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Comparative study of microbial, proximate and heavy metal compositions of some gastropods, bivalve and crustacean seafood

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Abstract

Background: Seafood are known to be nutritionally rich, however, water bodies from where these foods are harvested are often burdened with wastes from industries, household and run-offs. Thus seafood can harbor pathogenic microorganisms and heavy metals which can pose a serious health hazard to consumers.

Materials and Methods: In this study, 5kg each of *Littorina littorea*, *Achatina fulica*, *Tympanotonos fuscatus*, *Dorsanum miran*, *Egeria radiata* and *Penaeus notialis* were investigated for microbial, proximate and heavy metal qualities using standard microbiological and chemical methods of analysis.

Results: The gastropod mollusks *Tympanotonos fuscatus*, *Littorina littorea* and *Achatina fulica* had significantly ($p \leq 0.05$) higher microbial loads compared to other samples. All the samples had significantly ($p \leq 0.05$) higher coliform counts compared to standard specifications. The microbial isolates from the samples included species of *Bacillus*, *Klebsiellae*, *Citrobacter*, *Providencia*, *Pseudomonas*, *Staphylococcus aureus*, *Escherichia coli* and *Aspergillus niger*, *Aspergillus flavus*, yeasts, *Alternaria*, *Absidia*, *Rhizopus*, and *Mucor*. Antibiogram of the isolates revealed multiple resistances with 79.55% and 66.67% resistance to antibacterial and antifungal agents respectively. The seafood was rich in protein (8.0 ± 0.03 to $46.0 \pm 0.03\%$) and fat (0.6 ± 0.01 to $8.8 \pm 1.00\%$) but low in carbohydrate (1.18 ± 0.84 to $3.81 \pm 0.86\%$). The heavy metal compositions of the seafood were generally low except for manganese 6.36 ± 0.03 ppm in *Dorsanum miran* and nickel 0.81 ± 0.50 ppm in *Penaeus notialis*.

Conclusion: The microbial loads of the seafood are significantly ($p \leq 0.05$) higher in gastropods and more than acceptable standard, effective protection of water bodies for food cultivation and constant

monitoring of seafood is necessary. Adequate processing and employing good manufacturing practices can reduce the microbial loads to an acceptable level and prevent food borne hazards that could be associated with seafood consumption.

Keywords: Seafood; Heavy metals; Microbial profile; proximate compositions

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