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Effect of different *Nannochloropsis oculata* diets (cultured under different nitrogen and phosphorus regime) on growth and biochemical composition of rotifers *Brachionus plicatilis*

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Microalgae play an important role in aquaculture as a means of enriching zooplankton for feeding fish and other larvae. A previous series of incubations were conducted in order to investigate the effect of different molar concentrations, sources and ratios of nitrogen (as urea or ammonium nitrate) and phosphorus (as phosphoric acid) of commercial agricultural fertilizers (CAGF) on growth and biochemical compositions of *N. oculata*. The incubations achieved microalga *N. oculata* with different chemical composition as following: highest lipid percentage (HL), lowest lipid (LL), highest protein (HP), lowest protein (LP), highest carbohydrate (HC) and lowest carbohydrate percentage (LL), that comparing to the seventh patch of F/2 standard Guillard medium as a control (CO) treatment. The obtained *N. oculata* from the seven incubations were served as a live food for rotifer *Brachionus plicatilis* reared in batch culture for 72 hours in order to examine its effects on growth performance (population, population growth rate, fecundity, filtration and ingestion rate) and biochemical composition (lipid, protein, carbohydrates, fatty acids and amino acids profile). The results showed that there were no significant differences ($P \leq 0.05$) in population (R^{Fn}) and population growth rate (R^r) of rotifer, whereas significant differences ($P \leq 0.05$) were achieved by rotifer fecundity (R^{Fc}), filtration (R^F) and ingestion rate (R^I). The highest R^{Fn} (156±8.49 Ind. mL-1), R^r (0.0158 Ind./day) and R^{Fc} (0.405±0.005 egg/popu.) were achieved by rotifer fed on LL *N. oculata* diet. On the contrary, the lowest RFn (116±1.41 Ind./ml), Rr (0.0117 Ind./day) and RFc (0.211±0.004 egg/popu.) were achieved by rotifer fed on HC *N. oculata* diet. On the other hand, rotifer fed on *N. oculata* diet cultured on F/2 medium (CO) achieved the lowest significant rotifer carbohydrates percent (10.94%). The highest significant total protein percentage (46.53%) and energy (665270 ca./g) of rotifer were achieved by rotifer fed on *N. oculata* diet LL. On the other hand, rotifer fed on *N. oculata* diet HC achieved the highest rotifer lipids (35.56%) and carbohydrates (18.88%), respectively. Finally, our result demonstrated that the microalga *N. oculata* cultured on CAGF under different nutrient limitation achieved high significant rotifer *B. plicatilis* growth and biochemical composition when compared, as rotifer diets, to F/2 standard media, with advantage of reduced cost media.

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Modification of physicochemical properties to control bacterial attachment to laser engineered surfaces

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Surfaces which prevent bacterial fouling through their physical structure represent a key area of research for food and medical technology. Correlating bacterial adhesion with the physicochemical properties of the surface has seen limited success. However, the ratio between the Liftshitz-Van der Waals and the electron donor component (γ^{LW}/γ-) has been found to be a good predictor of bacterial adhesion to unmodified biomedical polymers. In this study, advancing and receding contact angles of water, formamide and diiodomethane were used to calculate the physicochemical properties by the Liftshitz-Van der Waals acid-base approach on laser surface engineered polyethylene terephthalate films. Changes in surface characteristics were evaluated through surface roughness and XPS. Morphological changes were observed by SEM and Light microscopes. *Escherichia coli* attachment was monitored using SEM and enumerated by total viable counts. Preliminary results suggest that using advancing contact angle to calculate the surface energy components yields no relationship between *E. coli* attachment and the γ^{LW}/γ- ratio. However, when using the receding contact angle, the adhesion of *E. coli* reduces as the ratio between γ^{LW}/γ- decreases. This is significant because receding contact angles have previously been related to the adhesion properties of textured surfaces. Chemical analysis of the engineered surfaces indicate that changes to the γ^{LW}, γ- components and the wettability of the laser engineered PET, are as a result of surface morphology changes rather than a modification of the chemical structure. Relating the γ^{LW}/γ- ratio to bacterial adhesion could provide a reliable method for predicting the anti-biofouling capabilities of textured surfaces.

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