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TITLE:

DETERMINATION OF GALLIC ACID USING DIFFERENT EXTRACTION
SOLVENTS ON *AZADIRACHTA INDICA*

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ABSTRACT

This study was conducted to search for the bioactive compounds contain in the *Azadirachta indica* plant. The effectiveness of *Azadirachta indica* (neem) which aid in the treatment of inflammatory diseases is proven due to the bioactive compounds contains. Soxhlet extraction was used to extract the bioactive compounds from the leaves of *Azadirachta indica* using various solvents, which include ethanol, methanol, and aqueous (distilled water). High-performance liquid chromatography analysis was used to determine the phenolic content in *Azadirachta indica*. Based on the outcomes, the highest extraction yield was obtained by using aqueous (distilled water) solvent, which yielded 13.50%. While the highest concentration of gallic acid obtained from ethanol extraction, which is 38.02 ppm. The outcomes of this study provide a valid documentation and validation of the various biologically active compounds contain in *Azadirachta indica* plant which act as a natural remedy for a variety of ailments.

TABLE OF CONTENTS

	Page
AUTHOR'S DECLARATION	2
ABSTRACT	3
TABLE OF CONTENTS	4
CHAPTER ONE BACKGROUND	5
1.1 Introduction	5
1.2 Literature Review	6
1.3 Problem Statement	8
1.4 Objectives	8
1.5 Scope of Study	9
CHAPTER TWO METHODOLOGY	10
2.1 Introduction	10
2.2 Materials	10
2.3 Method/synthesis	11
CHAPTER THREE RESULT AND DISCUSSION	15
3.1 Introduction	15
3.2 Percentage of Extraction Yield	15
3.3 Determination and Quantification of Gallic Acid using HPLC	16
CHAPTER FOUR CONCLUSION AND RECOMMENDATION	21
4.1 Conclusion	21
4.2 Recommendation	21
REFERENCES	22

CHAPTER ONE

BACKGROUND

1.1 Introduction

Herbal plants have been utilized in various cultures since ancient times. To treat illnesses, these kinds of plants have been used medicinally. Numerous studies suggest that antioxidants found in plants, fruits, and vegetables are essential in reducing the rate of chronic diseases. One of such plants is *Azadirachta indica*, also known as neem, which has long been used as a natural remedy. *Azadirachta indica* plants have drawn the attention of numerous researchers in recent years due to findings on their antioxidant phytochemicals, particularly phenols, flavonoids, and tannins, which have the potential to prevent a wide range of diseases in living creatures. (McCreath and R. Delgoda, 2016) As proven by scientific research, it displays a wide range of biological activity and classified in one of the most versatile plants. Previous research has demonstrated that nearly every part of neem contains active ingredients (Dubey and Kashyap 2014) Every component of the tree, including the seeds, flowers, twigs, bark, roots, and leaves, has medicinal value for humans. (Pandey *et al.* 2014; Biswas *et al.* 2002) Numerous bioactive qualities of the neem extract have been discovered, including antioxidant, antiviral, antitumor, anti-malaria, and antifungal activities (Singh 2019; Dubey and Kashyap 2014) The neem plant contains several chemical compounds that have antimicrobial properties and the capabilities to prevent the development of microorganisms. *Azadirachta indica*, sometimes known as neem, belongs to the mahogany family and is well-known for its biomedical and insecticidal properties. (Dubey and Kashyap 2014) Any substance that prevents or delays oxidative damage is an antioxidant. (Halliwell B., 1995) High-performance liquid chromatography will be

used to screen the plant part that exhibits the highest yield of antibacterial activity. The High-performance liquid chromatography test was done to detect the presence of gallic acid, bioactive compound contains in *Azadirachta indica* plant using Soxhlet of methanol, ethanol and aqueous (distilled water) extraction method. The leaves of *Azadirachta indica* (Neem) were analysed for gradient yields in different solvents and its inflammatory properties.

1.2 Literature Review

Azadirachta Indica

Neem is an Indian-born tropical evergreen tree. (Abhishek Raj, 2015) Sanskrit refers to *Azadirachta indica* (neem) as "arista," which means "perfect, whole, and imperishable" (Girish and Shankara, 2008). Since it has many natural substances in its leaves, seeds, and bark and has many biological activities against disease-causing organisms, *Azadirachta indica* (neem) is one of the family's trees that scientists are most interested about. (Biswas *et al.*, 2002) The neem tree appears to require little water but plenty of sunlight to thrive. The tree can adapt to a variety of climatic, topographic, and edaphic factors. It does well in shallow soils that are dry, stony, and even have hard calcareous or clay pan. (Anonymous, 2006). The *Azadirachta indica* tree has been used for a multitude of ways including weed control, pharmaceuticals, industry, and many others. (Schmutterer, 1995) A substance known as azadivactrin is present in the neem tree's leaves and seeds (Sankaram *et al.*, 1987). Research has shown that some disease-causing fungi, viruses, and parasites can be killed by neem leaves and seeds (Basak and Chakraborty 1968, Thind and Dahiya, 1977, Khan *et al.*,1991). The fungal disease which causes leaf rust of ground nut plants, was found to be very resistant to