

## EXTRACTION OF ESSENTIAL OILS FROM THE PEELS OF DIFFERENT FRUITS

*Himani & Saransh Singh*

*Research Scholar, Department of Food Technology, UCALS, Uttarakhand University, Dehradun, Uttarakhand India*

**Received: 18 Mar 2019**

**Accepted: 23 May 2019**

**Published: 27 May 2019**

### ABSTRACT

*Essential oil derived from plant material which is detained inside particular parts of the plants or specific parts of plants cells. Essential oils are used for thousands of years in different cultures for health and medicinal purpose. Essential oils are abundant source of antibacterial, anti-viral and antidepressant properties. The purpose of the present study is to discover essential oil from different types of fruits peels. The technique used to obtain essential oil is solvent extraction by soxhlet method; it is called as solid liquid extraction method. The current study result that peels of orange and banana gives great amount of essential oil.*

**KEYWORDS:** *Essential oils, Fruits Peels, Cold pressing, Distillation*

### INTRODUCTION

Essential oils is derived from plant seeds or fruit waste which is held within specific portion of plants such as seeds (e.g. coriander, caraway, fennel), leaves (e.g. mint, jamrosa, lemongrass), flowers (e.g. rosemary, lavender, jasmine, clove, rose), leaves and stems (e.g. cinnamon, verbena, geranium), bark (e.g. canella), roots (e.g. saffras, vetiver), wood (e.g. sandal, pine) and also from some type of fruits peels (e.g. lemon, orange), depending upon the type of plant and species. (H.C. Baserk, et al. 2010) There are different techniques used for production of medicinal essential herb oil like hydrodistillation, steam distillation, soxhlet extraction, cold pressing and microwave extraction. The conventional technologies involved in essential oil processing are of great importance and still being used in some part of world. Essential oil have been widely used for long time in diverse cultures for health purposes and medicinal because of their Antibacterial, Veridical, Fungicidal, Ant parasitical, Insecticidal, Antidepressant, Detoxifying and Calming properties and these days essential oil are very well known and safe, herbal therapy which is cost effective for a number of health concerns. (Nurul Azlina Binti Mohamed, et al. 2005) Essential oils are very concentrated oil that have powerful aromatic fact, periodically they are also called as volatile aromatic oils because of their high concentration of the aromatic compound (K. Bajpaiv, A. Sharma 2013). Essential oils have high impulsive matter that can be removed by physical method and process from plants of a same botanical species. Generally the oil name is similar to the plant species from which they are obtained. Some essential oils have good effects on microbial growth. The world consumption and production of essential oils growing up very quickly. Production technology is a key element to enhance the production and quality of essential oils.

All citrus fruits are belongs to six genera (Fortwnella, citrus, Poncirus, Clymendia, Microcitrus and Eremocitrus), which are located in sub-tropical and tropical regions of Asia, but the main profitable fruits belongs to genus citrus (Shaw,

**P. E. 1979**). The genus citrus include some important fruits like orange, mandarins, lime, lemon and grape fruits.**(Lvetal.,2015)** Orange peel oil is the most pure essential oil, which is derived from the peels of orange fruit and is popular for its strong solvent and antiseptic properties. Many food industry used natural aroma by essential and medicinal oil. Mainly orange peel oil is used in perfume because of its pleasant odour, but it also used in food products like beverages, sweets and cakes, in fact it is the most commonly used essential oil in food industries. The orange peel essential oil is also used as a flavour in distasteful drugs in pharmaceutical industries to make easy to consume. The liquid which comes in the packet of orange flavoured soft drink concentrates is occasionally orange oil.

Banana belongs to the family of muscaceae. Commercially it is one of the extensively cultivated crops in the humid and semi-humid zones. The fruit is grown in hanging cluster, in which 20 fruits are tier in a bunch. The banana has fleshy inner portion covered with outer layer which is yellow in colour. The inner pulp is edible when raw and the outer peel is generally discarded.**(Anhwange, B.A, 2008)** Banana is rich source of carbohydrates and also contain large amount of vitamin and minerals like vitamin A, B and C, potassium, phosphorus. There are different varieties of banana are grown in all over the world of which two varieties Sagar(mausa Cavendish) and Shavri(mausasapientum) are most popular and easily available to peoples.. Banana essences are produced by homogenizing the pulp of banana, or by separation process and extraction method of banana peel.

Rosemary, which is scientifically known as *Rosmarinus officinalis*. L. It belongs to the family labiates. It also have medicinal value, rosemary is broadly stretch in Algeria and also widely used as conventional medicine. It has the characteristics of preservative and ant oxidative**(Flavour and fragrance Journal, 2003)**. It is mainly used in different industries such as food industries, pharmaceutical industry and cosmetic industries. Rosemary essential oil mainly obtains by different technique of distillation.

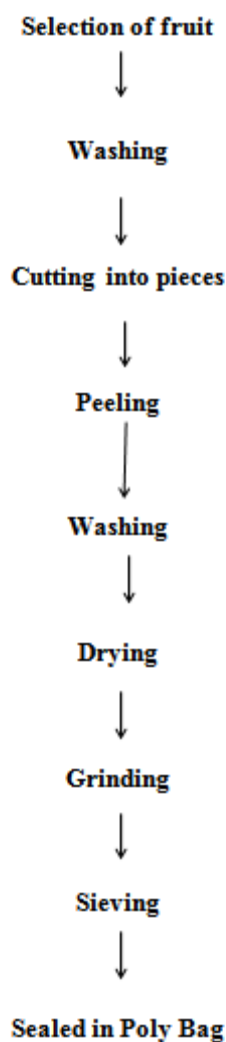
The scientific name of lavender is *lavandula angustifolia*. Lavender oil has been described to be an effective antifungal agent against fungi. Traditionally the lavender is observed as safe oil for use. Although lavender oil is corresponding medicine used as an additive in cosmetic product and it is used for centuries as a therapeutic agent.

### **Essential oils**

Essential oils are used for their flavour and health and medicinal properties such as foods, medicines and cosmetics.. They are highly concentrated oils.Process of extraction of essential oil is very time taking.

The components of the essential oil are important and their quality depends on the qualitative and quantitative characteristic of the oils.**(Chanthaphon A et al., 2008)**.

Furthermore, antimicrobial activity comes in essential oil were found to show against a broad variety of microorganisms, including bacteria, protozoa and fungi **(Dean and Ritchie, 1987; Sivropoulou et al., 1996; Chao et al., 2000)**. Different method of extraction of oil –



### Some Extraction Methods Are-

#### Solvent Extraction Method

To extract essential oil solvent extraction technique is used. In this technique, the solvent bath is used which dissolves the plant material deposit (Forsonetal, 2016). After the extraction process, the filtration is done in which the liquid mixture consisting of essential oil with other components is filtered followed out by distillation. Solvents that are often used for extraction are methanol, petroleum ether, ethanol, hexane, and alcohol. In this process, the lower temperature is the major benefits for extraction instead of distillation, hence decreasing the risk of chemical variations because of high temperatures, which are used throughout distillation. Solvent extraction technique is low-priced and comparatively quick and since, diffusion rate is affected by the temperature, it is probable to enhance the speed of the process by means of hot solvents. The essential oil process consist a small amount of solvent as a deposit and consequently this oil used for food applications becomes unfit. Though, if the alcohol is used as a solvent, it is secure for ingesting and considered “food grade”. This technique is normally used in the aroma industry.

### Cold Pressing

Cold pressing or Expression is the oldest extraction technique and is used practically for the invention of citrus essential oils. This technique is a physical process throughout which the essential oil glands in the peel and outer hard covering are shattered in order for the oil to be liberated. (Bousbia et al., 2009). Before the start of the twentieth century, industrial invention of cold pressed citrus oils was followed through manually. Presently, the single systems in use for the production of peel oils in industries are “sfumatrici” “specialsfumatrici” and “Pellatrici” machines, “Food Machinery Company tire fruit process,” “brown oil extractors” and the “bergamot oil extractors” (Arnodou, 1991; Dugo and Di Giacomo, 2002).

The motive for extraction of citrus peel essential oils by mechanical techniques is the thermal variability of the aldehydes present. Essential oils from non-citrus fruits like berries are not typically extracted by this process.

### Distillation

Steam distillation is the most widely used method for extraction. The time taken for the extraction can take up to 1 to 10 hours. The quantity of oil obtained varies on span of distillation duration, pressure, temperature, and plant (Naves, 1974). Throughout distillation, plant components are kept in steam or boiling stream in order to discharge the essential oil by vanishing. As the hot vapour and essential oil vapours are condensed, they are filled in a vessel commonly known as “Florentine flask” (Dugo and Di Giacomo, 2002). Extraction of an essential oil by distillation method seems to be a direct procedure, it has many disadvantages. Since the essential oils are visible to boiling water for long period, the creation of articles is a probable matter because of the acidity of water or the high temperature. This can mainly lead to changes in the configuration of the volatile oils which is extracted. Throughout distillation the acids and the hydrolysis of esters to alcohols can occur which may have a severe implication in the case of oils with large amounts of esters. Besides, some essential oils need alteration. This procedure includes the re-distillation of the oil so as to remove unwanted impurities (e.g., waxes) as well as constituents that can convey an intolerable odour.

### Different Solvents used for Extraction of Essential Oils

Table 1

S.No	Solvent	Polarity Index Unit	Boiling Point C°	Density 25 C° gm/ml
1	Petroleum ether	0.2	35.0 - 60.0	0.640
2	Hexane	0.1	69.0	0.659
3	Benzene	2.1	75.0	0.812
4	Acetone	5	55.0	0.750
5	Methanol	4.9	60.5	0.76
6	Ethanol	5.1	75.0	0.745
7	Cyclohexane	0.1	78.7	0.776

## Different Essential Oils with their Therapeutic Effects and Uses

Table 2

Essential oil	Therapeutic Effects and Uses	Reference
Orange oil	Use as a flavouring agent in carbonated drinks and ice-creams.	(Braun & Cohen, 2007)
Banana oil	Used for smooth muscles relaxant.	(Bobb gene Edwards, 1998)
Lavender oil	Reduce pain caused due to musculoskeletal disorder.	(Billany MR, 1995)
Rosemary oil	Use to treat fibromyalgia (chronic painful condition)	(Ruteldge DN, 2007)
Bergamot oil	Reduce anxiety, depression and headache.	(Manley CH, 1993)
Lemon oil	Anti-microbial effects.	(Junabalielta, 2017)
Tea tree oil	Medicinal properties, good for skin and hair.	(C.F.Carsonetal,2006)

## CONCLUSIONS

It is concluded that essential oil have antimicrobial activity found from the peels of different types of fruits against extensive range of fungi and bacteria. Due to the phytochemical compounds which are present in the peels oil shows the antimicrobial property. This is safe, herbal method of healing of pain.

## REFERENCES

1. H.C.Baserk, G.Buchbauer, (2010), "Handbook of Essential oils: science technology and applications", Boca Raton, fl: CRC press, 2nd edition, pp. 2243-2245
2. NurulAzlinaBinti Mohamed, (2005), "Study on important parameters affecting the Hydro-distillation for Ginger oil production", M.Sc. thesis, chemical engineering, university of Malaysia.
3. K. Bajpaiv, A. Sharma, H. Baekk, (2013), "Antibacterial mode of action of fruit essential oil, affecting membrane permeability and surface characteristics of food-borne pathogens", food control, vol.32, pp.582-590.
4. Shaw, P. E. (1979). Review of quantitative analyses of citrus essential oils. *Journal of Agriculture and Food Chemistry*, 27(2): 246–257
5. Lv, X., Zhao, S., Ning, Z., Zeng, H., Shu, Y., Tao, O., Xiao, C., Lu, C. & Lie, Y. (2015). Citrus fruits as a treasure trove of active natural metabolites that potentially provide benefits for human health. *Chemistry Central Journal*, vol. 9: 68.
6. Anhwange, B.A., 2008. Chemical Composition of *Musa sapientum* (Banana) Peels. *Journal of Food Technology*, 6: 263-266.
7. *Flavour and fragrance Journal*, 2003; 18: 481-484 published online 1 October 2003 in Wiley InterScience.
8. Dean and Ritchie, 1987; Sivropoulou et al., 1996; Chao et al., 2000.
9. Forson, F.K., E.K. Oduro and E. Hammond-Donkoh, 2004. Performance of jatropha oil blends in a diesel engine. *Renew. Energy*, 29: 1135-1145 2016.
10. Bousbia, N., AbertVian, M.A., Ferhat, M.A., Meklati, B.Y., Chemat, F., 2009. A new process for extraction of essential oil from Citrus peels: microwave hydrodiffusion and gravity. *J. Food Eng.* 90, 409–413.

11. Arnodou, J.F., 1991. *The taste of nature; industrial methods of natural products extraction*. In: *Presented at a Conference Organized by the Royal Society of Chemistry in Canterbury, 16–19 July*.
12. Naves, Y.R., 1974. *TechnologieetChimie des ParfumsNaturels*. Masson, Paris.
13. Dugo, G., Di Giacomo, A., 2002. *The Genus Citrus*. Taylor Francis Publishing, London
14. Junabali, Biswajit Das, TrideepSaikia, GirijanandaChowdhury Institute of Pharmaceutical Science, Azara, Guwahati 781017/ Vol 9, ISSUE 4, 2017.
15. Billany MR, Denman S, Jameel S, Sugden JK. (1995) *Topical antriheumatic agents as hydroxyl radical scavengers*. *International Journal of pharmaceutics*, 124, 279-283.
16. Rutledge DN, Jones CJ. (2007) *Effects of topical essential oil on exercise volume after a 12-week exercise program for women with fibromyalgia: a pilot study*. *The journal of Alternative and Complementary Medicine*, 13, 1099-1106.
17. Manley CH. (1993) *psychophysiological effect of odor*. *Critical Reviews in Food Science and Nutrition*, 33, 57-62.