CHAPTER 9

CONCLUSION AND FUTURE RESEARCH

This thesis set out to investigate pollination-induced senescence in *Dendrobium* Pompadour and the effectiveness of treatment solutions in circumventing the phenomenon. The physiological and biochemical changes that take place indicate that post pollination phenomena have a number of functions, one of which is to remove pollinated flowers from competition for pollinators. This is achieved through visual and olfactory changes in the perianth and its closure. A second function is the reutilization substances and salvaging nutrients by breaking down complex molecules. In this final chapter, the significance and contributions of this research well as the future direction will be presented.

9.1 Contributions:

Below are the major contributions of this research:

- Comprehensive investigation of pollination induced senescence in *D.* Pompadour orchids. Considering pollination –induced senescence is a major challenge in the marketability of orchids; this thesis provides a comprehensive research to understand the phenomenon with regards to the physiological and biochemical changes. This is crucial as less research is devoted to pollination-induced senescence compared to leaf senescence and fruit ripening.

- Establishment of the climacteric ethylene profile in pollinated *D.* Pompadour orchids. Early studies on *Dendrobium* Pompadour focused on the sensitivity and response of these flowers to exposure of ethylene. This thesis provides the first ethylene evolution profile for *D.* Pompadour flowers.

- Successful extension of shelf life and flower quality using ethylene inhibitors. The success of the treatments in delaying senescence and maintaining quality of flowers adds value to the *D.* Pompadour orchids. Furthermore the potential manipulation of the isolated ethylene related genes provides an avenue for development of transgenic for flower improvement.

- Characterization of polypeptides with potential significant roles. This thesis gives insight into polypeptides that potentially play significant roles in pollination-induced senescence of *D.* Pompadour. This serves as a foundation to understand the regulation of specific proteins during pollination induced senescence.

- Successful isolation five ethylene related genes in pollinated *D.* Pompadour. Currently, transgenic studies face challenges in manipulating ethylene where extension of shelf life is at the expanse of poor root formation and hypocotyl growth. This is due to the fact that ethylene is responsible for many physiological responses in plant. The genes isolated and characterized in this thesis provide pollination specific genes that may potentially allow for manipulation of genes that affect pollination induced senescence without interfering with other physiological developments.

9.2 Future research

The results from this study revealed the up-regulation of polypeptides that may play a significant role in pollination-induced senescence. The application of 2D-dimensional electrophoresis and sequencing using mass spectrometry will help in identifying hundreds of different proteins that are up or down regulated during pollination induced senescence. This will give crucial insight into the role of specific proteins during this phenomenon.

The role of the isolated genes during this phenomenon can also be determined. This will be crucial for future gene manipulation. Substantial expression studies on both temporal and stage specific genes can elucidate the ethylene response pathway during pollination induced senescence. Furthermore, this can also assist in the ability to selectively block genes in flowers that play a significant role in ethylene production and perception.