

Distillate Water: Overlooked Golden Drops

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Aromatic plants possess odorous volatile compounds, which occur in specialized structures in the form of essential oil in one or more parts of the plant. Aromatic plants occur in nearly all vegetation-covered regions of the world. A large number of plant species belongs to family Lamiaceae, Asteraceae, Apiaceae, Zingiberaceae, Rutaceae etc. are characterised by the presence of essential oils. The essential oils are usually complex mixture of terpenes (mainly mono-, C_{10} and sesquiterpenes, C_{15}) and their oxygenated derivatives. The essential oils are practically insoluble in water, generally lighter than water, and possess characteristic odour. Essential oils find extensive application in flavour, perfumery, cosmetic, and pharmaceutical industries. Therapeutically these are used as antiseptic, stimulant, carminative, diuretic, antihelmintic, analgesics, anti-rheumatic, and counter irritant. Aromatic plants which are being cultivated in different parts of the world for commercial production of essential oils are Orange, lemon, lime, mints (*Mentha arvensis*, *M. x piperita*, *M. x spicata*), cedar, citronella, lemongrass, basil, *Eucalyptus*, geranium, lavender *Litsea cubeba*, clove, sassafras (*Ocotea pretiosa* and *Cinnamomum micranthum*), *Osmanthus fragrans*, patchouli, rose (*Rosa* spp), tuberose, jasmine, sandalwood, vetiver, bergamot, coriander, etc.

The natural essential oils are extracted from aromatic plants by steam-distillation, hydro-distillation, hydro-cum-steam distillation, and hydro-diffusion processes. Other methods viz. expression, effleurage, and solvent extraction are also employed to trap the essence from aromatic plants. However, most popular methods for essential oil extraction are hydro-distillation/ hydro-cum-steam distillation, and steam distillation. In this process the aromatic plant material is loaded in to a distillation tank and steam generated either in a boiler or in the distillation tank itself is allowed to pass through the aromatic material to rupture the oil glands. The steam and essential oil vapours come out of the tank is then passed through a condenser to remove the energy and convert vapours in to the liquid. The condensate, mixture of essential oil and water (distillate water) is collected in a receiver. As the essential oil and water have different densities; oil in general float on the surface of water and hence can be easily separated. The essential oil thus obtained is called 'primary' or 'decanted' or 'main' essential oil, which is filtered, and dried over anhydrous sodium sulphate to remove moisture before its storage. However, during the process of distilling aromatic plant materials, hydrophilic components (polar compounds) of the essential oil prefer to pass in and remain in the distillation water and the product is known as 'distillate water' or 'hydrosol' or 'hydrolate'. The distillate water is often highly aromatic owing to presence of organoleptically important oxygenated components. Nevertheless, in most of the cases farmers discard this distillate water during the course of distillation process. The dissolved fraction of essential oil, also called 'secondary oil' can be recovered by re-distillation or solvent extraction of distillate water [1-4]. The secondary essential oil typically has a different composition and odour than the primary essential oil. To date, studies concerning water soluble fraction of essential oil are restricted to just a few aromatic plants such as basil [5], geranium [2], *Eucalyptus* [6], rose [7], palmarosa [3], American marigold [8], lavender [9,10], clary sage [11] and mints [12,13].

Studies suggested that, the distillate water is charged with more

active principles than the main essential oil; therefore, distillate water should not be discarded and can be used for wide range of therapeutic and cosmetic benefits. Alternatively, distillate water may be redistilled to recover the dissolve oil by introducing cohobation system in distillation unit or may be collected separately and used to distill the other batch of the same herb. Further, it is necessary to extend this type of studies to other aromatic crops also to stop the wastage of high value aroma chemicals during distillation process, which will ensure to harness the potential of these overlooked golden drops.

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