

Molecular approaches for microbiome characterisation of the giant red shrimp *Aristaeomorpha foliacea* (Risso, 1827) from two different fishing grounds

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Abstract:

The giant red shrimp *Aristaeomorpha foliacea* has a wide geographical distribution in the world and represents an important economic resource, highly exploited in the Mediterranean Sea. However, new fishing grounds recently joined the global seafood market and began exporting their catch worldwide. This led to a value differentiation of the species in relation to different origin, making it a subject of commercial fraud.

Recent studies revealed how geographical and environmental features can shape the microbiome of organisms, paving the way for the use of a “microbial fingerprint” to obtain information about their ecosystem for seafood traceability purposes.

In this study, a molecular characterization of *A. foliacea* gut and gills microbiome was carried out, in order to explore its associated bacterial communities and to find any origin-related differences. To this end, two fishing areas were selected, characterized by both economic and environmental diversity: Strait of Sicily, where the Mazara del Vallo red shrimps are caught, and Mozambique Channel. A DNA metabarcoding approach was used to investigate the microbial composition, performing a High Throughput DNA Sequencing of the hypervariable V3-V4 regions of the 16S rRNA gene. Raw sequences were processed and compared to Silva DNA reference database, allowing a taxonomic characterization of bacterial communities and a consequent assessment of their biodiversity.

In parallel, a preliminary research was conducted for the molecular characterization of the giant red shrimp feeding habits, since its strict correlation with gut microbiome and environment. First, a literature search was performed about *A. foliacea* diet and possible DNA metabarcoding molecular markers. Then, *in silico* and *in vitro* tests were carried out and a molecular workflow was developed to assess its diet diversity. On the whole, this study constitutes a promising ground for the investigation of the ecological footprints influencing the sustainability and safety of seafood in our plate.