

# Beneficial Microbes: Food, Pharma, Aqua & Beverages Industry

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## Growth and biochemical composition of molecular identified marine microalga *Nannochloropsis oceanica*, cultured under nutrient limitation on reduced cost media for aquaculture and biodiesel production

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Microalgae culture media should be economical, allow for high growth, satisfy the needs of microalgal cells and easy to prepare. In this study, we evaluate the effect of different medium formula prepared from commercial agricultural fertilizers (CAGF), comparing to F/2 Guillard medium as control medium on growth (specific growth rate,  $\mu$ ; cell density, CD; and dry weight, DW) and biochemical composition (lipid, protein, and carbohydrate) of *Nannochloropsis oceanica*, identified by 18S RNA. Comparing to N/P ratio of F/2 Guillard medium, six treatments of N/P ratios (1.6, 3.2, 4.8, 9.6, 10.3 and 20.7) were prepared from ammonium sulfate (NH) or nitric acid (NU) as a nitrogen source with phosphoric acid (P) as phosphorus source. The results investigated that some CAGF media achieved significant ( $P \leq 0.05$ ) growth and biochemical composition higher than F/2, depending on N/P ratios and atomic sources concentrations. The highest CD ( $9.325 \pm 0.855 \times 10^7$  cell/ml), DW ( $0.9060 \pm 0.0274$  g/l) and  $\mu$  ( $0.6500 \pm 0.223$  Division/day) was achieved by treatment NU100+P100, while the lowest CD ( $4.400 \pm 1.710 \times 10^7$  cell/ml) and DW ( $0.7484 \pm 0.0547$  g/l) were achieved by treatment NU50+P300. Comparing to F/2 control lipids (30.70%), protein (14.47%) and carbohydrates (8.31%), the highest significant total lipid ( $48.62 \pm 5.08\%$ ) was achieved by NH100+P300, while the lowest ( $18.40 \pm 1.39\%$ ) were observed by NU50+P300. Furthermore, NU100+P300 and NH50+P100 were achieved the highest protein ( $28.46 \pm 2.39\%$  and  $28.40 \pm 2.47\%$ ), respectively, while the lowest ( $10.27 \pm 2.39\%$  and  $10.65 \pm 0.72\%$ ) were achieved by NH50+P50 and NH100+P100, respectively. The highest carbohydrate ( $38.50 \pm 1.21\%$ ) was achieved by NU50+P50, while the lowest was achieved by F/2 Control ( $8.312 \pm 4.47\%$ ), followed by NU100+P50 ( $8.64 \pm 2.73\%$ ), NH50+P300 ( $9.62 \pm 2.42\%$ ) and NU50+P300 ( $9.84 \pm 1.15\%$ ), respectively. From the previous data we can conclude that the different nitrogen sources may affect the growth and biochemical composition of *N. oceanica*, depending on the atom concentration and N/P ratio. Finally, the use of CAGF constitutes a viable alternative to reduce production costs and it also can substitute the F/2 media which is commonly used for culture of *N. oceanica* in the fields of aquaculture and biodiesel production.

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## Quality assessment of fresh milk from managed Nigerian Bunaji and Bokolooji breed of cattle in Potiskum Local Government Area, Yobe State, Nigeria

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The quality assessment of fresh cow milk from traditionally managed Bunaji and Bokolooji Nigerian breeds of cattle in Potiskum Local Government Area, Yobe State, Nigeria were assessed. Raw milk samples were collected from 20 lactating cows, made up of ten 10 animals from each breed and analyzed for their bacterial count and isolation. The mean values of  $5.6 \times 10^{10}$  cfu/ml and  $5.45 \times 10^{10}$  cfu/ml were obtained for the total bacterial count for Bunaji and Bokolooji breeds respectively. Five bacteria species were isolated and identified from the milk samples across the breeds namely, *Bacillus* spp., *Escherichia coli*, *micrococcus* spp., *Streptococcus* spp., and *Staphylococcus aureus* with *Bacillus* spp., and *Escherichia coli* being the most predominant bacteria isolates in the study. The result obtained from the study indicated that, the bacteria count shows that the milk is not good for human consumption as the current situation is critical and needs proper and sterile handling from production to the point of processing.

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