CHAPTER V

SUMMARY

The results of the present investigation can be summarized as follows:

1. Methanol was the best solvent for beta-carotene extraction of Spirulina.

2. The optimal conditions of Spirulina to produce high yield of beta-carotene were prepared by adjusting the components of Zarrouk medium to contain 1.25 g/l $NaNO_3$, 0.25 g/l K_2HPO_4, 0.1 g/l $MgSO_4$ and without K_2SO_4. Spirulina grown in optimized medium produced the higher yield of beta-carotene content than that grown in Zarrouk medium accounting for about 1.16 times and no difference of growth in both were observed.

3. An increase of NaCl concentrations resulted in promoting increased beta-carotene content whereas growth was obviously decreased. Conditions which Spirulina gave the highest beta-carotene content were:

3.1 Changing NaCl content from 20 to 30 g/l gave beta-carotene accounting for about 1.6 times of that under Zarrouk medium.

3.2 Adding 40 g/l of NaCl after 4-day growth gave beta-carotene accounting for about 1.3 times of that under Zarrouk medium.

3.3 Cultivation in Zarrouk medium containing 40 g/l of NaCl after acclimation to this concentration for 1 week gave beta-carotene accounting for about 2.3 times of that under Zarrouk medium.

4. An increase in light intensity resulted in an increase in growth and beta-carotene content of Spirulina and the optimal light intensity to produce high yield of beta-carotene was found to be 10,000 lux.

5. At the same photosynthetic photon flux density, growth of Spirulina was the highest when grown under white light but beta-carotene content was the highest when grown under red light.

6. Norflurazon was a strong inhibitor for beta-carotene production whereas diphenylamine was a medium inhibitor and 2,4-dinitrophenol was a weak inhibitor for beta-carotene production.

7. The results in pilot scale outdoor cultivation were similar to those in laboratory scale cultivation. Growth and beta-carotene were dependent on other environmental factors such as light intensity, temperature and NaCl concentration.

8. Freeze drying was the best method of drying because percent of beta-carotene loss and moisture content of Spirulina were the lowest.

9. Partial purification of beta-carotene was accomplished by only 1 successive run on Silica G-60 column with 97% of efficiency of beta-carotene purification.

10. The optimal storage temperature on beta-carotene of Spirulina was -70^{o}C. Sodium metabisulphite slightly affected beta-carotene preservation of Spirulina.