

**EFFECT OF EXTRACTION CONDITIONS ON
ANTIOXIDANT ACTIVITY AND PHENOLIC
CONTENT IN *GARCINIA MANGOSTANA L.*
PERICARP POWDER**

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ABSTRACT

Garcinia Mangostana L. is a popular subject in both modern and traditional medicinal world. Few studies proved that the ability of the fruit to treat various kinds of infections and diseases comes from abundance of antioxidant inside the fruit mainly at the pericarp. This study was made to understand the effect of time, temperature, solid to solvent ratio towards antioxidant activity and phenol yield and constructing mathematical model of antioxidant and phenol activity in *Garcinia mangostana* pericarp. Powdered pericarp as the sample undergoes solvent extraction by using two solvents, methanol and ethanol. The solid-and solvent ratio was maintained at 1 g: 50 ml and 1 g: 100 ml. The time and temperature of extraction that are being generated from Design Expert software was in the range of 1-3 hours and 30-60°C respectively. The absorbance was measured using UV-Vis spectrophotometer and the results were being analyzed by DPPH assay for antioxidant activity and Folin-Ciocalteu assay for phenol content. Highest antioxidant yield from methanol was obtained at 3.41 hours extraction time, 23.79°C temperature and 1:100 solid-to-solvent ratio. Highest TPC from methanol was obtained at 3.41 hours extraction time, 23.79°C temperature and 1:100 solid-to-solvent ratio. Extraction from ethanol has the highest antioxidant yield at 3.41 hours extraction, 30°C temperature, and 1:50 solid-to-solvent ratio while TPC yield is the highest at 3.41 hours extraction, 66.21°C temperature, and 1:50 solid-to-solvent ratio. Methanol has higher percent inhibition (80.36%) compared to ethanol (78.53%). Methanol also has higher TPC yield (33.88 mg/ml) than ethanol (31.47 mg/ml). Regression equation of the data was made and optimization was successfully done. Optimized condition for methanol is 57.75°C temperature, 1.03 h extraction time, and 1 g: 50 ml solid-to-solvent ratio while optimized condition for ethanol is 57.74°C temperature, 2.40 h extraction time, and 1g: 50 ml solid-to-solvent ratio.

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CHAPTER ONE

INTRODUCTION

1.1 RESEARCH BACKGROUND

Garcinia mangostana is a tropical fruit that can be found in Southeast Asia mainly in Malaysia, Indonesia, and Thailand. The plant is only suitable to be grown in area that has tropical environment of 4.44-37.78°C (Mangosteen Health Tree, 2007). Few attempts have been made to grow it in few states in United States which are California, Hawaii, and Florida but the climate and the soil of those states are unfavorable for *Garcinia mangostana* tree. This plant needs an area that has high atmospheric humidity as well as high annual rainfall amount and absence of long droughts. As a slow grow plant, the tree will take 7-9 years before can be harvested. The ripeness of *Garcinia mangostana* is determined by its dark purple skin color and softness of the skin. Immature *Garcinia mangostana* that plucked from the tree will not continue to ripe and affect the sweetness of the fruit.

This so-called ‘Queen of Fruit’ due to its sweetness has a lot of medicinal benefit. In Southeast Asia, this fruit is well known traditionally to treat a wide range of ailment including fighting infections, healing wounds, diarrhea, and other gastrointestinal related complaints as stated by Talbott (2011). According to study made by Shan et. al (2011) *Garcinia mangostana* is known to contain xanthenes which possess the ability as antioxidant, anti-proliferative, pro-apoptotic, anti-inflammatory, and anti-carcinogenic. The pericarp extract of *Garcinia mangostana* that rich with xanthenes have been demonstrate by Pedrava-Chaverri et. al (2008) to possess antitumor, antiallergic, antibacterial, antifungal, and antiviral properties.