PATCHOULI ALCOHOL ENRICHMENT FROM PATCHOULI OIL USING MOLECULAR DISTILLATION UNIT

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ABSTRACT

Molecular distillation in the vacuum pressure about 10^{-3} mbar, temperature in the range of 80 °C – 100 °C, and wiper rate between 60 – 80 rpm was used for the separation and purification of patchouli oil. Patchouli oil has a large composition of patchouli alcohol which is usually used as a fixative for perfumery, cosmetics and pharmaceuticals. A large composition of patchouli alcohol usually is in the residue due to the high boiling point of this compound than others. Purification of patchouli alcohol increased with wiper rate and temperature but decreased with the feed rate. The temperature of liquid entering to the unit, feed rate and the wiping element bears on the distillation cylinder due to the centrifugal force and rolls over it bringing the liquid on the distillation cylinder into an intensive complex movement were the important technological parameters that determined distillation operation. Pursuant to condition above produced purification of patchouli alcohol due to the patchouli oil about 73.37%.

Keywords: Patchouli oil, molecular distillation, patchouli alcohol, separation, purification.

INTRODUCTION

Patchouli oil is one of several kinds of essential oils. Vegetable oils and essential oil are the most interesting products proposed for its purification using molecular distillation unit. Molecular distillation technology has many advantages due to its characteristic vapor pressure of each substance. The vapor pressures difference dictates how easily a complex compound can be separated into its constituent components (Joddy and Wuryaningsih, 2002). The patchouli oil could be woody, earthy, and sweet smell that is pungent and persistent. It is stimulate in small amounts and sedates when use more generously. The patchouli oil is anti-inflammatory and anti septic. The oil can be applied directly to relieve skin condition such as burns, cracked skin, allergies, acne, herpes and eczema. In aromatherapy it is used for tiredness, tension, dandruff and oily skin or scalp (Ketaren, 1985).

Molecular or short-path distillation is characterized by a short exposure of distilled liquid to elevated temperatures, high vacuum in the distillation space and a small distance between the evaporator and the condenser. The short residence time of the liquid on the evaporating cylinder is guaranteed by distributing the liquid in the form of a thin film of even consistency (Cvengros, 2000). Feed temperature influences on the efficiency of a molecular evaporator were explored by Cvengros *et al.* (1999). Cvengros *et al.* (2000) studied film wiping in the molecular evaporator. Heat and mass transfer in the evaporating film of molecular evaporator were presented by Lutisan *et al.* (2001). Wiped-Film Molecular or molecular distilla-tion, can be used where the distillate has high boiling point, then processed in high vacuum (to 0.001 torr) and a close proximity internal condenser are utilized in molecular distillation. This design is selected when a significant percentage of moderate or low boiling distillate, medium vacuum (to 0.1 torr) and a high surface area external condenser are utilized (Anonimous, 2004).

A fundamental process attribute of molecular distillation is ability of evaporate high molecular weight materials without heat degradation and to strip off solvent into very low residual levels. This is accomplished by (i) reducing system pressure, to a minimum of several microns, (ii) lowering the boiling temperature of the distillate, and (iii) creating a very thin film on the distillation unit wall. The thin liquid film is produced by slotted wiper a blade propels across heated surface in a few seconds. A high degree of film turbulence is also created, to minimize the temperature difference between the wall and the evaporating surface of the liquid. All of these factors are combined to allow operation at the lowest possible temperature, thus preserve product stability.

Since the molecules of all matter are in constant motion in varying degrees, depending upon the chemical composition of that matter and the tempe-