

Extraction and Formulation of Perfume from Pelargonium Graveolens Essential Oil

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Abstract: *Essential oils are found in different plants these are different from fatty oils because they evaporate on contact with air and they possess a pleasant taste and strong aromatic odour. The main compounds of geranium is citronellol (24.54%) Geraniol (15.33%) Citronellyl formate (10.66%) and linalool (9.80%) The essential oil of Pelargonium Graveolens from the areial parts obtained by steam distillation and analyzed by gas chromatography mass spectrometry (GC-MS) and this oil are used in high grade perfumery. perfume industries are growing demand as the living standards improving day by day. The increasing demand of perfume they mask the body odour. various methods of oil extraction such as solvent extraction, hydrodistillation, expression and steam distillation can be used for oil extraction. Distillation based processes steam and vacuum distillation preferred for the extraction of essential oils from the Pelargonium Graveolens plants. The extracted essential oils was formulated into perfume using a fixative and carrier solvent.*

Keywords: Essential oil, Citronellyl, Geraniol, extraction, steam distillation

I. INTRODUCTION

Pelargonium graveolens is a herb belonging to the Geraniaceae family and has good aromatic property. It is cultivated under varied agroclimatic condition in India. [1] Pelargonium graveolens L. Her. ex Ait. (Synonym P. roseum Wild) is a species in the Pelargonium genus and is often called a geranium. P. graveolens is an important high value perennial aromatic shrub that can reach height upto 1.3m and spread of 1 m. It's hairy stems are herbaceous when young and become woody with age and plants leaves are deeply incised soft to the touch, and strongly rose scented. [2,3]. The crop is cultivated under rained condition. It is tolerant to drought, but sensitive to continual rains. [4]

Geranium has been traditionally used in medicinal, cosmetic, perfumery and food beverages industry. It shows antioxidant, antibacterial, anti-inflammatory, antifungal and anti-diabetic properties. It has an astringent and chemostatic effect that regulates the bloodstream, stimulates the adrenal glands and lymphatic system which is combination with diuretic properties makes essential oil excellent in the fight against cellulite and fluid retention in the body due to the antiseptic effect it is used for the hygiene of the oral cavity and for treatment of various skin problems. [5] Pelargonium graveolens antioxidant ability is linked to its hypoglycemic effect against the diabetes has been linked to oxidative stress human trials ensure in this area. It was able to reduce the DPPH (2,2-diphenyl-1-picrylhydrazil) radicals into the natural forms and this activity was dose dependent. The oil exhibited antioxidant activity and reduced DPPH to 50% at EC50 value of 0.502 mg/ml of oil solution. In most of the cases P. graveolens toxicity level was relatively low and within limits harmless to human. [6]

Geranium essential oil has been historically used in treatment of dysentery hemorrhoids, inflammation, heavy menstrual flows and even cancer. [7] Geranium oil has many positive benefits like boost immune system, reduces scars, prevent hemorrhaging, diuretic, prevents bacterial growth, deodorants. Essential oils are the secondary metabolites of that plant produce these oils are the volatile natural and complex compounds that are known to be important in plant reproduction as they facilitate in the dispersion of seed and pollen by attracting some insects. Many chemical constituents are present in p. graveolens. [8] The Geranium leaves and stalks are used for extraction, the oil is obtained through steam distillation. The oil is a clear liquid with light yellow to light-brown color or green color. This oil has a strong, heavy rose-like odor with minty top note.

Perfume is fragrant liquid made from an extract that has been distilled in alcohol and water. The aromatic compounds that make up perfume can be manufactured synthetically or extracted from plant or animal sources. While perfume and perfumery also existed in India. [9] perfume is a mixture of fragrant essential oils fixatives and solvents. perfume gives

pleasant feeling and increase enthusiasm to perform better at workplaces [10] A perfume is composed of three notes mainly base note, middle note and top note. The base note referred as smell of fragrance after drying. Middle note mixing of perfume with unique body chemistry forms middle note they also called as heart notes. Top note or head notes the first smell experienced in an aroma is top note. plant sources are used for perfume formation. Essential oils, pure grain oil and water are three key ingredients to making perfume. [11,12]

II. CHEMICAL COMPOSITION

The chief constituents of the geranium oil are geraniol and citronellol. esters of these alcohol such as acetates, formates are present. other important constituents of geranium oil are isomenthone, linalool, turpeneol, phenyl ethyl alcohol, 3-hexane-1-ol and rose oxides. According to available data on chemical composition of *P. graveolens*, essential oil major were the citronellol, geraniol, and Citronellyl formate. [13]

III. MATERIAL AND METHODS

Fresh leaves of *Pelargonium graveolens* by steam distillation and chemical components were analyzed by Gas-chromatography mass- spectrometry (GC-MS). The geranium essential oil used in formation of perfume.

Extraction of Essential Oil

Steam Distillation

Steam distillation is the best process which gives better quality of oil. It is the most popular methods used to extract and isolate essential oil from plant. This method used for purifying liquids which decompose at their normal boiling point. The steam vaporizes the plant materials volatile compounds, which go through condensation and collection process. It is used for separating organic compounds from plant elements. [14]

General Procedure for Steam Distillation

The leaves from the plant material was cut and grinded into small pieces with a juice blender. The sample was placed inside a round-bottomed flask which connected with the distillation apparatus. water (200 ml) was added inside the round-bottomed flask to generate the steam. The sample was heated to 200 °C and distilled for 6 hours. The oil containing distillate was then collected and dried over anhydrous magnesium sulfate with further separation by centrifuging at 1300 rpm for 30 minutes. The essential oil was then transferred into Amber glass vial for further analysis. [15]

IV. FORMULATION OF PERFUME

Formulation of Perfume

Essential oil used in the fragrance industry to describe the source purity and techniques used to obtain particular fragrant extract. Absolute, concentrate, essential oil, tincture these extracts are used in perfume formulation. [9] There are various methods for extraction of essential oil from plants including steam distillation [16,17] solvent extraction [18,19] Soxhlet extraction [20,16] enfleurage [18,21] and expression [22]. The steam distillation is a common method which involves the evaporation of volatile components from the plant at lower temperature with the presence of steam. The steam distillation extraction method used for *Pelargonium graveolens*. [23]

Formulation of perfume

Geranium oil extract 10 ml were measured and placed in a 120 ml beaker containing 5 ml of methanol solution were shaken and poured into 50 ml bottle.

V. RESULT AND DISCUSSION

The results of chemical analysis of *Pelargonium graveolens* essential oil are presented in (Table) It can be seen that tested oil contain a amount of Citronellol (24.54%) geraniol (15.33%), Citronellyl formate (10.66%) and linalool (9.80%) other constituents of tested oil were present in small quantities of (less than 1%) total 55 compounds were identified.

Table 1: Constituents

Constituents	KIE	KIL	%
α -Pinene	924.5	932	0.41
2,2,6-Trimethyl-6-vinyltetrahydropyran	963.9	972	0.03
Limonene	1022.0	1024	0.08
cis-Linalool oxide (furanoid)	1067.0	1067	0.09
trans-Linalool oxide (furanoid)	1082.7	1088	0.04
Linalool	1094.0	1095	9.80
cis-Rose oxide	1103.8	1106	1.17
trans-Rose oxide	1120.3	1122	0.37
Menthone	1145.0	1148	4.33
Isomenthone	1155.5	1158	2.86
Menthol	1176.2	1167	0.08
α -Terpineol	1185.6	1186	0.36
Citronellol	1224.2	1223	24.54
Neral	1236.5	1235	0.68
Geraniol	1249.9	1249	15.33
Geranial	1266.3	1264	0.06
Citronellyl formate	1268.6	1271	10.66
Neryl formate	1274.5	1280	0.41
Geranyl formate	1295.1	1298	5.61
α -Cubebene	1339.6	1345	0.07
Citronellyl acetate	1348.6	1350	0.28
α -Copaene	1365.1	1374	0.46
β -Bourbonene	1373.8	1387	1.38
β -Elemene	1382.3	1389	0.25
β -Caryophyllene	1407.5	1417	1.33
trans- α -Bergamotene	1425.8	1432	0.10
α -Guaiene	1427.9	1437	0.55
6,9-Guaiadiene	1432.7	1442	7.08
Aromadendrene	1441.4	1439	0.95
α -Humulene	1445.9	1452	0.42
allo-Aromadendrene	1453.0	1458	0.14
cis-Muurolo-4(14),5-diene	1466.6	1465	0.09
γ -Muuroloene	1465.9	1478	0.18
Geranyl propionate	1472.5	1476	0.86
γ -Gurjunene	1474.7	1475	0.35
β -Selinene	1484.1	1489	0.16
α -Muuroloene	1493.7	1500	0.19
γ -Cadinene	1507.0	1513	0.16
Geranyl isobutanoate	1510.1	1514	0.28
δ -Cadinene	1516.8	1522	1.16
Citronellyl butanoate	1524.5	1530	0.68
Furopelargone A	1536.9	1538	0.50
Geranyl butanoate	1557.5	1562	0.76
Neryl isovalerate	1564.9	1582	0.05
Caryophyllene oxide	1578.8	1582	0.43

5,5,9,10-Tetramethyltricyclo			
[7.3.0.0(1,6)]dodecan-11-one**	1577.6	n/a	0.46
2-Phenyl ethyl tiglate	1586.5	1584	0.24
Geranyl isovalerate	1601.9	1606	0.33
Humulene epoxide II	1605.2	1608	0.09
1,10-di-epi-Cubenol	1611.5	1618	0.20
1-epi-Cubenol	1624.9	1627	0.12
Cubenol	1636.4	1645	0.15
α -Cadinol	1649.4	1652	0.13
cis-Citronellyl tiglate	1662.9	1666	0.31
Geranyl tiglate	1697.8	1696	1.52

Grouped constituents

Monoterpene hydrocarbons.	0.49
Oxygenated monoterpenes	59.74
Sesquiterpene hydrocarbons	15.02
Oxygenated sesquiterpenes	6.01
Others	18.06

Total 99.32

n/a – not available

Results indicated that most of the components of Pelargonium graveolens are belong to the group of terpenoids including monoterpenoids , sesquiterpenoids and oxygenated terpenes.

VI. CONCLUSION

The study indicates that chemical composition of Pelargonium graveolens oil is high quality with alcohols Citronellol and geraniol compounds. Essential oil were extracted from the plant Pelargonium graveolens using steam distillation.essential oil ,pure grain oil ,and water are three key ingredients to making perfume volatile oils are found in different plants. Distillation base recovery processes such as steam and vacuum distillation are preferred for the extraction of essential oils from the plant materials

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