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SỐ ĐẶC BIỆT CỦA TẠP CHÍ REGIONAL STUDIES IN MARINE SCIENCE
CỦA CÁN BỘ GIẢNG VIÊN TRƯỜNG ĐẠI HỌC NHA TRANG

NHÂN KỶ NIỆM 50 NĂM TRƯỜNG ĐẠI HỌC NHA TRANG XÂY DỰNG VÀ PHÁT TRIỂN TẠI TỈNH KHÁNH HÒA

04/10/1976 - 04/10/2026



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04/10/1976 - 04/10/2026

FULL TITLE FOR SPECIAL ISSUE: MARINE SCIENCE IN A CHANGING CLIMATE: REGIONAL PERSPECTIVES FROM 50 YEARS OF RESEARCH IN NHA TRANG, VIET NAM

Short title for special issue: Viet Nam Marine Science

Introduction: This Special Issue commemorates the 50th anniversary (1976–2026) of marine research in Nha Trang, Viet Nam, a major center of marine science in Southeast Asia. The special Issue uses this five-decade research legacy as a foundation to highlight regionally focused marine science in Viet Nam and comparable tropical marine systems. This issue invites original research and review articles addressing regional-scale marine processes, tropical coastal and offshore ecosystems, fisheries and aquaculture–environment interactions, marine pollution, and climate change impacts. Emphasis is placed on laboratory and field experiments, long-term observations, ecosystem-based management, and regionally grounded case studies that contribute to understanding and managing marine systems under changing climatic conditions in tropical and subtropical regions.

Special Issue Keywords: Tropical marine ecosystems; Climate change impacts; Coastal and offshore processes; Fisheries–environment interactions; Aquaculture–environment linkages; Marine pollution; Ecosystem-based management; Southeast Asia.

Acknowledgments: This work contributes to the celebration of the 50th anniversary of Nha Trang University, located in Khanh Hoa Province, Viet Nam.

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MỤC LỤC

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Effects of temperature, irradiance, and culture medium on carpospore release and germination of the antimethanogenic seaweed *Asparagopsis taxiformis* from Nha Trang, Vietnam

Pham-Thi Minh-Thu [a], Ngo Dang Nghia [b], Khuc Thi An [a], Nguyen Thi Nhu Thuong [a], Nguyen Thi Kim Cuc [a], Vo Van Trong [c], Tran Ngoc Khanh [c d], Ngo Thi Hoai Duong [b] Show more

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Abstract

Asparagopsis taxiformis has emerged as a promising biological candidate for a strategy to mitigate enteric methane emissions in ruminants. However, establishing scalable biomass production systems for local lineages remains a major challenge. This study investigated the reproductive phenology and improved early-stage hatchery protocols for a local lineage collected from Nha Trang Bay in Central Vietnam. The wild populations exhibited high reproductive capacity, characterized by a cystocarp density of 12.3 ± 4.8 cystocarp cm^{-1}. Thermal tolerance experiments identified a narrow optimal temperature range of 24–28°C, at which carpospore survival and germination both reached 100%. In contrast, exposure to 32°C resulted in complete mortality, whereas 20°C significantly inhibited tetrasporophyte development. Among the spore-release methods evaluated, natural induction was quantitatively superior, producing 5–10-fold higher spore yields than forcible release. However, forcible release generated cultures with higher cleanliness (95.8–100%). Light was identified as an essential factor for germination, confirming the positively photoblastic nature of the carpospores. A significant three-way interaction among liberation method, irradiance, and culture medium was observed, indicating that the combination of natural induction, f/2 medium, and 21 µmol photons m^{-2} s^{-1} irradiance yielded the highest performance, including higher spore yield, longest germling length (0.39 ± 0.04 mm) and 100% morphological branching within seven days. Collectively, these findings establish the first hatchery baseline for Vietnamese *A. taxiformis* and provide critical baseline culture conditions for overcoming the developmental lag phase. This study therefore lays an important foundation for the development of a domestic seaweed cultivation industry capable of contributing to both national and global methane mitigation strategies.

Keywords

Asparagopsis taxiformis; Carpospore; Temperature; Irradiance; Culture medium; Vietnam

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Reproductive biology of Chinese thorny oyster, *Spondylus sinensis* Schreibers, 1793 in Khanh Hoa seawater, Vietnam

Hua Thai An [a], Cao Van Nguyen [a], Tran Mai Duc [a], Le Trong Nghia [a], Vu Thi Mo [a], Tran Van Huynh [a], Vu Trong Dai [b], Huynh Minh Sang [a c]
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Abstract

This study investigates the reproductive biology of the Chinese thorny oyster *Spondylus sinensis* in the nearshore waters of Khanh Hoa Province, Vietnam, to provide baseline information for stock management and aquaculture development. A total of 30 individuals were collected monthly from November 2024 to October 2025 and examined for reproductive characteristics. Five gonadal maturity stages were identified, consistent with reproductive patterns typical of tropical bivalves. The population exhibited a significantly male-biased sex structure, with 55.5% males, 30.0% females, 10.3% hermaphrodites, and 4.1% indeterminate individuals, resulting in a sex ratio of 1.9:1. The gonadosomatic index showed clear seasonality, with peak spawning activity occurring from March to May and a secondary spawning period from July to October. The size at first sexual maturity (L50) was estimated at 50.9 mm shell height, and individuals began reproducing at approximately 46 mm. Absolute fecundity increased with size, averaging 854,540 ± 322,468 eggs per individual, while relative fecundity averaged 8540 ± 2358 eggs per gram of body weight. These findings indicate that *S. sinensis* exhibits an extended spawning season, high fecundity, and size-dependent reproductive characteristics. Establishing harvest size limits above 56 mm and regulating wild collection are recommended to ensure population sustainability. Overall, the study provides foundational reproductive data essential for effective resource management and for supporting future hatchery development of *S. sinensis* in Vietnam.

Keywords

Spondylus sinensis; Reproductive biology; Fecundity; Spawning season; Sexual maturity; Vietnam

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Effects of food type and feeding regime on selected physiological characteristics of the soft coral, *Sarcophyton serenei* (Tixier-Durivault, 1958)

Ho Son Lam [a], Do-Huu Hoang [a] ✉, Dang-Tran Tu Tram [a], Nguyen-Thi Nguyet Hue [a], Le Thi Bich Nguyen [a], Hoang-Xuan Ben [a], Dao-Viet Ha [a], Tran Van Phuoc [b] Show more

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Abstract

The present study aimed to assess the combined influences of food type and feeding regime on the growth rate, survival, zooxanthellae density, chlorophyll-*a* concentration, and organic matter content of the soft coral *Sarcophyton serenei* during a 60-day indoor culture period. Three feeding types (rotifers, *Artemia*, and a rotifer-*Artemia* combination) and two feeding regimes (every 2 days and every 4 days) were tested, together with a unfed control. The findings indicated that feeding with rotifers (*Brachionus plicatilis*) every other day resulted in higher growth and organic matter content compared to the other dietary treatments. In contrast, survival rate, zooxanthellae density, and chlorophyll-*a* concentration did not differ significantly among treatments. The findings of this study contribute valuable information for refining asexual propagation techniques in this coral species, thereby supporting the development of sustainable aquaculture practices. Such advancements can help secure a reliable source of soft corals and improve husbandry practices in captivity.

Keywords

Food type; Feeding regime; Soft coral; *Sarcophyton*; *S. serenei*

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Coral reef degradation is associated with gut microbiome shifts in the tomato anemonefish *Amphiprion frenatus*

Hai-Thanh Thi Nguyen [a], Viet Do Hung Dang [b], Dien Duc Tran [b], Anze Abram [c d], Fabian Gösser [d], James Davis Reimer [d e] Show more

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Abstract

Anemonefish in association with anemones are iconic images of tropical coral reefs and essential to maintaining the structure and function of coral reefs. Coral reef degradation may influence host-associated microbiomes, yet its effects on anemonefish gut microbial communities remain poorly understood. This study compared the gut microbiomes of the tomato anemonefish, *Amphiprion frenatus*, in symbiosis with the bubble anemone host *Entacmaea quadricolor*, inhabiting two contrasting reef ecosystems: a degraded reef system (Nha Trang Bay - NTB) and a relatively pristine reef system (Van Phong Bay - VPB), Vietnam. Gut microbiomes from 30 fish (n = 15 per bay) were analyzed using 16S rRNA amplicon sequencing. Although Shannon diversity and Evenness did not differ significantly between bays (Shannon: 7.22 ± 0.71 in VPB vs. 6.86 ± 0.70 in NTB; Evenness: 0.84 ± 0.04 vs. 0.85 ± 0.05), fish from VPB harbored significantly richer gut microbiomes, with higher observed ASV richness (407.9 ± 144.7 vs. 282.6 ± 95.3) and Chao1 diversity estimates (626.5 ± 300.9 vs. 367.5 ± 142.8). Beta-diversity analyses showed statistically significant differences in microbial composition and density between sample groups in NTB and VPB (PERMANOVA, R^2=0.094 p = 0.006). Proteobacteria and Firmicutes were dominant phyla in both communities with Firmicutes accounted for 41.59% of sequences in VPB compared with 38.04% in NTB, whereas Proteobacteria represented 35.88% and 42.59%, respectively. In contrast, NTB fish showed a greater relative abundance of Proteobacteria and Planctomycetota. PICRUSt2-based functional predictions suggested enrichment of fermentation and energy acquisition pathways in VPB fish, whereas microbiomes from NTB were associated with predicted functions related to a variety of biosynthetic and metabolic processes. These findings suggest that habitat conditions may be associated with the carbon and nitrogen cycles mediated by the microbial communities within the anemonefish-anemone symbiotic relationship.

Keywords

Microbiome; 16S amplicon; Coral reef; Anemonefish; Nha Trang Bay

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Enriching *Artemia* with n-3HUFA modulated growth, survival, digestive enzymes, body composition and stress resistance in giant trevally (*Caranx ignobilis*) larvae

Anh Thi Pham [a], Manh Van Ngo [a], Ha Kim Thi Nguyen [b], Hung Duc Pham [a 1] Show more

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Abstract

High mortality of marine fish larvae during live-prey feeding and metamorphosis is a bottleneck in commercial hatchery production. This study investigated the effects of dietary highly unsaturated fatty acids (HUFA) used to enrich *Artemia* on the growth, survival, digestive enzyme activity, proximate composition and stress resistance of giant trevally (*Caranx ignobilis*) larvae. The 13 days after hatching larvae were fed *Artemia* enriched with a rich HUFA emulsion at five levels (0, 150, 300, 450 and 600 mg/L) for 28 days. The results indicated that enriched HUFA *Artemia* significantly increased the survival of giant trevally larvae. Larval growth tended to increase in fish fed enriched *Artemia*, with the highest weight and length obtained in a dietary n-3HUFA of 19.03% total fatty acids (TFA). There were no differences in protein and moisture of the larvae fed experimental diets, while lipid content was significantly increased in fish fed n-3HUFA enrichment at 150, 300 and 450 mg/L. The activities of pepsin and trypsin remained unchanged in larvae fed enriched HUFA diets, but significantly increased compared to the unenriched *Artemia* group ($P < 0.05$). Activity of chymotrypsin increased to a peak at 300 mg/L enrichment and was significantly reduced in the 450 and 600 mg/L groups. The mortalities of the larvae after the salinity test were significantly reduced in the 300, 450 and 600 mg/L groups. Overall, dietary n-3HUFA requirements to maximize final body weight and survival for giant trevally during *Artemia* feeding were estimated at 15.63% and 22.67% TFA, respectively based on polynomial regression analysis.

Keywords

Caranx ignobilis; Enrichment; N-3 HUFA; Digestive enzyme; Stress resistance

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Dynamics of carbon and nitrogen profiles in the hatching medium of decapsulated *Artemia franciscana* cysts

Thai Truong Quoc [a c], Dat Nguyen Khac [a], Hong Truong Thi Bich [b], Sorgeloos Patrick [c], De Schryver Peter [c] Show more

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Abstract

During hatching, a carbon metabolism drives the release of nauplii from the cysts of the zooplankton brine shrimp *Artemia*. In this study, the change in carbonaceous compounds (trehalose, glycerol, glycogen and total organic carbon) and total nitrogen in the axenic hatching medium of decapsulated *Artemia franciscana* cysts was determined throughout the hatching process. Three different salinities (5, 12 and 35 g L^{-1}) of the incubation medium were applied. Trehalose appeared in the medium in small quantities (maximally 2.6 mg C g^{-1} incubated dry cysts L^{-1}) as compared to glycerol and glycogen (maximally 28.5 ± 1.2 and 13.8 ± 1.0 mg C g^{-1} incubated dry cysts L^{-1}, respectively). This is consistent with the conversion of trehalose within the cyst into glycogen for energy delivery during respiration and into glycerol for hatching of the nauplius out of the shell. Salinity only seemed to substantially affect glycerol release which was significantly higher at 12 g L^{-1} and 35 g L^{-1} than at 5 g L^{-1} for most of the incubation period. The maximum total organic carbon (TOC) levels were 38.6 ± 9.0, 55.2 ± 6.0 and 58.7 ± 7.7 mg g^{-1} incubated dry cysts L^{-1} and the maximum total nitrogen (TN) levels were 3.0 ± 0.4, 4.6 ± 0.3 and 6.9 ± 0.4 mg g^{-1} incubated dry cysts L^{-1} for the 5 g L^{-1}, 12 g L^{-1} and 35 g L^{-1} treatment, respectively. The resulting C/N ratio was 10 or more throughout most of the cyst incubation period in each treatment and showed adequate to support bacterial growth of the probiotic bacterium *Bacillus* sp. LT12. The observations from this study can form the basis of further studies on the integration of *Artemia* live feed production and bacterial culture to apply in larviculture.

Keywords

Artemia; Dormant cysts; Trehalose; Glycerol; Glycogen; Hatching medium

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Optimization of dietary marigold (*Tagetes erecta*) carotenoid levels on growth performance, feed utilization, skin pigmentation, and digestive enzyme activities of juvenile golden trevally (*Gnathanodon speciosus*)

Dung Van Tran [a], Trang Le Thi Tran [a], Dang Duyen Thi Thach [a], Dai Quang Tran [a], Manh Van Ngo [a], Dai Trong Vu [a], Hung Quoc Pham [a], Thanh Trung Dang [b] Show more

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Abstract

Color fading under captivity substantially reduces the market value of golden trevally (*Gnathanodon speciosus*), a tropical marine fish of high ornamental and food value. This study determined the optimum dietary level of marigold (*Tagetes erecta*) carotenoids for juvenile golden trevally. Fish (2.92 ± 0.06 cm; 0.51 ± 0.04 g) were fed six diets supplemented with carotenoids at 0, 200, 400, 600, 800, and 1000 mg/kg (triplicate) for 8 weeks. Final body weight, specific growth rate (SGR), feed conversion ratio (FCR), and protein efficiency ratio improved significantly ($P < 0.05$), peaking at 600–800 mg/kg. Skin yellowness (b*) rose 3.3⁻3.4-fold and plateaued near 800 mg/kg. Carotenoid deposition was strongly tissue-specific (skin ≫ whole body > muscle), with a skin-to-muscle ratio of 35–69-fold. Intestinal protease and lipase activities increased 1.9- and 2.3-fold, respectively, whereas amylase was unaffected. Crude protein increased (≥ 400 mg/kg) and crude lipid decreased (≥ 600 mg/kg) significantly. Survival exceeded 94% across all treatments. Model selection (quadratic models selected via AICc-based comparison among eight candidates) estimated optima of 646 mg/kg for specific growth rate (SGR_W) and 761 mg/kg for skin yellowness, while pigment accumulation and lipase activity saturated within 600–800 mg/kg. A practical range of 600–800 mg/kg is recommended. This is the first dose–response study of marigold carotenoids in golden trevally, providing a scientific basis for natural-pigment aquafeed in tropical marine aquaculture.

Keywords

Carotenoids; Marigold; *Gnathanodon speciosus*; Skin pigmentation; Digestive enzymes; Marine aquaculture

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Chitosan nanoparticles derived from molted shrimp shells as biodegradable adjuvants for *Vibrio harveyi* vaccination in Asian sea bass (*Lates calcarifer*)

Tran Vi Hich [a], Khuong V. Dinh [a b] ✉, Nguyen Thi Kim Cuc [a], Nguyen Thi Thuy Giang [a], Pham Thi Dan Phuong [b], Nguyen Cong Minh [c d], Trang Si Trung [c] ✉ Show more

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Abstract

The development of biodegradable adjuvants is crucial for aquaculture vaccination, yet it is still understudied. This study evaluated the comparative adjuvanticity of three chitosan derivatives prepared from molted shrimp shells (*Litopenaeus vannamei*), low viscosity chitosan (LV-chitosan), water-soluble chitosan lactate (Chi-L), and ionically cross-linked chitosan nanoparticles (Chi-N), in an inactivated *Vibrio harveyi* vaccine for Asian sea bass (*Lates calcarifer*), a major aquaculture species in Asia. Following intraperitoneal injection, the immune response was monitored against phosphate-buffered saline (PBS) and Freund's Complete Adjuvant (FCA) controls. The results showed that soluble derivatives (LV-chitosan and Chi-L) did not induce higher antibody titers than the PBS control by day 28 post-vaccination. Chi-N elicited antibody titers ($2^{3.29} \pm 0.1$) that were lower than the FCA benchmark ($2^{4.73} \pm 0.1$), but significantly higher than the PBS control, suggesting immune enhancement. In addition, Chi-N significantly enhanced serum lysozyme activity compared with the PBS control, indicating stimulation of innate immunity. Macroscopic examination showed no visible persistent residues in the Chi-N group, whereas FCA produced obvious intra-abdominal residues. These observations are consistent with the expected biodegradability of nanochitosan, although in vivo biodegradation needed to be confirmed by histological examination or quantitative assessment of material degradation. Overall, these findings suggest that valorizing molted shrimp shells into nanoparticulate chitosan enhances adjuvant performance compared with soluble chitosan derivatives, highlighting the importance of the structure–property relationship among chitosan formulations and supporting the potential of nanochitosan as a sustainable alternative for aquaculture vaccination.

Keywords

Chitosan nanoparticles; Molted shrimp shells; Vaccine adjuvant; Vibrio harveyi; Biodegradability; Structure-property relationship

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Antiparasitic effects of silver nanoparticles on *Cryptocaryon irritans* and toxicity in juvenile *Trachinotus* spp.

Kim Minh Anh [a], Vu Duc Manh [a], Ngo Van Manh [b], Truong Dinh Hoai [a], Nguyen Manh Hung [c], Kim Van Van [a] Show more

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Abstract

White spot disease caused by *Cryptocaryon irritans* remains a major challenge in marine aquaculture, particularly in intensive cage-culture systems. This study evaluated the antiparasitic activity of silver nanoparticles (AgNPs) against two critical developmental stages of *C. irritans* and assessed their acute toxicity in juvenile golden pompano (*Trachinotus* spp.). AgNPs were tested in seawater at concentrations of 0, 0.25, 0.50, 1.00, 2.00, and 5.00 ppm. Protomont-to-tomont development was monitored after 24 and 48 h of exposure, whereas theront survival was evaluated after 1 h. Acute toxicity to juvenile *Trachinotus* spp. was assessed during a 96-h immersion exposure. AgNPs significantly inhibited protomont-to-tomont development in a concentration-dependent manner. Tomont formation was markedly suppressed at concentrations ≥ 1.00 ppm and completely inhibited at 5.00 ppm. Theronts were susceptible to AgNP exposure, with survival decreasing from 83.3 ± 5.8% in the control to 4.7 ± 2.9% at 0.50 ppm, while complete mortality occurred at concentrations ≥ 1.00 ppm. Toxicity assays in juvenile fish showed no mortality at 0.25 and 0.50 ppm, whereas the 96-h LC_{50} was estimated at 1.42 ppm. These findings demonstrate that AgNPs can inhibit the development and survival of *C. irritans* under experimental seawater conditions, particularly during the theront stage. However, the relatively narrow margin between antiparasitic activity and host toxicity highlights the need for further optimization of exposure conditions and safety evaluation prior to practical application in marine aquaculture.

Keywords

Acute toxicity; *Cryptocaryon irritans*; Marine aquaculture; Silver nanoparticles; *Trachinotus* spp

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First Molecular Detection and Preliminary Characterization of Red Sea Bream Iridovirus (RSIV) in Cultured Asian Seabass (*Lates calcarifer*) in Vietnam

Hoa Khanh Tran Kiem [a b], Trung Hieu Pham [a], Phuong Chung Le [b], Hung Vu-Khac [a] Show more

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Abstract

Red sea bream iridovirus (RSIV), a member of the genus *Megalocytivirus* within the family *Iridoviridae*, is one of the most economically important viral pathogens affecting marine aquaculture in Asia. Until now, information regarding its occurrence in farmed marine fish in Vietnam remains limited. In the present study, RSIV infection was investigated in cultured Asian seabass (*Lates calcarifer*) collected from coastal provinces of Vietnam. Diseased fish exhibited typical clinical signs including lethargy, anorexia, body darkening, abdominal distension, anemia, gill hemorrhage, and splenomegaly. Approximately 40% of sampled fish tested positive for RSIV by PCR with specific primers. The virus was successfully isolated and propagated in GF cell lines, where cytopathic effects appeared 4–5 days post-inoculation and were characterized by enlarged, rounded cells followed by cell detachment. Phylogenetic analysis based on the Major Capsid Protein clustered the Vietnamese isolates in this study together with RSIV type II strains from Japan, China, South Korea, and Taiwan. Serial passages of the virus in GF cells demonstrated genetic stability of the MCP gene during serial *in vitro* passaging since there were no differences in MCP sequences between the first and the fifteenth RSIV passage. Experimental challenge of healthy seabass with the isolated strain KH63 (Accession Number PZ897675) resulted in 100% cumulative mortality within 10 days post-infection in the RSIV-inoculated group, whereas no mortality was observed in the control group, confirming the high virulence under intraperitoneal challenge of the isolate. To our knowledge, this study represents the first molecular confirmation, isolation, and characterization of RSIV infection in cultured Asian seabass in Vietnam. The detection and isolation of RSIV from diseased Asian seabass in three coastal provinces, together with the observed mortality following experimental challenge, provide evidence that RSIV should be considered in the differential diagnosis of disease outbreaks in cultured Asian seabass in Vietnam.

Keywords

Red sea bream iridovirus; RSIV; *Lates calcarifer*; Asian seabass; fish disease

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Development of chitosan-red onion peel extract coatings for enhancing the quality and shelf life of houndfish (*Tylosurus crocodilus*) during ice storage

Nguyen Thi Nhu Ha [a], Nguyen Cong Minh [b], Vuong Thanh Tung [a] Show more

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Abstract

This study investigated the effectiveness of 1.5% (w/v) chitosan coatings incorporated with red onion peel extract (ROPE) in improving the quality and shelf life of houndfish (*Tylosurus crocodilus*) during ice storage. The incorporation of ROPE significantly enhanced the antioxidant capacity of chitosan coatings, increasing DPPH radical scavenging activity from 31.6% to 74.0%. Chitosan showed antibacterial activity against *Bacillus cereus* and *Salmonella enterica* with an MIC of 234 µg/mL. The addition of ROPE significantly improved its effectiveness, lowering the MIC to 29 µg/mL (chitosan combined with 125 µg/mL ROPE). This substantial reduction highlights a strong synergistic interaction between chitosan and ROPE-derived phenolic compounds, significantly improving antibacterial activity. During 24 days of ice storage, ROPE-enriched coatings, particularly at 500–1000 µg/mL, effectively delayed quality deterioration by suppressing microbial growth, protein degradation, and lipid oxidation. These treatments maintained lower pH, total volatile basic nitrogen (TVBN), and total viable counts (TVC), while reducing TCA-soluble peptide formation and preserving myofibrillar protein integrity, as confirmed by SDS-PAGE. In addition, lipid oxidation was significantly reduced, with lower peroxide value (PV) and TBARS than in control and chitosan-only samples. Furthermore, ROPE incorporation improved water holding capacity, maintained texture, and extended sensory acceptability for up to 24 days. Pearson correlation analysis revealed strong negative relationships between sensory quality and spoilage indicators (pH, TVBN, TVC, PV, TBARS, and TCA-soluble peptides), while texture showed a positive correlation with overall acceptability, confirming the effectiveness of CROPE in delaying quality deterioration. Overall, 1.5% chitosan combined with ROPE represents a promising bioactive coating strategy for enhancing seafood quality and shelf life stability during ice storage.

Keywords

Antioxidant and antibacterial properties; Chitosan-red onion peel extract coatings; Fish preservation; Houndfish

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LC-MS-based chemical profiling and *in vivo* anti-inflammatory effects of the Vietnamese red alga *Tricleocarpa cylindrica*

Thi Hong Tuoi Do [a b 1], Thanh Tra Do [a], Huong-Giang Le [a 2], Thi Kim Anh Le [b 3], Van Minh Nguyen [c 4], The Han Nguyen [c 5], Anh Duy Do [d 6], Thi Van Anh Tran [a 7] Show more

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Abstract

Inflammation is a protective response to harmful stimuli; however, excessive or persistent inflammation contributes to chronic disease and remains a therapeutic challenge. Marine algae are promising sources of bioactive metabolites, yet the anti-inflammatory potential and oral safety of *Tricleocarpa cylindrica* remain poorly characterized. This study characterized the chemical profile of *T. cylindrica* using LC-MS and GNPS-based molecular networking, identifying triterpene sulfates as the primary bioactive constituents. The *in vivo* anti-inflammatory activity was evaluated using carrageenan-induced paw edema, cotton pellet-induced granuloma, and acute/chronic carrageenan-induced arthritis models. The extract significantly reduced carrageenan-induced paw edema by 34.79 – 40.97% (185 mg/kg) and 35.42 – 57.95% (370 mg/kg). In the granuloma model, the 185 mg/kg group reduced granuloma weights by 22.96%. Furthermore, in acute arthritis, joint swelling decreased by 34–59% and 49–65% at 185 and 370 mg/kg, respectively, while in chronic arthritis treatment with 185 mg/kg, joint circumference decrease by 42–55% from day 3 to day 12. These results highlight the anti-inflammatory potential of *T. cylindrica* and provide promising leads for identifying novel bioactive compounds in this species.

Keywords

Tricleocarpa cylindrica; Marine red alga, anti-inflammatory activity; Carrageenan; Arthritis, sulfated triterpene, molecular networking

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Bioactive triterpenoid sulfates and carbohydrate derivatives from the Vietnamese red alga *Tricleocarpa cylindrica*

T.V.A. Tran [a 1], Thi Dieu Hien Nguyen [a], Duy Hien Tran [a 2], Thi Kim Anh Le [b 3], Thi Hong Tuoi Do [a b 4], V.M. Nguyen [c 5], The Han Nguyen [c 6] Show more

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Abstract

Chemical investigation of the marine alga *Tricleocarpa cylindrica* collected in Vietnamese waters led to the structural elucidation of six compounds, including four triterpenoids (methyl-3β-hydroxycycloart-23,25-dien-29-oate-3-sulfate (1), 3β-hydroxycycloart-23,25-dien-3-sulfate (2), 3β-hydroxycycloart-24-en-23-one-3-sulfate (3) and methyl-3β-hydroxycycloart-24-en-23-one-29-oate-3-sulfate (4)) and two carbohydrate derivatives (O-α-galactopyranosyl (1″→6′)-O-β-galactopyranosyl-(1′→1)-glycerol (5) and floridoside (6)). Compounds 1 and 2 were identified as new natural compounds, and all six compounds were reported from *T. cylindrica* for the first time. These compounds were evaluated for their cytotoxic activities using the MTT assay and their anti-inflammatory effects against LPS-induced inflammation in RAW 264.7 cells via the NO inhibition assay. Compounds 3 and 4 exhibited cytotoxicity against the MDA-MB-231 cell line, with IC_{50} values of 66.24 ± 0.09 µM and 62.15 ± 0.25 µM, respectively. Notably, five out of the six isolated compounds demonstrated promising anti-inflammatory potential, with IC_{50} values ranging from 6.76 to 18.07 µM.

Keywords

Tricleocarpa cylindrica; Red alga; Triterpenoid sulfate; Carbohydrate derivative; Anti-inflammatory activity

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Mechanical and Morphological Characterization of Agricultural Waste-Reinforced Recycled HDPE Composites for Offshore Cage Frames

Nguyen Thi Kim Chi [a], Nguyen Van Tai [b], Nguyen Dac Kien [a], Nguyen Van Hoa [a] Show more

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Abstract

This study presents the fabrication and properties of eco-friendly composite materials using recycled high-density polyethylene (rHDPE) as the matrix, reinforced with agricultural by-products, including wood powder, coconut fiber, and rice-husk-derived nano-silica (SiO_2). Nano-SiO_2 with a size range of 10–20 nm was successfully extracted from rice husk ash. The composites were prepared via thermal melting and compression molding at 180°C and 5 tons of pressure. Structural and morphological properties were analyzed using scanning electron microscopy (SEM), X-ray diffraction (XRD), and Fourier-transform infrared spectroscopy (FTIR). Mechanical tests revealed that the addition of 2 wt% nano-SiO_2 significantly improved the tensile strength (640.88 MPa) and elastic modulus (1141.48 MPa) compared to those of pure rHDPE, 402.16 and 953.07 MPa, respectively. While increasing the content of wood powder or coconut fiber generally decreased tensile strength, these fillers modified flexural and water absorption properties. The significantly improved tensile and elastic properties confirm that structural requirements for marine aquaculture systems. By utilizing agricultural waste and recycled plastics, this material serves as a potential low-cost substitute for expensive virgin HDPE, drastically reducing the capital investment for offshore cage frame fabrication. These findings support the transition towards sustainable, bio-based engineering solutions for the regional mariculture industry.

Keywords

Recycled HDPE; Nano-SiO_2; Wood powder; Coconut fiber; Green composites; Rice husk

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Microplastic accumulation in oysters and water in farming areas of Can Gio mangroves, Vietnam

Nguyen Thanh Tam [a] ✉, Luu Thi Giao Chau [a] ✉, Nguyen Ngoc Ha [b c] ✉, Ong Moc Quy [a] ✉, Nguyen Ngoc Loi [a] ✉, Trong Dai Vu [d] ✉, Nguyen Phuc Cam Tu [a] ✉ Show more

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Abstract

This study quantified microplastic (MP) abundance in farmed oysters (*Crassostrea belcheri*) and surface water across three aquaculture zones in the Can Gio mangrove ecosystem, Vietnam; evaluated spatiotemporal variations; characterized particle morphology and polymer composition; and assessed MP clearance during a 5-day static depuration trial. Surface water and oysters were collected monthly from July to September 2024. Microplastics were detected in 100% of samples, ranging from 0.20–2.60 MPs g^{-1} wet weight (ww) in oysters and 0.06–0.10 MPs L^{-1} in surface water. Spatial differences across zones were not statistically significant ($p > 0.05$), with mean oyster abundance ranging from 0.79 MPs g^{-1} ww (Dong Hoa–Dinh Ba River) to 0.96 MPs g^{-1} ww (Thanh An Island). Oyster MP levels remained temporally stable across months ($p > 0.05$), whereas surface water showed a significant concentration peak in the Dong Tranh River during August ($p < 0.05$). Fibers (>50%) and particles smaller than 1,000 μm predominated in both matrices, with polyethylene terephthalate, nylon, and rayon identified as the primary polymers. In the depuration trial, tissue MP concentrations significantly decreased from 1.27 ± 0.11 MPs g^{-1} ww on day 0 to 0.87 ± 0.12 on day 3 and 0.20 ± 0.00 MPs g^{-1} ww on day 5 ($p < 0.05$), achieving an 84% reduction, though residual fibers persisted. These findings demonstrate substantial short-term depuration efficacy and support *C. belcheri* as a suitable bio-sentinel for monitoring estuarine MP pollution.

Keywords

Bivalves; Depuration; Exposure; Fibers; Sentinel

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Vietnamese fishing labour in global perspective: A critical review of social, economic, behavioural, and governance structures

Khanh Q. Nguyen [a b 1], Minh-Hoang Tran [c d 1], Phuong Viet Le [a], Luong T. Nguyen [a] Show more

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Abstract

Marine capture fisheries have contributed significantly to Vietnam's economy through employment, food security, export values, and income generation for coastal communities. However, the labour system remains characterized by informality, economic insecurity, and high occupational risk. We examine Vietnamese fisheries labour through an integrated Fisheries Labour Systems Framework (FLSF) adapted from the Social-Ecological Systems (SES) literature collected from selected Association of Southeast Asia Nations (ASEAN) and Organization for Economic Co-operation and Development (OECD) fisheries. The critical review shows that labour relations in Vietnam are predominantly informal, shaped by community-based recruitment, share-based remuneration, and widespread reliance on informal credit systems. These structural features contribute to income instability, labour dependency, and high mobility. Behavioural dynamics, including risk normalization, masculine occupational identities, and heterogeneous risk perception, further reinforce hazardous working practices. Comparative evidence highlights stark contrasts with OECD fisheries, where formal contracts, institutionalized safety systems, and regulatory oversight have reduced but not eliminated occupational risks. The paper also identifies persistent governance gaps in Vietnam, where fragmented legal frameworks and weak enforcement limit integrating labour protections into fisheries management. By situating Vietnamese fisheries labour within broader regional and global contexts, the study underscores the need for coordinated reforms that address informality, enhance safety, and strengthen labour governance as integral components of sustainable fisheries development.

Keywords

Vietnamese fisheries; Fishing labour; Labour informality; Occupational risk; Behavioural responses; Labour governance; Sustainability

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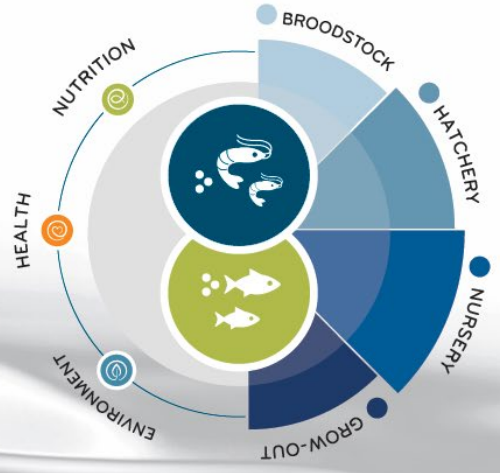
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