

**UNIVERSITI TEKNOLOGI MARA**

**COMPARISON OF SUPERCRITICAL  
FLUID EXTRACTION USING CO<sub>2</sub>  
ON PATCHOULI LEAVES  
(POGESTEMON CABLIN) BENTH  
ESSENTIAL OIL AND SOXHLET**

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## ABSTRACT

Supercritical fluid extraction (SFE) of essential oil from dried Patchouli leaves (*Pogestemon Cablin*) using CO<sub>2</sub> was reported in this work. Effect of pressure and effect of temperature towards yielding of patchouli essential oil in correlation towards quality of oil has been study. Process parameter was pursuing out under two different temperatures (40 °C and 80 °C) as well with three stages of pressure (100 bar, 200 bar and 300 bar). Result demonstrated that the extraction yield was increased as pressure increase from 1.13 % at 100 bar to 1.34 % at 200 Bar ultimately increased to 1.44 % at 300 bar. For the temperature effect, the yield was decreased as the temperature increases, from 1.13 % at 40 °C to 0.24 % at 80 °C. For comparison purposes, patchouli leaves were extracted by Soxhlet extraction using absolute EtOH. Result showed that Sohxlet extraction provided a better yield (12 times better at 17.21 %) than supercritical fluid extraction, nevertheless the quality of the Patchouli essential oil was poor, 1 times lower with only 34.912 % patchoulol composition than supercritical fluid extraction .

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Research background

Essential oil once also called as “aromatic oil” that can be extracted from a various plant. It’s uses has been locate since 3000-2500 B.C across many cultures in perfume and fragrance, therapeutic aromatherapy and medicine such as Ayurveda health in Indian culture and Chinese folk medicine as Chinese traditional medicine. It’s not only originated from flower but also being extracted from leaves, roots, herbs, tree and various other plant material. This powerful extract can be defined as concentrated hydrophobic liquid containing highly volatile substance that originated from plant. Its properties to believe exhibit from plant which it is derived such as flavor, essence of odor, aromatic value as flavorings in foods and medicinal rich such fragrant and anti-oxidants that widely use in pharmaceutical industry makes it’s valuable and demanded (KUMAR, 2010).

Nowadays, there are a lot of fragrant herbs plants available that are study which capable to produce essential oil. One of the species studied is *Pogestemon Cablin Benth Patchouli*. *Pogestemon Cablin* is categorized under *lamiaceae* family which is originated around Indian, Malaysia and Indonesia country. A special characteristic of Patchouli essential has brought a big contribution and impact in pharmacological, perfumery, flavorings and therapeutic industry according to (Hu et al., 2006). Patchouli essential oil believes to possess anti-inflammatory, anti-fungal and anti-bacteria properties which contributed well in medicinal industry (Suganya, Jeyaprakash, Mallavarapu, & Murugan, 2015). Thus, it can be deny that Patchouli essential oil can bring a good portfolio as one of the good business prospect where a big major player in manufacturing Patchouli essential oil such as PT. Djasula Wangi, PT. BotanAgra Indonesia and Penfabric Sdn. Bhd located in East Asian. Indonesian has been noticed as significant Patchouli oil manufacturer across international market with a percentage of 90% where Java and Sumatra has been noted as dominant area of Patchouli manufacturer (Steve Caiger,2014). From a world demand of Patchouli oil which is estimated to be around 587 ton per annum shows that supply