

Extraction of rose water by steam distillation

Girdhar shendre¹, Rajesh kumar sambhe¹, Mayur Mandaokar², Payal Gupta¹, Shraddha Sonone¹

¹ Student (Mechanical Engineering), SGBAU, Yavatmal, Maharashtra, India

² Professor (Mechanical Engineering), SGBAU, Yavatmal, Maharashtra, India

Abstract

Most of the rose species are used for ornamental purpose and a very few rose species are used for making fragrance in all over the world. Large quantities of flowers like Rose, contain Essential Oils with extensive bioactivities, further used for making Fragrance Water of respective flower. Acknowledging the importance of flower plants and its used in manufacturing of Cosmetic as well as Different types of Facewash and Face cream. It is done by the extraction of Essential Oil from Rose Flower, using Steam Distillation method. In this project Steam Distillation was used to extract rose water from different rose Flowers. Research has confirmed the practical use of rose water, and we know that the 'Fragrance Manufacturing Company' as well as 'Pharmaceutical Companies' are surrounded by huge range of different types of roses and bio chemicals. The distillation was conducted in Extraction unit in which boiling, condensing and decantation was done.

Keywords: fragrance water (Rose Water), distillation, extraction

Introduction

Extraction of natural antioxidant and flavor compounds from aromatic and flower plants is one of the most important research areas for cosmetic and fragrance industries. Among the natural compounds, essential oils are widely used as food flavors, constituents of fragrances and raw materials for the pharmaceutical industry. Volatile oils have been shown to possess antibacterial, antifungal, antiviral, insecticidal and antioxidant properties^[4]. Essential oils are commonly found in dietary and other flower plants, and they have been reported to exhibit numerous biological effects^[7, 8].

Rose water and dry rose flowers are used in traditional Indian medicines, food adjuvants and also used in production fragrance^[9]. Rose water is a liquid preparation obtained by hydro distillation of fresh rose flower^[10]. Dried rose flowers and fresh flowers of other cultivated Rose species are also being employed for the preparation of Rose water. Some industrial houses also use rose oil for the preparation of rose water. Rose essential oil is an exceptionally rich source of different terpenic and sesquiterpenic compounds, which are mostly responsible for rose oil high bioactivity exploited in traditional and modern medicine. Antioxidant activity of rose essential oil justifies its use in a broad range of applications, including cosmetics, nutraceuticals, phytol-medicine and pharmaceutical industry.

Various extraction methods are used in the extraction of essential oils; the method used is normally dependent on what type of botanical material is being used but the cost involved in those method is very high. For these traditional technique has been used i.e. distillation and solvent extraction, are associated with longer extraction times and lower yields, use of large amount of organic solvents^[11].

Steam distillation is a method of extracting essential oils. Steam distillation is done with fresh rose flower placed in pot inside the chamber of steel and it is being filled with water. Chamber has been connected by two heating coils

which is used for heating purpose, in order to get the steam. The top section of chamber is connected by the one end of condenser and other end to get the solvent as output. External low temperature fluid is used for condensation in condenser.

Chemical Composition of Rose Water

A volatile concentrate obtained from rose water by liquid-liquid extraction are as given below^[12].

1. 2-phenylethanol = 69.7-81.6 % 2)
2. Linalool = 1.5-3.3 %
3. Citronellol = 1.8-7.2 % 4)
4. Nerol = 0.2-4.2 %
5. Geraniol = 0.9-7.0 %

It also contains rose oxides along with all other characteristic minor rose compounds.

Literature Survey

Rose water is a flavored water made by steeping rose petals in water. Additionally, it is the hydrosol portion of the distillate of rose petals, a by-product of the production of rose oil for use in perfume. It is used to flavor food, as a component in some cosmetic and medical preparations, and for religious purposes throughout Europe and Asia.

Since ancient times, roses have been used medicinally, nutritionally, and as a source of perfume^[14]. The ancient Greeks, Romans and Phoenicians considered large public rose gardens to be as important as croplands. Rose perfumes are made from rose oil, also called attar of roses, which is a mixture of volatile essential oils obtained by steam-distilling the crushed petals of roses. Rose water is a by-product of this process^[15]. The process of creating rose water through steam distillation was refined by Persian and Arab chemists in the medieval Islamic world which led to more efficient and economic uses for perfumery industries^[17].

In Middle Eastern cuisines, rosewater is used in various dishes, especially in sweets such as Turkish delight, nougat,

and baklava. In medieval Europe, rose water was used to wash hands at a meal table during feasts [15, 16]. Rose water is a usual component of perfume. A rose water ointment is occasionally used as an emollient, and rose water is sometimes used in cosmetics such as cold creams, toners and face wash [18].

Materials and Methods

Materials

Various types of roses are collected from rose project area, according to need of product. Collection of flowers was carried out early in the morning before sun rise to avoid the loss of volatile oil. The flowers are plucked at full blooming stage and placed for overnight to remove excessive moisture.

Method for Rose Water Extraction

In this project, we used-Solvent Extraction by Steam Distillation for the extraction of rose water from fresh rose petals.

Rose Water Extraction by Steam Distillation

For rose water extraction, rose petals are poured in to the dotted pot placed inside the container, made up of steel. Water is poured into the container up to the level of dotted plot. Container has been connected by two heating coils at the bottom side of container to evaporate the water. One end of condenser is connected to the top of container which is the inlet of condenser, in order to enter the steam into the condenser. During evaporation of water, it converts into steam as well as it gets a flavor of rose. That rose flavor steam is passed through the condenser in order to get the condensate as a solvent i.e. rose water. Steam is condensate by using the cold water.

Condenser consist of pipes through which the low temperature water passes continuously to accomplish heat transfer process. Water is being circulated through condenser by using pump. Condenser has one point for inlet of low temperature water and one point for exit of high temperature water. Another end of condenser is used to get solvent as rose water.

Residues like rose petals is being further used for making medicine and cosmetics. There is no loss of material and gives more efficiency.

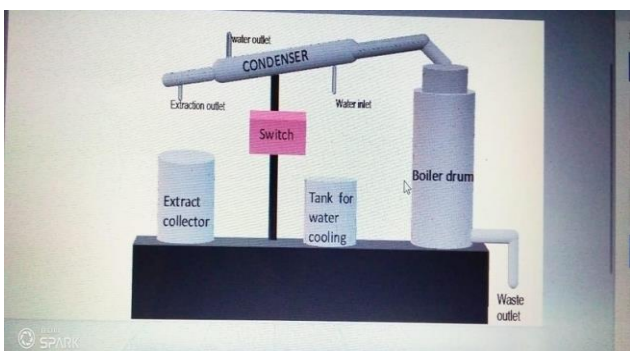


Fig 1: Dimensional sketch of model used in Extraction of Rose Water

Result

Steam distillation is a special process of distillation or a separation process for temperature sensitive materials like oils present in the flower, which are insoluble in water and

may decompose at their boiling point. The temperature of the steam must be high enough to vaporize the oil present, and not more than that it destroys the flowers or burns the essential oils.

This process is very easy and economical as well as very efficient also. This process does not contain any chemical components and the output is complete natural product.

Conclusion

This research studied the chemical composition of rose water. The essential oils or rose water is extracted using solvent extraction by steam distillation.

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