CHAPTER 5

CONCLUSIONS AND SUGGESTIONS

From these findings, they were found to be feasible to apply B. pandurata extract as disinfectant in tooth care product. The following conclusions can be employed to explain the inhibition of S. mutans by B. pandurata extract in both powder toothpaste and mouthwash products.

The optimal solvent extraction process of B. pandurata was 95% of ethanol extraction solvent, 7 days of immerging time and maximum dilution as disinfectant at 1:7 of extract per water (v/v). B. pandurata extract by solvent extraction can be inhibited S. mutans from $10^7$ to $10^2$ CFU/ml. The optimal hydrodistillation process of B. pandurata was 90°C of extraction temperature. This condition gave both B. pandurata oil and distillate product. Both products can inhibit S. mutans. The mouthwash mixed with B. pandurata extract inhibited S. mutans better than powder toothpaste because the other composition in mouthwash can inhibit the growth of microorganism, as well.

In summary, the B. pandurata extract had a good potential of being used as a disinfectant. It can be application for development of tooth care product as toothpaste and mouthwash products. Interested groups in participating of the transfer of technology is the elderly and those in the working age due to the knowledge gained to work for extra income. The people in community who join to the transfer technology workshop need to expend the techniques to commercial occupation because the
materials can be found in local market and the toothpaste and mouthwash is the everyday use product. The community needs to produce the products have an average level of 3.95, which is high level. It means that this technology was high demand for people in this area.

The research suggestions were for the next development recipes for mouth care product (powdered toothpaste and mouthwash). The results from time kill analysis were found that the inhibition efficiency of *S. mutans* ATCC 25175 were low efficiency. The next recipe must increase the volume of *B. pandurata* extract.

According to the *B. pandurata* extract, the composition of *B. pandurata* extract had Panduratin A. Panduratin A was proven as the antibacterial agents. The *B. pandurata* extract has an opportunity using as additive into other product. The next research must be concern on this property of this *B. pandurata* extract.

Hence, the mouth care product should be the type of mouth wash which contained the main recipes of *B. pandurata* employing solvent extracted method. The local community which processed the wisdom of producing highly concentrated alcohol and the advantage of easily obtainable raw material (finger roots), the *B. pandurata* solvent extraction which was the main mouth wash recipes could be produced. Subsequently, the mouth wash product could be successfully made available to the locality.

Technology transfer is the tools or techniques for development country to support developing country. This technique will help to spread knowledge from university toward private sector and community. Many examples of tools for technology transfer are competency development, process improvement, prototype buildings, workshop and practices. The research unit should scout what the universities
are doing and capture interesting technology and facilitate transfer into the company's business units. Moreover, the research unit should perform technology development and transfer technology to the business units or local community. Ideally the technology transfer from university to community, where transfer is a result of basic research and technology development. Several phases in a research life cycle ranging from basic research in which the problems are recognized and the key ideas provided to the popularization in which comes to the real transfer of the knowledge and technology. Consequently, the maturity of the technology is dependent on where in its life-cycle the transfer starts.

This research on development of mouthwash and powder toothpaste from *Boesenbergi Pundurata Roxb* is a bridge linking between university knowledge and local medical techniques for preventive dentals carries in local community. Moreover, this research can transfer technology to community and save health cost. Local community can use the details in this research to develop OTOP product. The investment cost and emission of pollutant for both products are lower than the chemical commercial product. This research indicated that the production process is not complicate for local community. This research is the valuable knowledge management for technology transfer to local community.