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CHEMICAL EFFECTS

Plasmonic nanoparticle's anti-aggregation application in sensor development for water and wastewater analysis

2023-06-23

Colorimetric sensors have emerged as a powerful tool in the detection of water pollutants. Plasmonic nanoparticles use localized surface plasmon resonance (LSPR)-based colorimetric sensing. LSPR-based sensing can be accomplished through different strategies such as etching, growth, aggregation, and anti-aggregation. Based on these strategies, various sensors have been developed. This review focuses on the newly developed anti-aggregation-based strategy of plasmonic nanoparticles. Sensors based on this strategy have attracted increasing interest because of their exciting properties of high sensitivity, selectivity, and applicability. This review highlights LSPR-based anti-aggregation sensors, their classification, and role of plasmonic nanoparticles in these sensors for the detection of water pollutants. The anti-aggregation-based sensing of major water pollutants such as heavy metal ions, anions, and small organic molecules has been summarized herein. This review also provides some personal insights into current challenges associated with anti-aggregation strategy of LSPR-based colorimetric sensors and proposes future research directions.

Authors: Shailja Pandey, Shipra Mital Gupta, Surendra Kumar Sharma

Full Source: Environmental monitoring and assessment 2023 Jun 23;195(7):874. doi: 10.1007/s10661-023-11355-x.~sAuthors: authors

Colorimetric sensors have emerged as a powerful tool in the detection of water pollutants.

Lake water chemistry and population of origin interact to shape fecundity and growth in Daphnia ambigua

2023-06-20

Freshwater environments vary widely in ion availability, owing to both natural and anthropogenic drivers. Field and laboratory work point to the importance of overall salinity, as well as cation depletion, in shaping the physiology, behavior, and ecology of freshwater taxa. Yet, we currently have a poor understanding of the degree to which populations may vary in response to ion availability. Using Daphnia collected from three lakes that differ greatly in salinity and calcium availability, we conducted a laboratory reciprocal transplant experiment to assess how animals representing these populations vary in fecundity, body size, and survival when reared in lake water from each environment. The lake water environment and population of origin strongly interacted to shape

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Daphnia growth and reproduction. Surprisingly, we found only modest evidence that lake water with abundant calcium (5.5 vs. 1.2-2.3 mg/L) increased Daphnia growth or reproduction. By contrast, water from a relatively ion-rich lake (400 µS/cm specific conductance) strongly boosted Daphnia fecundity over lower-ion lake water (20-50 µS/cm), especially for the population originating from the high-ion environment. Our results suggest that ion-poor conditions common in regions around the world may exert stress on freshwater organisms, even for populations inhabiting these environments. Meanwhile, moderate salt enrichment may not prove harmful but could even benefit freshwater taxa in these ion-poor regions. The context dependence of how and when lake water chemistry affects Daphnia and other freshwater taxa deserves greater attention, in both ion-depleted and ion-rich conditions. Daphnia are key members of lake food webs and serve as an important model for ecology, evolution, and toxicology research. Consideration of how lake water chemistry may influence how Daphnia populations respond to abiotic and biotic stress may improve the ability to evaluate and predict ecological and evolutionary dynamics in lakes of varying chemical composition.

Authors: Mary A Rogalski, Utku Ferah

Full Source: Ecology and evolution 2023 Jun 20;13(6):e10176. doi: 10.1002/ece3.10176.

ENVIRONMENTAL RESEARCH

Microplastics in Tai Lake food web: Trophic transfer and human health risk assessment

2023-06-28

Although microplastics (MPs) in marine organisms have been widely studied, the toxicity of MPs in freshwaters and human health is still a global challenge. To fill this gap, we implemented an Ecopath and food web accumulation model to simulate the Tai Lake ecosystem, a region dependent on tourism and seafood industries. Our results suggested the accumulation of MPs throughout the food web and ultimately reach organisms at high trophic levels, including human-being, who consume MPs through seafood. The adults were prone to consume more MPs than adolescents and children. Unlike clams, fish biota magnification factors indicated that MPs accumulation between specific predator-prey interactions is not expected. The abundance of MPs within clams reveals a potential risk of MPs entering the food web. To better understand the

Although microplastics (MPs) in marine organisms have been widely studied, the toxicity of MPs in freshwaters and human health is still a global challenge.

MPs transfer, we recommend paying greater attention to species-specific mechanisms and the resources they rely on.
Authors: Seerat Ul Ain Bhutto, Yi-Fei Ma, Muhammad Akram, Xue-Yi You
Full Source: Environmental toxicology and pharmacology 2023 Jun 28;101:104206. doi: 10.1016/j.etap.2023.104206.

Microplastics Reshape the Fate of Aqueous Carbon by Inducing Dynamic Changes in Biodiversity and Chemodiversity

2023-07-01
The interactions among dissolved organic matter (DOM), microplastics (MPs) and microbes influence the fate of aqueous carbon and greenhouse gas emissions. However, the related processes and mechanisms remain unclear. Here, we found that MPs determined the fate of aqueous carbon by influencing biodiversity and chemodiversity. MPs release chemical additives such as diethylhexyl phthalate (DEHP) and bisphenol A (BPA) into the aqueous phase. The microbial community, especially autotrophic bacteria such as Cyanobacteria, showed a negative correlation with the additives released from MPs. The inhibition of autotrophs promoted CO2 emissions. Meanwhile, MPs stimulated microbial metabolic pathways such as the tricarboxylic acid (TCA) cycle to accelerate the DOM biodegradation process, and then the transformed DOM presented low bioavailability, high stability, and aromaticity. Our findings highlight an urgent need for chemodiversity and biodiversity surveys to assess ecological risks from MP pollution and the impact of MPs on the carbon cycle.
Authors: Xueju Liu, Shuting Wang, Li Mu, Yingying Xie, Xiangang Hu
Full Source: Environmental science & technology 2023 Jul 1. doi: 10.1021/acs.est.3c02976.

The interactions among dissolved organic matter (DOM), microplastics (MPs) and microbes influence the fate of aqueous carbon and greenhouse gas emissions.

The effect of grape seed procyanidins extract on cognitive function in elderly people with mild cognitive impairment: A randomized, double-blind, placebo-controlled clinical trial

2023-06-05
Background: Procyanidins have antioxidative properties that may protect against age-related brain oxidative stress. Previous studies indicated that procyanidin-rich foods could improve cognitive function and prevent neurodegenerative diseases. This study hypothesized that grape seed procyanidins extract (GSPE) would have a favorable effect on cognitive function in elderly people with mild cognitive impairment (MCI).

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Methods: A community-based, randomized, double-blind, placebo-controlled trial was conducted. Participants aged 60 years or older with MCI were randomly assigned into the GSPE group (n = 35, 320 mg/d) or placebo group (n = 36) and received capsules for 6 months. Cognitive function was assessed using the Montreal Cognitive Assessment Scale (MoCA). The change in MoCA scores between groups were tested by the time treatment interaction in mixed-design ANOVA.
Results: After 6 months of intervention, the MoCA score was higher than the baseline both in the intervention group and placebo control group, while the there was no significant difference for mean change in MoCA score from baseline between the intervention group and the placebo group (2.35 ± 3.20 vs. 1.28 ± 2.93, P = 0.192).
Conclusions: Present study showed that 6-month supplementation with GSPE did not significantly improve cognitive function in subjects with MCI. Further investigations regarding the longer-term intervention effect of procyanidins extract on mild or moderate cognitive disorders are needed.
Authors: Benchao Li, Jing Cheng, Guangwen Cheng, Hailin Zhu, Buyun Liu, Yuhuan Yang, Qiong Dai, Wenfang Li, Wei Bao, Shuang Rong
Full Source: Heliyon 2023 Jun 5;9(6):e16994. doi: 10.1016/j.heliyon.2023.e16994.

PHARMACEUTICAL/TOXICOLOGY

Acute chlorothalonil exposure had the potential to influence the intestinal barrier function and micro-environment in mice

2023-06-22
The intestinal barrier maintains intestinal homeostasis and metabolism and protects against harmful pollutants. Some environmental pollutants seriously affect intestinal barrier function. However, it remains unclear whether or how chlorothalonil (CTL) impacts the intestinal barrier function in animals. Herein, 6-week-old male mice were acutely exposed to different CTL concentrations (100 and 300 mg/kg BW) via intragastric administration once a day for 7 days. Histopathological examination revealed obvious inflammation in the mice' colon and ileum. Most notably, CTL exposure increased the intestinal permeability, particularly in the CTL-300 group. CTL exposure reduced the secretion of colonic epithelial mucus and changed the transcription levels of genes bound up with ion transport and ileal antimicrobial peptide (AMP) secretion, indicating intestinal chemical barrier damage. The results of terminal deoxynucleotidyl

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transferase dUTP nick end labelling (TUNEL) assay and Ki67 staining revealed abnormal apoptosis and increased intestinal epithelial cell proliferation, suggesting that CTL exposure led to cytotoxicity and inflammation. The results of 16S rRNA sequencing revealed that CTL exposure altered the intestinal microbiota composition and reduced its diversity and richness in the colon contents. Thus, acute CTL exposure affected the different intestinal barrier- and gut microenvironment-related endpoints in mice.

Authors: Huaping Tao, Juntao Wang, Zhiwei Bao, Yuanxiang Jin, Yingping Xiao

Full Source: The Science of the total environment 2023 Jun 22;165038. doi: 10.1016/j.scitotenv.2023.165038.

Can We Use Blood Biomarkers as Entry Criteria and for Monitoring Drug Treatment Effects in Clinical Trials? A Report from the EU/US CTAD Task Force

2023

In randomized clinical trials (RCTs) for Alzheimer's Disease (AD), cerebrospinal fluid (CSF) and positron emission tomography (PET) biomarkers are currently used for the detection and monitoring of AD pathological features. The use of less resource-intensive plasma biomarkers could decrease the burden to study volunteers and limit costs and time for study enrollment. Blood-based markers (BBMs) could thus play an important role in improving the design and the conduct of RCTs on AD. It remains to be determined if the data available on BBMs are strong enough to replace CSF and PET biomarkers as entry criteria and monitoring tools in RCTs.

Authors: D Angioni, O Hansson, R J Bateman, C Rabe, M Toloue, J B Braunstein, S Agus, J R Sims, T Bittner, M C Carrillo, H Fillit, C L Masters, S Salloway, P Aisen, M Weiner, B Vellas, S Gauthier

Full Source: The journal of prevention of Alzheimer's disease 2023;10(3):418-425. doi: 10.14283/jpad.2023.68.

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2023-06-22

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Authors: Huaping Tao, Juntao Wang, Zhiwei Bao, Yuanxiang Jin, Yingping Xiao

Full Source: The Science of the total environment 2023 Jun 22;165038. doi: 10.1016/j.scitotenv.2023.165038.

OCCUPATIONAL

Occupational safety perceptions of prehospital emergency health services employees: A sample of sivas central district

2023-06-26

Background: Prehospital emergency health services ambulance workers are in the risky class in terms of occupational health and safety, and they are faced with more risks due to the fact that they are the first responders to the events, especially regarding COVID-19.

Objective: The aim of the present study is to determine the occupational risk perceptions of health care workers and their relations with demographic variables.

Methods: A literature review was performed to develop a questionnaire. This questionnaire was used in a survey with 250 respondents. The collected data was analysed through factor analysis. Cronbach Alpha was calculated to verify the reliability of the data.

Results: The risk perceptions of the employees (Factor 1 and Factor 3) differ significantly according to gender. Another important point is that 60.3%

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of the participants stated that they "agree" with the statement that health workers "experience violence" during work.
Conclusion: The risk perception of women was found to be higher, and the reason for this is that women are less physically strong than men along with social gender roles and gender discrimination.
Authors: Omer Faruk Alacahan, Arif Nihat Gulluoglu, Naim Karagoz
Full Source: Work (Reading, Mass.) 2023 Jun 26. doi: 10.3233/WOR-220425.

Association of length of service and job category with occupational health literacy of port employees in Shenzhen, China

2023-06-23
Background: Health literacy (HL) is associated with health outcomes, but little is known about the occupational HL (OHL) for port employees and its link to the length of service and job category.
Method: A cross-sectional survey was conducted on 3492 port employees from the Occupational Health Survey for Port Employees project, and a special questionnaire was utilized to measure the OHL status. Binary and ordinal logistic regressions were used to estimate the association.
Result: Among the participants, 72.90% had sufficient OHL with a mean score (standard deviation) of 53.10 (7.26). Binary logistic regression results indicated that the association between length of service (33-40 years group Adjusted OR = 1.11; 41-49 years group Adjusted OR = 1.14; ≥50 years group Adjusted OR = 1.19) and job category (longshoremen Adjusted OR = 0.90; driver Adjusted OR = 0.91) with OHL were statistically significant. Ordinal logistic regression results indicated that, for OHL, Adjusted OR was increased in different lengths of service level (33-40 years group, Adjusted OR = 1.50; 41-49 years group, Adjusted OR = 1.75; ≥50 years group, Adjusted OR = 2.19), and the Adjusted OR of skilled workers was 1.60.
Conclusion: Most port participants had sufficient OHL, and the length of service and job category could affect OHL. The effect of the length of service may be more obvious; the length of service can promote the improvement of OHL continuously.
Authors: Jinlin Wang, Chunbao Mo, Qiujie Sheng, Yuehong Huang, Dafeng Lin, Yuan Liang, Naixing Zhang
Full Source: BMC public health 2023 Jun 23;23(1):1223. doi: 10.1186/s12889-023-15769-7.

Background: Health literacy (HL) is associated with health outcomes, but little is known about the occupational HL (OHL) for port employees and its link to the length of service and job category.