

I. INTRODUCTION

1.1 Background

The exploration on alternative wood commodities have been done extensively forest product. It was caused by high demand for commercial wood while the productivity of forest became decreasing. To fill this gap, it is necessary to select alternative woody plants which is categorized as fast growing tree species. Indarung is a pioneer tree from the family of Cannabaceae distributed throughout the tropical climate zone e.g. Indonesia. This species is native to Indonesian archipelago which can grow up to 35 m height (Wati & Azwar, 2009). This plant is commonly use for feeding an animal, fuel, natural dyes, shading tree and also as pioneer species on land's reclamation process (Orwa, Mutua, Kindt, Jamnadass, Anthony, 2009).

In West Sumatra, Indarung has a unique signature i.e. name of the place in Padang City. Currently, the population of Indarung is decreased due to massive exploitation which caused this species difficult to find in natural habitat. Isnaini, Ema, Siti (2011), states that excessive exploitation, habitat destruction, environmental degradation, habitat loss by converting natural area into residential and industrial have an impact on existence of certain types of plants which could be the cause of extinction. According to the IUCN (International Union for Conservation of Nature) Red list (2018), Indarung have a status as least concern. Therefore, it is necessary to propagate it by cuttings or seed germination through various techniques, one of them is using seeds as sources for in vitro culture.



Indarung seeds have a low percentage of germination. It might caused by the characteristics of which is semi-recalcitrant seed (Kurniaty *et al.*, 2015). Previously, Wang *et al.*, (2011), stated semi-recalcitrant seeds have a low viability and vigor. There are a several artificial techniques used to break seed dormancy i.e mechanics, thermal and chemical scarification. These techniques have been worked efficiently in producing a large amount of seedlings for revegetation. By understanding these techniques, it can break dormancy of Indarung seed and accelerate propagation of this species. (Rodrigues & Rodrigues, 2014) had been used chemical scarification to break the dormancy of Indarung seed by soaking in HCl 10% (v/v) for 15 minutes. This technique also can be applied in propagation of Indarung by tissue culture.

Tissue culture technique is used to grow parts of plant (cells, tissues or organs) called explant, aseptically on an artificially media for producing plantlet (mini plant). This technique required planting media which is contant amount of nutrients and phytohormones to support the growth of explant (Dwiyani, 2015). WPM (*McCown's Woody Plant Medium*) is one of planting media use for annual or woody plants exclusively (Beyl, 2011). Li & Zang, (2018) stated that WPM was a suitable media for germination of *Kalmia latifolia* seeds. Singh *et al.*, (2014), also stated that WPM was the suitable media for *in vitro* propagation of *Shorea robusta*. Phytohormones (Plant Growth Regulators) commontly added into the media to support growth and development of explant.

Phytohormones have a role in regulating the growth and development of cells, tissues and organs to direct differentiation process at an appropriate concentration. Cytokinins is one of phytohormones which is often used in seed germination beside of



gibberellins. The use of cytokinin types i.e. TDZ (Thidiazuron), BAP (6-Benzyl Amino Purin), and KIN (Kinetin) have been examined in the germination of woody plant seeds. Rainiyati *et al.*, (2007), stated that the use of an appropriate cytokinins concentration determines the growth of explants in tissue culture. Martinez *et al.*, (2008), have been used TDZ 0.1 mg.L⁻¹ to stimulate seed germination and shoot proliferation of *Quercus robur*. Schulze *et al.*, (2017) have been used BAP 0.7 mg.L⁻¹ to induce radicle and plumule on germination of *Prunus lusitanica* seeds. Recently, Sinuhaji *et al.*, (2017) have been used KIN 4 mg L⁻¹ to induce seed germination and shoot proliferation of *Intsia bijuga*.

Based on the explanation above, a research had been done with the title “*In Vitro* Seeds Germination of Indarung (*Trema orientalis* (L.) Blume) On McCown’s Woody Plant Medium Supplemented With Several Cytokinins”. This research was mainly aim for *in vitro* propagating Indarung using seeds on WPM media supplemented with cytokinins.

1.2 Formulation of Research Problem

The formulation of research problems which want to be answered as follows:

1. Is the cytokinins (TDZ, BAP, KIN) able to initiate germination of Indarung seeds on WPM media *in vitro*?
2. In the cytokinins which are better in initiate germination of Indarung seeds on WPM media *in vitro*?



1.3 Research Objectives

The purpose of the research are:

1. To evaluate the cytokinins (TDZ, BAP, KIN) were able to initiate germination of Indarung seeds on WPM media *in vitro*.
2. To determine the best cytokinins in initiate germination of Indarung seeds on WPM media *in vitro*.

1.4 Research Benefits

The research is expected to provide information about the better of cytokinins in initiating germination of Indarung seeds on WPM media *in vitro* and provide information regarding the propagation of Indarung plants through tissue culture techniques.

