



## CHAPTER V

### CONCLUSION

*Zymomonas mobilis* was an anaerobic Gram-negative and fermentative bacteria used for replacing yeast in the industrial ethanol industry. *Zymomonas mobilis* CM141 was a mutant strain produced by hydroxylamine produced no levan. A mutant strain of *Zymomonas mobilis* CM 141 found to produce red pigments under aerobic conditions.

From these studies were found that

1. The red pigments contained more than one compounds, at least three distinct components, one red brown (Rf 0.2), one red (Rf 0.4) and one pink (Rf 0.8) and the decomposition components as the purple-brown residue on the origin.
2. The red fraction was the most part, it was 2,2 -bipyrrole,4-methoxy-5-[(5-methyl-4-pentyl-2H-pyrrole-2-ylidene)methyl], **prodigiosin**.

3. Prodigiosin was found in two forms, free and protonated forms. The free form in water-free solution was orange color and from the  $^1\text{H}$  NMR spectrum showed there were the mixture of three tautomers. This solution showed the maximum absorption wavelength at 468 nm and fluorescence which excitation wavelength at 380 nm and emission wavelength at 688 nm.

4. The protonated form in solution was red color and was the hydrated form, from  $^1\text{H}$  NMR spectrum showed that the protonation was happened at 1- position. This solution showed the maximum absorption wavelength at 534 - 536 nm and nonfluorescence.

5. The free form was very unstable, it was spontaneously transformed to protonated form the interaction of the base with water in the solvent, adsorbent, moisture in the air.

6. There were another prodigiosin-like compounds produced by *Zymomonas mobilis* CM 141 mutant but in the little quantities and all of these were unstable and decomposed on standing to form the purple-brown residue.

7. The development of improved red pigments producing strains of *Zymomonas mobilis* CM141 were done by mutations and selection. Strain A<sub>113</sub> from hydroxylamine treatment was the best.

This work was reported the informations of red pigments produced by *Zymomonas mobilis* CM141 that never found before. Mutation and selection experiments were used to development of better red pigments producing strains which expected were the source of prodigiosin production.



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