Chapter 1

Introduction

1.1 Background

Saga plants (*Abrus precatorius*) are commonly used in traditional medicine due to their pharmacological properties, including anti-inflammatory and antioxidant activities. Bioactive compounds such as phenolics, flavonoids, and saponins contribute to these medicinal effects (Tungmunnithum et al., 2018). Enhancing the concentration of these compounds through exogenous elicitor treatments, such as methyl jasmonate, offers a promising approach to improving the plant's therapeutic potential.

Methyl jasmonate is a well-documented elicitor that enhances the biosynthesis of secondary metabolites, including phenolic compounds, flavonoids, and possibly saponins, in medicinal plants. methyl jasmonate is a signaling molecule that activates various metabolic pathways, particularly those involved in plant defense mechanisms (Zhao et al., 2022). In *Ajuga bracteosa* root cultures, methyl jasmonate elicitation significantly increased total phenolic and flavonoid content, demonstrating its role in stimulating the phenylpropanoid pathway, which is crucial for the synthesis of these bioactive compounds (Saeed et al., 2017). In *Talinum paniculatum*, methyl jasmonate elicitation enhanced bacoside content and contributed to saponin accumulation, indicating its broader impact on secondary metabolite production (Restiani et al., 2022). These outcomes are generally associated with the upregulation of biosynthetic genes and the activation of stress-related pathways, ultimately leading to elevated levels of bioactive phytochemicals (Ho et al., 2020).

However, the efficacy of different concentrations on saga plants remains unclear. This study investigated the effect of methyl jasmonate treatment on saga plants' phenolic, flavonoid, and

saponin content. The findings are expected to provide insights into optimizing elicitor-induced bioactive compound production for potential pharmaceutical and nutraceutical applications.

1.2 Objective

This study aims to evaluate the effects of different concentrations of methyl jasmonate on the phenolic, flavonoid, and saponin content of *Abrus precatorius*. It compares the impact of different concentrations of methyl jasmonate on the bioactive compound yield. Another objective is to determine the antioxidant activity of the saga plant extracts after treatment. This study specifically compares the effects of different methyl jasmonate concentrations on phenolic, flavonoid, saponin levels, and antioxidant activity in both leaves and roots to improve understanding of the plant's response to the elicitor.

1.3 Hypothesis

H_0: Methyl jasmonate treatment has no significant effect on accumulating phenolic compounds, flavonoids, and saponins in saga plants.

H_1: Methyl jasmonate treatment significantly enhances the accumulation of phenolic compounds, flavonoids, and saponins in saga plants in a concentration-dependent manner.