ESSENTIAL OILS

Essential oils are generally plant-based highly concentrated, volatile, odorous products of complex chemical composition. The method which is most commonly used for the extraction of essential oils is steam distillation or hydro-distillation. Other methods include hydrodiffussion, cold pressing, solvent extraction etc. After the extraction, the essential oils may undergo a suitable subsequent treatment. Some of the commercially known essential oils are deterpenated, desesquiterpenated, rectified or 'x'-free.

Deterpenated essential oil – It is type of essential oil from which monoterpenes are specifically removed to leave only the oxygenated components. As a result, the strength of its odor is increased. This is achieved using various methods including distillation and liquid liquid-extraction.

Deterpenated and desesquiterpenated essential oil - It is a type of essential oil from which the monoterpenes and the sesquiterpenes were partially or totally removed.

Rectified essential oil – It is a type of essential oil which is purified by re-distillation, either with steam or by vacuum, in order to remove the impurities from it.

'x'-free essential oil - When any one chemical entity is partially or completely removed from an essential oil, it is referred as 'x'-free essential oil.

PRODUCTION

The state of the plant raw material (whether fresh, dried, whole) taken for extraction of essential oil depends on the monograph of that oil.

Hydro-distillation – It is a typical method used for the recovery of essential oils from plant materials. In this method, the plant material is packed in a still and a sufficient quantity of water is added and brought to a boil. Due to the influence of hot water and steam, the essential oil is freed from the oil glands present in the plant tissue. The vapor mixture of water and oil is condensed by indirect cooling with water. From the condenser, distillate flows into a separator, where oil separates automatically from the distillate water.

Hydrodiffusion – This process consists of extracting the essential oil with steam that circulates through the plant material, whereby the steam volatile compounds are volatilized, condensed and collected in receivers.

Solvent extraction – In this type of extraction process, a solvent like hexane or ethanol is used to extract the essential oil components from the crushed raw plant material. An advantage of this method is that the heat labile chemical compounds can be retained easily in the extract.

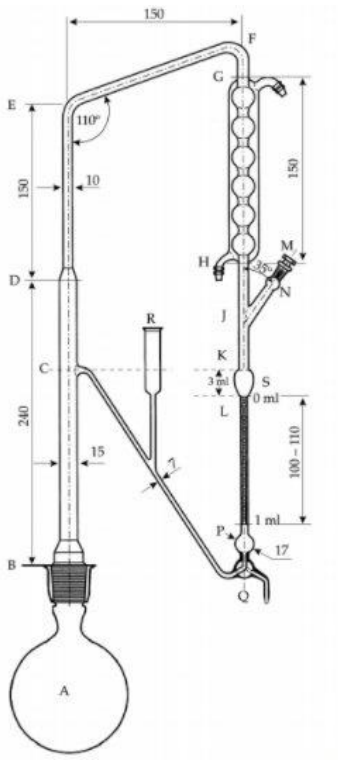

Figure. Apparatus for the determination of essential oil

Cold pressing –In this process, essential oil is produced by applying a mechanical force without application of heat to break the essential oil glands.

TESTS

Identification

Gas chromatography (Refer to section 2.4.13)

General Tests

The essential oil must comply with the prescribed limits given in the respective monograph for the following tests.

Relative density (Refer to section 2.4.29) – It is an important criterion to determine the quality and purity of an essential oil.

Refractive index (Refer to section 2.4.27) – The refractive index of an essential oil is a unique number that designates how the oil responds and bends light. When a beam of light passes from a less dense to a denser medium, it is bent or "refracted" toward the normal.

Optical rotation (Refer to section 2.4.22) – It is the property of most of the essential oil to rotate the plane of polarization to the right (dextrorotatory) or to the left (laevorotatory) when placed in a beam of polarized light.

Acid value (Refer to section 2.3.23) – Most essential oils contain only small amounts of free acids. The acid value of an essential oil is defined as the number of milligrams of potassium

hydroxide required to neutralize the free acids in 1 gram of oil. The acid value of an essential oil often increases as the oil ages, especially if the oil is improperly stored; processes such as oxidation of aldehydes and hydrolysis of esters increase the acid value. Essential oils which have been thoroughly dried and which are protected from air and light, show little change in the acid value.

Ultraviolet Absorbance: This test is specific to the cold pressed citrus oils.

Residue on Evaporation: The residue on evaporation of an essential oil is the percentage by mass of the oil which remains after evaporation on a water-bath under the specified conditions. This test is an important criterion of purity in the case of the citrus oils.

Assay

Gas chromatography (Refer to section 2.4.13)

STORAGE

In an airtight container, protected from light.