ABSTRACT

LIZAWATI. Improvement of mangosteen (*Garcinia mangostana* L.) seedling root system through *Agrobacterium rhizogenes* inoculation. Supervised by ROEDHY POERWANTO, IMAN RUSMANA, SOBIR, TRI MUJI ERMAYANTI.

Mangosteen is known as a slow growing plant, this is due to the root that is fragile, sensitive to the environmental condition and easily disturbed. Great care is therefore required during the transplanting of seedling, which form a long taproot with few laterals. Many writers note an apparent absence of root hairs at all stage of growth. The use of *Agrobacterium rhizogenes* may improve root system of mangosteen. The soil bacterium *Agrobacterium rhizogenes* can induce the abundant adventitious root formation at the infection site through the transfer of genetic material T-DNA, a part of the Root inducing (Ri) plasmid from bacterium to the plant genome. This research is aimed to develop a technique in improving root system of Mangosteen using Agrobacterium transformation technique in order to improve seedling growth. This research is divide into two step of research, I) improvement of mangosteen seedling root system through *A. rhizogeneses* inoculation at the mangosteen nursery; and II) induction of root formation using *A. rhizogenes in vitro*. The materials used in this experiment were; mangosteen fruit originated from Purwakarta and *A. rhizogenes* collection from Puslit Biotechnology LIPI Cibinong-Bogor. The result showed that strains inoculation of ATCC-15834, 509, 07-20001, A4, and R-1000 increased: stem diameter, plant height, leaf number, lateral and tersier roots number better than control. Inoculation with cutting root method results in the higher live plant percentage compared with dipping root method. *A. rhizogenes* strain ATCC-15834 (OD$_{600}$ = 1.0) was able to infect 6 week old of mangosteen seedling root. Based on PCR product, T$_L$-DNA from *A. rhizogenes* strain ATCC-15834 succeeded to be transferred into genome of mangosteen seedling root cell since the rolB gene was detected at 780 bp agarose electrophoresis. The *A. rhizogenes* strains ATCC-15834 could increase the root anatomy in terms of the mean xylem vascular diameter, conductivity, total xylem width, roots hair, nutrient uptake (N, P and K), IAA hormone content and was better than and control. 509, 07-20001, ATCC-158343 strains induced root formation. All explant with cotyledon that were root formation were induced were able to survive at acclimation stage, but none for cotyledoneless explants. Anatomy observation showed that 509 resulted in higher xylem diameter, total number of xylem, conductivity, and higher ration of conductivity/total root transversal area in comparation to control.

**Key words:** hormone, root hairs, strain, soil bacterium, T-DNA, xylem