Essential Oil of Rose

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Figure 1: *Rose market, India. Image by Dorene Petersen.*

"And the woodbine spices are wafted abroad,
And the musk of the rose is blown."

—“Maud,” Tennyson (1809-1892)

Latin Name

Rosa damascena

Family

Rosaceae

Common Names

Bulgarian rose and damask rose

Sources

There are more than 250 rose species, but the three primarily distilled for rose essential oil are *Rosa damascena*, *Rosa centifolia*, and *Rosa gallica*. *R. damascena* is cultivated and produced mainly in Bulgaria, as well as regions of Turkey and, to a lesser extent, in Tunisia, China, and India. In France, *R. gallica* is the species usually grown for perfume. *R. centifolia* is also distilled in small quantities in Morocco.

See an image of *R. centifolia* at the British Institute of Perfumers website at:
http://www.bsp.org.uk/gallery_full.php?id=7

History

The word *rosa* comes from the Greek word *rodon*, meaning red, and the rose used by the Greeks was a deep crimson color. Referred to as the "Queen of Flowers" by the Greek poet Sappho, the Greeks cultivated the rose and the Romans made extensive use of it. The petals were used to cover floors, baths were filled with rose petals, and roses were scattered at feasts and beneath chariot wheels. Avicenna first prepared rose water in the 10th century and the oil of rose was discovered between 1582 and 1612.

An enchanting story is told of the discovery of rose oil. At the wedding feast of Shah Jahan, who built the Taj Mahal and Shalimar Gardens for his wife, a canal circling the whole garden was dug and filled with water and rose petals. The heat of the sun separated the water from the essential oil of rose. The bridal pair observed this when they were rowing on the fragrant water; the oil was skimmed off and found to be an exquisite perfume, thus beginning rose distillation in India.

There is an old custom of hanging a rose over a dinner table to ensure dinner conversation will be held in confidence. This comes from the folktale that Cupid gave a rose to the God of Silence as a bribe, so that the God of Silence would not reveal the amorous ways of Venus.

Initially, rose oil was the by-product of rose water, which was the primary product.

Parts Used

The fresh flowers of the damask rose, *R. damascena*, and other species are used to produce rose oil. It takes 30 handpicked flowers, or about 2,000 petals, to yield 1 drop of rose essential oil. *R. damascena* yields the essential oil known as *otto* of rose, or *attar* of rose. Attar means "essential oil" in Arabic. *R. damascena* is steam distilled from the whole flower petals minus the calyx. "May" rose is an absolute grade that is produced from a concrete extraction of *R. centifolia*.

Figure 2: Women harvesting roses in Turkey. Image by Dorene Petersen © 1996.

Figure 3: Women harvesting roses in Turkey. Image by Dorene Petersen © 1996.

Cultivation

Roses flourish best in a sandy or light, stony soil in full sun, and with good drainage. They are grown from either roots or cuttings planted out in rows in autumn or the early spring. In the first year, no flowers appear and only a few appear in the second year. More flowers appear in the third year, with a maximum between the fourth and tenth years. The rose is rejuvenated after 10 seasons by removing the branches and as new shoots appear, the crop is rejuvenated and harvested in the second year.

Rose trees can be productive from anywhere between 10 to 30 years. A half-acre of land will hold about 5,000 roses and can produce 2,200 pounds of flowers during a season. Experts hold that roses cultivated at altitudes of 1,000 to 2,700 feet in the Balkans are superior to any grown in plains areas.

Harvesting and Production

Harvesting takes place in the late spring or early summer. The weather during the rose harvest greatly influences the quality and quantity of the oil. Dry, hot weather usually gives a poorer yield.

In Turkey, roses are grown on hillsides in long, horizontal, evenly spaced rows. Women with large wicker baskets hanging down their fronts and secured by back straps quickly move along the rows plucking the flowers. Plucking just the flower with no leaves or stem and avoiding the thorns is a skilled technique. The presence of leaves or stem reduces the value that the distiller will pay for the crop. The flowers are delivered to the distillery and are distilled on the same day. Women start to gather the rose flowers in the very early morning before the sun rises, and they complete the harvest before the midday sun has started to evaporate the volatile constituents, reducing the aromatic quality.

The yield is quite low. To obtain 1 pound of oil, about 10,000 pounds of rose flowers have to be distilled. Rose oil is either steam or water distilled.

Distilled rose oil is called rose otto or rose attar.

Rose absolutes are also produced but not as common. The volatile components are extracted by solvents or carbon dioxide extraction of the rose petals. The yield of oil from a solvent extraction is approximately 24% of the weight of the flowers and is more efficient than steam distillation. However, the extraction method can impact the active constituents found in the final product.

For aromatherapy purposes the steam distilled rose is preferred. An absolute that is extracted using a “green” solvent, such as ethanol or carbon dioxide, can also be used for external application if a distilled rose is unavailable. It is not to be ingested.

[Author’s Note: While I was participating in the rose harvest with the women in Turkey (see the pictures on the previous page), I noticed the fields were littered with pesticides and herbicides. While herbicides are typically water-soluble and, therefore, would not be absorbed by the plant, pesticides are oil-soluble and could be absorbed into the plant and picked up by the essential oil. It is important, therefore, to use organic, spray-free essential oil.]

Characteristics

Distilled rose oil is a pale yellow with an occasional green tinge. The absolute is a viscous liquid ranging from olive-yellow to brownish, orange-red. Distilled rose essential oil has a sweet, yet spicy floral aroma. At ordinary temperatures, it should form a semi-solid crystalline mass. The taste is slightly bitter at high concentrations, but becomes very pleasant in extreme dilution. It leaves no stain on the perfume blotter and feels slightly oily when rubbed between the fingers.

It should be stored in a cool place in airtight containers and protected from light. It separates into white or colorless blades of crystals at temperatures below 21°C (70°F).

Identifiable quality standards for rose oil include:

- Congealing Point: +18º to 23.5
- Specific Gravity: +At 20º/15º .856 to .870
- Optical Rotation: -1º to -4º
- Refractive Index: At 25º 1.452 to 1.466
- Solubility in Alcohol: Even in 90% alcohol slightly soluble giving turbid mixtures

Adulteration

Because rose oil is so expensive, it is frequently adulterated. Synthetic oil is often passed as natural rose oil. Adulterants that may be used are geraniol and *l*-citronellol extracted from geranium oil. This adulteration is difficult to detect through chemical analysis. Careful olfactory tests may detect their presence. Gildemeister[1] says that guaiac, *Bulnesia sarmienti*, wood oil is also used as an adulterant but this can be detected with a microscope when the oil is cooled and crystallized. The guaiac wood oil crystals are long with a canal-like groove in the middle while a rose crystal is smaller and thinner with sharply articulated shapes.

A remarkable difference between synthetic and natural rose oil is that synthetic rose is almost entirely deodorized by iodine, while natural rose oil is unaffected.

To assess the strength of rose oil, try the following test:
Drop an equal amount of oil from a number of different sources onto perfume blotters. Mark each perfume blotter with the source. Leave them at room temperature in identical environmental conditions. For 10 consecutive days, check the aroma between 10 a.m. and 11 a.m. Record the results with the following point allocation: strong = three points, medium = two points, and weak = one point. After the tenth day, add the points. Those oils with the highest points are most likely unadulterated.

Another olfactory test that helps to confirm the results of the strength test is the bouquet test. Take your samples of rose oil that you have sourced from different suppliers and, in clean brandy glasses, add 1 drop of rose to 3.5 ounces

[1] Gildemeister, E., Hoffmann, F., Kremers, E. (1900). *The Volatile Oils*, Volume 11. Milwaukee: Pharmaceutical Review Publishing Co: 574.

of distilled water at 108° F. Use the same oils that you used for the strength test. Examine each glass carefully by inhaling deeply and slowly, and place them in order of preference. Repeat the process every hour for six hours, then again the following morning. Note the order after each examination. You will most likely find that certain samples consistently take first place. Now cross-reference your results with the strength test.

Active Constituents

Steam-distilled rose oil contains more than 275 constituents, including:

- The terpene alcohols geraniol, l-citronellol, nerol (5%), and l-linalool. Geraniol and citronellol suggest an antiseptic, antibacterial, antiviral, and germicidal effect.
- The phenols eugenol (1%) and methyl eugenol: eugenol and the sesquiterpenes may be responsible for the topical analgesic effect.
- The aldehydes citral and nonyl aldehyde. Rhodinol, which is also called l-citronellol, is present in high-quality oil from 40-65%. The alcohols also occur in ester form, such as geranyl acetate.
- Up to 3% phenylethyl alcohol is sometimes found in traces, but is usually lost in the distillation water because of its water solubility. Rose absolute, which is extracted with a solvent, contains more phenylethyl alcohol; Gildemeister in *The Volatile Oils*, Volume 11, says this is an important aromatic ingredient and without it rose does not truly correspond to the natural perfume of the true rose. This is why rose hydrosol is such a wonderful aromatic product with many therapeutic, culinary, and perfumery applications.
- Phenylethyl alcohol (78.38%) was found to be the main constituent of rose absolute, while citronellol and geraniol were the major compounds (>55%) of rose essential oil. The rose absolute contains more beta-carotene and vitamin E (alpha and gamma tocopherol) than the essential oil[2].
- Traces of sesquiterpenes have also been found with azulene-like qualities.
- It also contains about 2% of a sesquiterpene alcohol and farnesol, which has an analgesic effect and is an important constituent for perfumery.
- Also important for perfumery are the esters, the nerol, the nonyl aldehyde, and trace constituents, such as carvone and rosefuran.

Therapeutic Actions

Analgesic (topical), anthelmintic, antibacterial, antidepressant, antifungal, anti-inflammatory, antimicrobial, antiphlogistic, antiseptic, antiviral, aphrodisiac, astringent, bactericidal, cholagogue, cosmetic, deodorant, depurative, disinfectant, diuretic, emmenagogue, febrifuge, germicidal, hypotensive, hepatic, narcotic, nervine, stomachic, tonic, and vulnerary

Medicinal Uses

The topical analgesic action of rose essential oil coupled with its antibacterial and antifungal actions provides a powerful but pleasant-smelling therapeutic application with potential supportive application for: Abrasions, abscesses, acne, boils, bronchitis, burns, candida, capillaries (fragile), conjunctivitis, dermatitis, eczema, eye inflammation, rashes, sores, tinea, thrush (oral), and ulcers (mouth and tongue).

For use with any infections, ensure the rose is diluted at a 2% dilution in boiled, cooled water and applied as a

[2] Ulusoy S, Boşgelmez-Tinaz G, Seçilmiş-Canbay H. (2009). Tocopherol, carotene, phenolic contents and antibacterial properties of rose essential oil, hydrosol and absolute. *Curr Microbiol*, 59(5):554-8. Epub 2009 Aug 18.

compress using sterile gauze. Additional skin support for broken capillaries and potential UV protection[3] has been suggested, primarily due to the presence of flavonoids. The infusion of rose petals may yield more flavonoids than the distilled oil.

Other potential support that would require inhalation or a few drops on a sugar cube, lactose tablet, or in a small quantity of milk include a range of respiratory issues such as coughs, fever, hay fever, throat (sore), and tonsillitis. The latter would be best supported with gargling the diluted oil in boiled, cooled water.

Digestive and urinary system issues can also be supported by rose oil such as diarrhea, flatulence, fluid retention, gallbladder (congestion), headache, indigestion, nausea, and urinary tract infection. Can be taken in boiled, cooled water; however, it is important to remember that oil and water do not mix and some of the oil may be lost alongside the cup. Therefore, it is better to dilute in milk, then add water. Or, use on a sugar cube or on a lactose tablet.

Psychological and emotional support is also attributed to rose when added to a bath blend or diffused in the atmosphere. It is said to counteract a lack of cheerfulness, such as in depression and specifically with post natal, stress-induced insomnia, a lack of concentration, reduced memory function, and stress.

Other notable uses are support for a low libido and liver congestion and protection, which is supported by the study discussed below. Cardiovascular system support has also been traditionally attributed to rose with suggested uses such as high blood pressure.

These results of a South Korean study indicate that *R. damascena* and its flavonoids may be effective to improve the cardiovascular system[4].

Notable Therapeutic Actions and Medicinal Uses

ANTIBACTERIAL

In a 2010 study 10 essential oils, namely, mint (*Mentha spicata* L., Lamiaceae), ginger (*Zingiber officinale* Rosc., Zingiberaceae), lemon (*Citrus limon* Burm.f., Rutaceae), grapefruit (*Citrus paradisi* Macf., Rutaceae), jasmine (*Jasminum grandiflora* L., Oleaceae), lavender (Mill., Lamiaceae), chamomile (*Matricaria chamomilla* L., Compositae), thyme (*Thymus vulgaris* L., Lamiaceae), rose (*Rosa damascena* Mill., Rosaceae) and cinnamon (*Cinnamomum zeylanicum* N. Lauraceae) were tested for their antibacterial activities towards *Propionibacterium* acnes and *in vitro* toxicology against three human cancer cell lines. Thyme, cinnamon, and rose essential oils exhibited the best antibacterial activities towards *P. acnes* at a 25% dilution[5].

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[3] Tabrizi H, Mortazavi SA, Kamalinejad M. (2003). An *in vitro* evaluation of various *Rosa damascena* flower extracts as a natural antisolar agent. *Int J Cosmet Sci*., 25(6):259-65.

[4] Kwon EK, Lee DY, Lee H, Kim DO, Baek NI, Kim YE, et al. (2010). Flavonoids from the buds of *Rosa damascena* inhibit the activity of 3-hydroxy-3-methylglutaryl-coenzyme a reductase and angiotensin I-converting enzyme. *J Agric Food Chem*., 58(2):882-6.

[5] Zu, Y., Yu, H., Liang, L., Fu, Y., Efferth, T., Liu, X., et al. (2010). Activities of ten essential oils towards *Propionibacterium acnes and* PC-3, A-549 and MCF-7 cancer cells. *Molecules*, 15(5):3200-10.

A March 2010 study also showed positive antimicrobial activity of rose against *Candida albicans* and methicillin-resistant *Staphylococcus aureus*[6].

Another study of interest in 2009 in Isparta, Turkey (where the rose industry flourishes), looked at the antioxidant and antibacterial activities of rose hydrosol, rose absolute, and distilled rose. It found rose absolute and essential oil contained high levels of phenolics and demonstrated strong antibacterial activity against *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Staphylococcus aureus*, *Chromobacterium violaceum*, and *Erwinia carotovora* (causes decay in stored fruits and vegetables) strains[7].

HEPATIC

A 1988 study using rats showed rose oil provided protection for the liver. The rats had ethanol-induced liver dystrophy. At a dose of 1.01-ml/kg and 0.5-ml/kg, dystrophy and lipid infiltration were less and glycogen levels were almost completely restored. There was regeneration of liver cells. Unfortunately, the botanical source of the rose oil was not given[8].

NERVINE

A 1969 study using 48 medical students tested the neuro-psychic effect of rose, lavender, and geranium. The study showed an increase in concentration capacity, improved attention span, and a faster reflex action when a 1% solution of the oils was sprayed into the room[9].

HOUSEHOLD USES

It was Hippocrates who said, "Let food be thy medicine," and the delicious and delicate flavor of rose essential oil and hydrosol make this easy to do. Rose oil is an exquisite and luxurious addition to butter, syrup, jam, and honey. Rose water or rose hydrosol is used in desserts, pastries, and cakes. The suggested use level is 0.02-0.05-mg%*.

*The notation mg% = milligrams per 100 grams = thousandth of one percent. One mg% equals ten parts per million (10 ppm)[10]. This is a flavoring standard. Rose oil has a high level of flavoring and fragrance potential, so only very small quantities need to be used.

Perfumery

When 100 perfumers selected a standard for a floral aroma, Bulgarian rose was the one chosen. The absolute is unique in that it has a high tenacity alongside a deep, rosy fragrance.

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[6] Talib WH & Mahasneh AM. (2010). Antimicrobial, cytotoxicity and phytochemical screening of Jordanian plants used in traditional medicine. *Molecules*, 15(3):1811-24.

[7] Ulusoy S, Boşgelmez-Tinaz G, Seçilmiş-Canbay H. (2009). Tocopherol, carotene, phenolic contents and antibacterial properties of rose essential oil, hydrosol and absolute. *Curr Microbiol*, 59(5):554-8. Epub 2009 Aug 18.

[8] Kirov M., Burkova T., Kapurdov V., Spasovki M. (1988). Rose Oil: Lipotropic Effect in Modeled Fatty Dystrophy of the Liver. *Medico Biologic Information* 3:18-22.

[9] Tasev T., Toleva P., Balabanova V. (1969). The neuro-psychic effect of Bulgarian rose, lavender, and geranium. *Folia med*, 11(5):3070317.

[10] Arctander, S. (1994). *Perfume and Flavor Materials of Natural Origin*. Carol Stream, IL: Allured Publishing Corporation.

Distilled rose otto has more top note, and absolute rose has more fixative power. Rose oil has a warm, deep floral, slightly spicy, rich, honey-like odor.

Rose is a very popular fragrance in many cosmetics and creams, as well as perfumes, toilet preparations, lozenges, and toothpaste.

Rose's uplifting fragrance blends well with most other floral essential oils and it is frequently combined with jasmine. It also blends well with anise (*Pimpinella anisum*), benzoin (*Styrax tonkinensis*), bergamot (*Citrus aurantium* var. *bergamia*), black pepper (*Piper nigrum*), chamomile (*Chamaemelum nobile*), costus (*Aplotaxis lappa*), fennel (*Foeniculum vulgare*), geranium (*Pelargonium graveolens*), ginger (*Zingiber officinale*), immortelle (*Helichrysum italicum*), neroli (*Citrus aurantium* var. *amara*), orris root (*Iris germanica* var. *florentina*), patchouli (*Pogostemon cablin*), sandalwood (*Santalum album*), vetiver (*Vetiveria zizanioides*), and ylang ylang (*Cananga odorata* var. *genuine*).

The minimum perceptible is 0.01-0.02-mg%.

Recommended Daily Dosage (RDD)

Three times daily unless stated otherwise:

- Adult: 1 drop three times daily on a sugar cube or lactose tablet
- External: 1 to 4 drops in the bath

Cautions and Contraindications

The toxic constituent is citronellal. It is contraindicated during the first trimester of pregnancy.

A 1988 study on pregnant rats showed a daily dose of 0.1-ml/kg of rose oil had no teratogenic effects on the rat embryos. At doses as high as 50% of the known LD50, there was slight toxicity to the embryo[11].

In rare cases, it may cause dermatitis. The steam-distilled rose is more suitable for internal use. The toxic rating is I[12] and a skin patch test is required.

Formulas

Rose Water Ointment

1 ounce sweet almond oil
½ ounce beeswax grated

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[11] Kirov M., Vergieva T., Spasovski M. (1988). Rose oil, Embryotoxic and Teratogenic Activity. *Medico Biologic Information*, 3:15-17.

[12] Toxic Rating: I = Low, II = Moderate, III = High (Low Therapeutic Margin)

7 ounces rose water
8 drops rose essential oil (*Rosa damascena*)

Melt the beeswax and almond oil over a water bath. Remove from heat and cool until lukewarm. Beat in the rose water until the ointment emulsifies, and then add the 8 drops of rose essential oil.

Transfer to 9-ounce jar, label and store in a cool place. Use within 3 to 6 months.

Baby Massage Oil

4 ounces sweet almond oil
1 to 2 drops rose oil (*Rosa damascena*)
1 to 2 drops chamomile oil (*Chamaemelum nobile*)
2 to 3 drops tangerine oil (*Citrus reticulate*)

Mix all of the oils together in a clean bottle and label. Apply as massage oil. Use with infants three months or older to support rest and relaxation.

Basic Body Scrub Recipe

⅛ cup white clay
¼ cup ground oatmeal
¼ cup ground almonds
¼ cup kelp powder
¼ cup comfrey root powder
¼ cup powdered roses (you can also substitute lavender or peppermint)
Essential oil (optional)

Mix together and then add water to make a paste. Rub paste into face and scrub body. Wash off. Add an additional base oil for an oil-rich scrub.

Aromatic Room Spray

To make a 2-ounce room or body spray, mix 60 drops of your aroma concentrate with 2 ounces of distilled water or witch hazel hydrosol. Shake well. Spray upward into the air and walk underneath. If the aroma is not strong enough, add more concentrate in 5-drop increments and test again.

Holiday Romance Aromatic Room Spray

2 teaspoons alcohol
5 drops rose essential oil (*Rosa damascena*)
3 drops ylang ylang essential oil (*Cananga odorata* var. *genuine*)
2 drops patchouli essential oil (*Pogostemon cablin*)
2 drops bergamot essential oil (*Citrus aurantium* var. *bergamia*)

Follow directions above for how to make an aromatic room spray.

About the Author

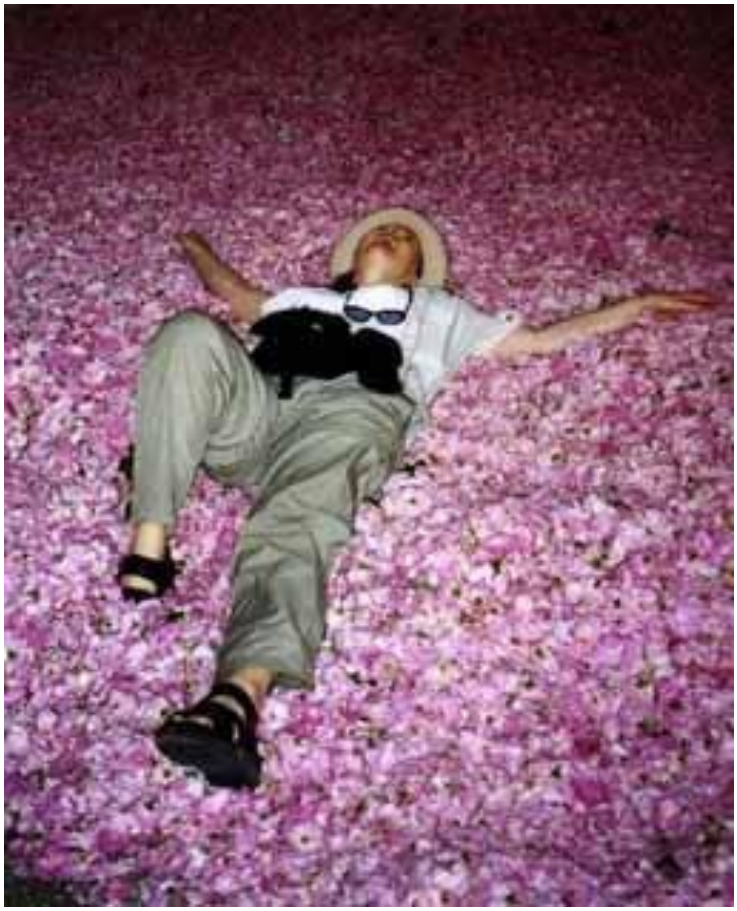

Figure 4: Dorene Petersen lying (literally!) on a bed of roses. Image by Robert Seidel © 1996.

Dorene Petersen, BA, Dip.NT, Dip.Acu, RH (AHG),
is President and Founder of the American College of Healthcare Sciences. She regularly lectures on aromatherapy and has appeared on various TV and radio shows, including *Good Morning Oregon*, the national radio show *Voice of America*, and KPTV's *Better Portland*. Dorene's articles about aromatherapy have appeared in publications worldwide, including *Alternative Therapies in Clinical Practice*, *The News Quarterly*, *Making Scents, The Herbarist*, and the white paper "U.S. Trends in Aromatherapy" for the 2012 AAIC Asian Aroma Ingredients Congress & Expo.

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