COMPARISON OF VARIOUS WAYS OF EMULSIFYING COD LIVER OIL TO INCREASE THE n3 POLYUNSATURATED FATTY ACID (PUFA) CONTENT IN *Artemia salina* L

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Comparison of various ways of emulsifying cod liver oil to increase the n3 polyunsaturated fatty acid (PUFA) content in *Artemia salina* L.

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

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

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by

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DEDICATED

TO

My dearest *Krishna*

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ABSTRACT

Studies on the improvement of dietary values of Artemia salina as live food by feeding them with n3 PUFA were carried out. Feeding was carried out based on the direct method. By this method, cod liver oil which contains high n3 PUFA was emulsified with either caesin, soybean lecithin or raw egg yolk. Results from this study showed that the concentration of n3 PUFA of cod liver oil emulsified in caesin was the highest compared to soybean lecithin and raw egg yolk. Analyses carried out indicated that 20:5n3 and 22:6n3 present in the cod liver oil emulsified caesin was also present in the tissues of Artemia salina. This, therefore entails that the nutritional value of Artemia as live food for fish larvae and invertebrates will be enhanced.

The concentration of n3 PUFA in Artemia reached its maximum value between 6 and 12 hours of the enrichment period for cod liver oil emulsified in caesin, while in the case of using soybean lecithin as emulsifier, the maximum level was obtained between 6th and 9th hours of enrichment before the level decreased from the 9th to the 12th hour.

From this study too it can be said that the globule size formed when different emulsifier were used did not vary much. This means that the globule sizes would not influence in the concentrations of n3 PUFA formed in the enriched Artemia.

This study also showed that the different emulsifiers did not affect the composition of n3 PUFA present in the tissues of Macrobrachium rosenbergii.

ABSTRAK

Kajian telah dijalankan untuk meningkatkan nilai pemakanan naupli Artemia salina sebagai makanan hidup dengan cara memberikannya makanan yang telah diperkayakan dengan n3 PUFA. Pemberian makanan ini dilakukan secara langsung. Dalam kaedah ini, minyak ikan kod yang mengandungi n3 PUFA yang tinggi diemulsikan dengan menggunakan agen pengemulsi kasein, lesitin kacang soya dan kuning telur mentah. Dalam kajian yang telah dijalankan, kepekatan n3 PUFA di dalam minyak ikan kod yang diemulsikan dengan kaesin mempunyai peratus yang tertinggi berbanding dengan lesitin kacang soya dan kuning telur mentah. Analisis yang telah dijalankan menunjukkan bahawa asid lemak (20:5n3 dan 22:6n3) di dalam minyak ikan kod yang diemulsikan dengan kasein wujud didalam tisu naupli Artemia salina. Ini selanjutnya memperbaiki nilai pemakanan Artemia salina sebagai makanan hidup bagi larva ikan dan invertebrat.

Kepekatan n3 PUFA di dalam Artemia meningkat kepada tahap maksimum di antara 6 hingga 12 jam selepas diperkayakan, kecuali bagi Artemia yang diperkayakan dengan minyak ikan kod yang telah diemulsikan dengan lesitin kacang soya mencapai tahap maksimum di antara 6 hingga 9 jam, tetapi kandungannya menurun dari jam 9 ke 12 selepas diperkayakan.

Dari kajian ini juga didapati tidak ada perbezaan antara saiz globul minyak yang terbentuk bila diemulsikan dengan agen pengemulsi yang berlainan. Ini bermakna saiz globul dari berbagai jenis pengemulsi tidak ada pengaruh terhadap kandungan n3 PUFA Artemia.

Kajian ini juga telah menunjukkan bahawa Artemia yang diperkayakan dengan menggunakan 3 jenis pengemulsi tidak memberi kesan ke atas kandungan n3 PUFA di dalam tisu Macrobrachium rosenbergii.