diethyl phthalate
200	

HELIOTROPINE

The single chemical, heliotropine, which is frequently used as a floral adjuvant in lilac work, very closely approximates the heliotrope fragrance. The lilac and heliotrope are so closely related in odor that any reasonable lilac simulation may be transformed into some semblance of heliotrope by substantially increasing the heliotropine content. Better results are obtained by simultaneously increasing the rose notes and adding a touch of an almond effect. Since the lilac and heliotrope are so closely related, a discussion of the use classification will be dispensed with.

SWEET PEA

The sweet pea fragrance is basically a combination of lilac, hyacinth, and neroli notes, discreetly embroidered with rose and occasionally tuberose and jasmin. Some perfumers describe the sweet pea fragrance as a kind of "greened up" fancy lilac.

Terpineol is the base of the lilac note. Phenylacetaldehyde and its homologues furnish the hyacinth touch. Petitgrain is generally used to contribute the neroli effect.

Benzylidene acetone has a remarkable sweet pea note when diluted. However, it is one of the most irritating of perfume chemicals; this is also true of its paramethyl derivative. Phenylethylidene acetone and hydratropylidene acetone, made respectively from phenylacetaldehyde and hydratropic aldehyde, are less well known than benzylidene acetone but actually have a fine sweet pea odor. Their irritation potential is about half that of benzylidene acetone.

Following are the "use" classifications of the sweet pea components.

Basics. Petitgrain, phenylacetaldehyde, paramethyl hydratropic aldehyde, citronellyl oxyacetaldehyde, phenylacetone, benzylidene acetone, paramethyl benzylidene acetone, phenylethylidene acetone, hydratropylidene acetone.

Blenders. Oil bergamot, oil orange, oil mandarin, dimethyl anthranilate, ethyl anthranilate, terpineol, heliotropine, geraniol, citronellol, rhodinol, dimethyl octanol, nerol, phenylethyl acetate and propionate, hydratropyl acetate and propionate, hydroxycitronellal, linalool, "Cumin" ketone, amyl cinnamic aldehyde.

Adjuvants. Geranyl acetate, citronellyl acetate, dimethyl octanyl acetate, ylang Bourbon, methyl ionone, ethyl phenylacetate, isobutyl phenylacetate, phenylethyl salicylate, methyl nonyl ketone, aldehyde C-12 MNA, aldehyde C-11 (undecylenic), phenylacetaldehyde dimethyl acetal, ethylene and propylene glycol acetals of phenylacetaldehyde, oil geranium African, amyl phenylacetate, isobutyl benzoate, phenylpropyl alcohol, phenylpropyl acetate, phenylpropyl aldehyde, civette.

Fixatives. Geranyl phenylacetate, guaiac wood acetate, tolu and Peru resins, musk ketone, musk ambrette, vanillin, ethyl vanillin, methyl naphthyl ketone, isoeugenol phenylacetate, benzyl isoeugenol, phenylethyl cinnamate.

Naturals. Rose otto, rose absolute, tuberose absolute, jasmin absolute, ylang absolute, jonquille absolute, orange flower absolute, immortelle absolute, mimosa absolute.

The following is a sweet pea formula illustrative of the make-up of the fragrance. It can be varied in an almost unlimited number of ways at the discretion of the perfumer. Note carefully how it is built around a series of aldehydes, modified with alcohols, lightened with bergamot and orange, and then given a "green" touch with the phenylacetone. The balance of the formula is the "embroidery" and sweeteners.

SWEET PEA E.045

30	Terpineol
25	Oil bergamot natural
40	Linalool ex bois de rose
5	Paramethyl hydratropic aldehyde
7	Citronellyl oxyacetaldehyde
4	Phenylacetone
5	Oil petitgrain South American
8	Oil orange Italian
10	Alpha ionone
8	Isobutyl phenylacetate
6	Musk ambrette
12	Methyl naphthyl ketone
8	Heliotropine
4	Musk ketone
4	Ylang Bourbon
6	Anisic aldehyde
2	"Cumin" ketone
6	Hydroxycitronellal
4	Rhodinol
4	Hydratropyl alcohol

4 Dimethyl octanyl acetate
8 Benzyl salicylate

260

HYACINTH

The hyacinth fragrance is a blend of lilac notes, made heavy and sweet with jasmin and tuberose. It has a cloying odor, and does not find much use as a "solo" fragrance, except when it is worked into a cologne type with considerable citrus effect to give it lightness. Hyacinth does find extensive use as a floral adjuvant in many fantasies, and is used in about the same manner as jasmin. The fragrance of hyacinth varies somewhat according to the color of the flower. The blue hyacinth is inclined towards the orris-violet type. The pink is of the honey sweet, phenylacetic acid type. The white is lightest and most delicate of all. As a "solo" fragrance, the white type is best; as a working base the pink is more effective.

The reproduction of the hyacinth fragrance is fortunately made fairly easy by the existence of a number of synthetics whose odors resemble it. Phenylacetaldehyde, hydratropic aldehyde and paramethyl hydratropic aldehyde have distinct resemblance to hyacinth. This can be said of cinnamic alcohol, phenylpropyl alcohol and hydratropyl alcohol in a lesser degree. Galbanum oil, appropriately sweetened with phenylacetic acid, takes on the appearance of hyacinth. Bromstyrol has a very coarse but nevertheless recognizable hyacinth touch.

The following are the "purpose" classifications of the hyacinth components.

Basics. Phenylacetaldehyde, hydratropic aldehyde, paramethyl hydratropic aldehyde, cinnamic alcohol, hydratropyl alcohol, phenylpropyl alcohol, phenylethyl phenylacetaldehyde acetal.

Blenders. Phenylacetaldehyde dimethyl acetal, hydratropic dimethyl acetal, heliotropine, linalool, bergamot, terpineol, benzyl propionate, benzyl acetate, benzyl butyrate and isobutyrate, benzyl alcohol, tolyl alcohol, phenylethyl alcohol, petitgrain oil, hydroxycitronellal, cyclamen aldehyde, "Cumin" ketone, hydratropyl alcohol.

Adjuvants. Ylang Bourbon extra, paramethyl benzaldehyde, cinnamyl acetate, cinnamic aldehyde, amyl cinnamic aldehyde, paracresyl phenylacetate, benzyl phenylacetate, phenylethyl isobutyrate, paracresyl caprylate, methyl anthranilate, oil of mandarin natural, paramethoxy acetophenone, alpha ionone, methyl ionone, cuminic aldehyde (traces), "neo-folione" (methyl nonylenate), methyl benzoate, tuberyl acetate, eugenol.

Fixatives. The resins of galbanum, styrax and benzoin; civet, vanillin, musk ambrette, musk ketone, musk xylol, indole, skatole, benzyl salicylate, phenylethyl salicylate.

Naturals. The absolutes of jasmin, rose, tuberose, orange flower, immortelle (traces); rose otto, neroli.

Following is a pink hyacinth formula suitable for use either as a "solo" fragrance or a working base.

PINK HYACINTH E.046

70	Phenylacetaldehyde 50% in benzyl alcohol
50	Cinnamic alcohol
10	Linalool
25	Terpineol
10	Oil bergamot natural
8	Benzyl acetate
6	Hydroxycitronellal
10	Hydratropyl alcohol
40	Heliotropine
6	Benzyl butyrate
2	Alpha ionone
2	Indole 10% in DEP
2	Coumarin
2	Methyl benzoate
4	Musk ketone
8	Phenylethyl alcohol
8	Rhodinol
2	Para methyl hydratropic aldehyde
4	Amyl salicylate
2	Amyl cinnamic aldehyde
4	Petitgrain South American
275	

JONQUILLE

The jonquille and narcissus are considered to be distantly related to the hyacinth in fragrance. The narcissus fragrance is heavy but delightful. Nevertheless it has neglible use in perfumery. As a "solo" fragrance jonquille is somewhat better but has not won any special recognition. However, jonquille can be extremely useful as an adjuvant in the creation of fantasy effects, because in addition to its hyacinth note, it has inflections of jasmin rose and tuberose. The complexity of its fragrance makes jonquille an excellent, reasonably priced enrichening material for medium-priced fantasy creation.

The following formula demonstrates the construction of the jonquille effect.

JONQUILLE E.046-A

5	Aldehyde C-12 MNA 10%
10	Oil estragon
20	Phenylacetate
20	Heliotropine
30	Phenylacetic acid
30	Musk ketone
30	Paracresyl caprylate
30	Ylang Bourbon extra
30	Paramethyl hydratropic aldehyde
30	Alpine violette standard (Rhodia Co.)
30	Oil petitgrain South American
30	Anisic aldehyde
40	Phenylethyl alcohol
40	Citronellol
40	Benzyl acetate
40	Eugenyl phenylacetate
50	Vanillin
50	Nerolin
50	Oil sandalwood
60	Amyl cinnamic aldehyde
60	Benzyl salicylate
75	Paracresyl phenylacetate
100	Tolyl acetate
100	Hydroxycitronellal
1,000	

The hyacinth note is derived from the paramethyl

hydratropic aldehyde. Vanillin, nerolin and oil of sandalwood furnish the narcissus effect. Tolyl acetate and ylang Bourbon "strike" the tuberose note. Jasmin, rose and lilac components are readily recognizable.

ASPRO PLANTS

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Dandenong Mountains. Here an extensive research program in human and veterinary medicine is being conducted. One of the products of this research, Megamide, a barbiturate antagonist, is being sold in this country by Abbott under a license arrangement.

In developing the English plan, a similar site limitation was imposed. In Slough, near the company's original plant or plants, the company owned a long narrow piece of ground which for years had been used partly as a sports ground for employees. The sports ground contains six or seven acres and is the most beautifully landscaped and maintained sports ground I have ever seen. Although the site was too narrow to permit two-way expansion, the management nevertheless decided to utilize it because of labor conditions. Because of pay rates and excellent working conditions, the company always has had the pick of the labor force in the area and has never had a union even though all the plants around it are unionized.

Since the plant site fell away sharply at one end, it was decided to build a multiple-story unit for offices and plant services attached to a single-story factory and warehouse block. The lowest part of the service section contains the power plant and service garage. The company maintains all officers' and executives' cars and a fleet of delivery trucks. Nationalized British Road Services are so bad and so expensive that the company found it could maintain its own fleet of delivery vans and not only provide faster service to customers but save money as well.

The ground floor, on a common level with the factory, houses plant and employees services. It contains reception lobby, interview rooms, factory offices, personnel and medical offices, locker rooms, toilets, kitchen and canteen or cafeteria, and maintainance shops.

The floor above the main plant entrance houses the directors' suites, the general offices and, at the rear, the control labs. Between the directors' suites and the general offices there is a patio or open courtyard—an expensive architectural gimmick that serves no useful purpose that I can see. (The so-called architect did his damndest to interpolate another patio in the middle of the packaging department, but I stopped that.) I did not object to the one in the service block because it does not interfere with plant operations and its location in the service block is such that it does not interfere with the operation of the offices or the employees' services.