THE EFFECT OF SOME NUTRIENTS AND WATER QUALITY PARAMETERS ON THE *IN VITRO* MULTIPLICATION, LONGEVITY AND SURVIVAL OF *VIBRIO PARAHAEMOLYTICUS* ISOLATED FROM CAGE CULTURED FISH

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BY

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A research project report submitted in partial fulfilment of the requirement for the degree of Bachelor of Fisheries Science.

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To my beloved mother

for all her love and sacrifice

UNIVERSITI PERTANIAN MALAYSIA
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BORANG PENGESAHAN DAN KELULUSAN LAPORAN
AKHIR PROJEK

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Tajuk Projek	:	The effect of some nutrients and water quality parameters on the *in vitro* multiplication, longevity and survival of *Vibrio parahaemolyticus* isolated from cage cultured fish.

Dengan ini disahkan bahawa saya telah menyemak laporan akhir projek ini dan

(i) semua pembetulan yang disarankan oleh pemeriksa-pemeriksa telah dibuat, dan

(ii) laporan ini telah mengikut format yang diberikan dalam Panduan PSF 499 - Projek dan Seminar, 1991, Fakulti Perikanan dan Sains Samudera, Universiti Pertanian Malaysia.

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ABSTRACT

Laboratory microcosms were employed to evaluate the effect of some selected water quality parameters and inorganic nutrients on the population of *Vibrio parahaemolyticus*.

Of the five salinities examined (0, 5, 10, 20 and 30 ppt), *V. parahaemolyticus* showed maximum growth at salinity of 30 ppt. However, a decline in plate counts was associated with decreasing salinity. In contrast, over the range of temperature tested, an apparent inverse relationship between the temperature and the multiplication of *V. parahaemolyticus* was observed. Temperature of 20^0C induced the multiplication, whereas 35^0C proved to be lethal to this strain. With alkalinity lower than 50 mg/l $CaCO_3$ and at 150 mg/l $CaCO_3$ or above, the population of *V. parahaemolyticus* declined. *V. parahaemolyticus* stored on TSA slant supplemented with 3% NaCl at 5^0C showed the best potential of retrieval.

Natural seawater enriched with PO_4^{3-} showed a similar *V. parahaemolyticus* growth patterns at all the concentrations tested. Nitrate however, caused a marked increase in culturable cells of *V. parahaemolyticus* with a concentration of 70 µg NO_3^-/l but showed a decrease growth with higher NO_3^- levels. Based on the result of this study, it is concluded that the population of *V. parahaemolyticus* in estuarine microbial community has a close relationship with the environmental factors.

ABSTRAK

Mikrokosma telah digunakan untuk mengenalpastikan kesan beberapa parameter kualiti air dan nutrien bukan organik tertentu ke atas populasi *V. parahaemolyticus*.

Daripada lima saliniti iaitu 0, 5, 10,20, dan 30 ppt yang dikaji, *V. parahaemolyticus* menunjukkan pertumbuhan yang maksimum pada 30 ppt. Bagaimanapun, bilangan populasi dalam plat berkurangan apabila saliniti menurun. Sebaliknya, kesan suhu menunjukkan satu perhubungan yang songsang dengan multiplikasi *V. parahaemolyticus*. Suhu air pada 20^0C menggalakkan multiplikasi, manakala suhu 35^0C dibuktikan menyebabkan maut kepada *V. parahaemolyticus*. Pada tahap alkaliniti kurang daripada 50 mg/l $CaCO_3$ ataupun tinggi daripada 150 mg/l $CaCO_3$, jumlah populasi maksimum *V. parahaemolyticus* menurun. *V. parahaemolyticus* yang disimpan pada agar condong tryptone soya agar (TSA) yang ditambahkan dengan 3% NaCl dan dieramkan pada suhu 5^0C menunjukkan potensi yang paling baik untuk dikultur semula.

Air laut semulajadi yang diperkayakan dengan fosfat (PO_4^{3-}) menunjukkan corak pertumbuhan *V. parahaemolyticus* yang sama untuk semua kepekatan yang dikaji. Manakala pertambahan nitrat (NO_3^-) sebanyak 70 µg NO_3^-/l ke dalam mikrokosma menunjukkan kesan ke atas peningkatan pertumbuhan *V. parahaemolyticus* yang jelas

tetapi respon sebaliknya diperhatikan dengan kepekatan NO_3^- yang lebih tinggi. Berdasarkan kepada keputusan kajian ini, populasi *V. parahaemolyticus* dalam komuniti mikrob di muara mempunyai perhubungan yang tinggi dengan faktor persekitaran.