

UNIVERSITI TEKNOLOGI MARA

**DEVELOPMENT OF A PROTOTYPE
AUTOMATIC MORTAR AND
PESTLE**

**MUHAMMAD ALIFF BIN MOHD
ZAINUDDIN**

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ABSTRACT

This dissertation introduces an innovative automated mortar and pestle prototype designed to overcome challenges in traditional substance grinding. The primary aim was to create an efficient device automating substance crushing while minimizing manual effort. Utilizing stainless steel, aluminium, drills, and hand grinders in fabrication, the prototype incorporated a crank and slider mechanism, silicone spatula, and DC motors configured in a mortar and pestle setup. The methodology involved detailed design processes and calculations, specifically torque and power calculations to determine motor specifications for the crank and slider. The core of the design revolved around implementing a crank and slider mechanism as the primary structural element. Thorough testing with substances like onions and garlic showcased the final prototype's prowess, with its reciprocating pestle and rotating mortar, powered by two DC motors. This demonstrated significant advancements in speed and accuracy over traditional manual methods. The results hint at potential commercial applications with further enhancements, marking a notable stride in substance processing technology.

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Mortar and pestle with origins that stretch back to the Stone Age, have been an essential tool for ingredient preparation in a variety of settings, such as kitchens, labs, and pharmacies. Usually, the mortar is made of wood, metal, ceramic, or granite, and the pestle is a blunt tool fashioned like a club that is used to pound, squeeze, and rotate the mixture until the required consistency is reached.

Even with its historical importance, the manual mortar and pestle still poses difficulties, particularly in terms of labor and time requirements, particularly when working with large amounts of materials. This recognition prompted the pursuit of an innovative solution which is by inventing an automated mortar and pestle. Although automated mortar and pestle already existed, they are usually too expensive and mostly intended for use in industrial or laboratory environments.

The aim of this project is to bridge the existing gap in the market by innovating and crafting an automated mortar and pestle that stands out for its efficiency and affordability, with a keen focus on adapting it for small-scale home utilization. This ambitious endeavor seeks to revolutionize the grinding and crushing processes, ensuring not only operational efficiency but also cost-effectiveness for the end user.

With a definitive goal to streamline these fundamental processes, the automated mortar and pestle aspires to become a game-changer, contributing to significant time savings, reduction in labor costs, and the delivery of a consistently high-quality outcome. By tailoring the design and functionality to meet the unique needs of everyday home applications, this project envisions a future where automated grinding and crushing become seamlessly integrated into domestic settings, offering accessibility and practicality for a wide range of users.