Nanoparticles

1-Polymeric Nanoparticles for Drug Delivery

By Beach, MA (Beach, Maximilian A.) [1] ; Nayanathara, U (Nayanathara, Umeka) [1] ; Gao, YT (Gao, anting) [1] ; Zhang, CH (Zhang, Changhe) [1] ; Xiong, YJ (Xiong, Yijun) [1] ; Wang, YF (Wang, Yufu) [1] ; Such, GK (Such, Georgina K.) [1] (provided by Clarivate) **Source CHEMICAL REVIEWS Volume 124 Issue 9 Page 505-5616 DOI 10.1021/acs.chemrev.3c00705 Published APR 16 2024 Early Access APR 2024 Indexed 2024-04-28 Document Type Review**

Abstract

The recent emergence of nanomedicine has revolutionized the therapeutic landscape and necessitated the creation of more sophisticated drug delivery systems. Polymeric nanoparticles sit at the forefront of numerous promising drug delivery designs, due to their unmatched control over physiochemical properties such as size, shape, architecture, charge, and surface functionality. Furthermore, polymeric nanoparticles have the ability to navigate various biological barriers to precisely target specific sites within the body, encapsulate a diverse range of therapeutic cargo and efficiently release this cargo in response to internal and external stimuli. However, despite these remarkable advantages, the presence of polymeric nanoparticles in wider clinical application is minimal. This review will provide a comprehensive understanding of polymeric nanoparticles as drug delivery vehicles. The biological barriers affecting drug delivery will be outlined first, followed by a comprehensive description of the various nanoparticle designs and preparation methods, beginning with the polymers on which they are based. The review will meticulously explore the current performance of polymeric nanoparticles against a myriad of diseases including cancer, viral and bacterial infections, before finally evaluating the advantages and crucial challenges that will determine their wider clinical potential in the decades to come.

Keywords

Keywords Plus

BLOCK-COPOLYMER MICELLESMESOPOROUS SILICA NANOPARTICLESRING-OPENING POLYMERIZATIONPH-RESPONSIVE NANOPARTICLESPOLYION COMPLEX MICELLESSELF-IMMOLATIVE POLYMERSF-19 MAGNETIC-RESONANCEOVERCOMING BIOLOGICAL BARRIERSMODIFIED PLGA NANOPARTICLESIRON-OXIDE NANOPARTICLES

Nanoparticles

2-Green Silver Nanoparticles: An Antibacterial Mechanism

By Mikhailova, EO (Mikhailova, Ekaterina O.) [1] (provided by Clarivate) **Source** ANTIBIOTICS-BASEL Volume 14 Issue 1 DOI 10.3390/antibiotics14010005 **Article Number** 5 **Published** JAN 2025 **Indexed** 2025-01-30 **Document Type** Review

Abstract
Silver nanoparticles (AgNPs) are a promising tool in the fight against pathogenic microorganisms. "Green" nanoparticles are especially valuable due to their environmental friendliness and lower energy consumption during production, as well as their ability to minimize the number of toxic by-products. This review focuses on the features of AgNP synthesis using living organisms (bacteria, fungi, plants) and the involvement of various biological compounds in this process. The mechanism of antibacterial activity is also discussed in detail with special attention given to anti-biofilm and anti-quorum sensing activities. The toxicity of silver nanoparticles is considered in light of their further biomedical applications.

Keywords
Author Keywords
silver nanoparticlesAgNPsgreen synthesisantibacterial activityanti-biofilm activityanti-"quorum sensing" activity
Keywords Plus
EXTRACT CHARACTERIZATIONANTIMICROBIAL ACTIVITYSTAPHYLOCOCCUS-AUREUSAQUEOUS EXTRACTLEAF EXTRACTEFFICACYBACTERIA

Nanoparticles

3-The 60-year evolution of lipid nanoparticles for nucleic acid delivery

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By Cullis, PR (Cullis, P. R.) [1] ; Felgner, PL (Felgner, P. L.) [2] (provided by Clarivate) **Source NATURE REVIEWS DRUG DISCOVERY Volume 23 Issue 9 Page 709-722 DOI 10.1038/s41573-024-00977-6 Published SEP 2024 Early Access JUL 2024 Indexed 2024-07-12 Document Type Article**

Abstract

Delivery of genetic information to the interior of target cells in vivo has been a major challenge facing gene therapies. This barrier is now being overcome, owing in part to dramatic advances made by lipid-based systems that have led to lipid nanoparticles (LNPs) that enable delivery of nucleic acid-based vaccines and therapeutics. Examples include the clinically approved COVID-19 LNP mRNA vaccines and Onpattro (patisiran), an LNP small interfering RNA therapeutic to treat transthyretin-induced amyloidosis (hATTR). In addition, a host of promising LNP-enabled vaccines and gene therapies are in clinical development. Here, we trace this success to two streams of research conducted over the past 60 years: the discovery of the transfection properties of lipoplexes composed of positively charged cationic lipids complexed with nucleic acid cargos and the development of lipid nanoparticles using ionizable cationic lipids. The fundamental insights gained from these two streams of research offer potential delivery solutions for most forms of gene therapies.

Lipid nanoparticle-based systems are increasingly being utilized for the delivery of nucleic acid-based vaccines and therapeutics. In this Perspective, Cullis and Felgner trace the evolution of these systems over the past 60 years and discuss future prospects for LNP-enabled gene therapies.

Keywords

Keywords Plus

LARGE UNILAMELLAR VESICLESPROLONGED CIRCULATION TIMEGLOBIN MESSENGER-RNAIN-VIVOGENE-TRANSFERP-31 NMRINTRACELLULAR DELIVERYTRANSFECTION ACTIVITYASILOMAR CONFERENCEBIOLOGICAL-ACTIVITY

Nanoparticles

4-Nanoparticles in tumor microenvironment remodeling and cancer immunotherapy

By Lu, Q (Lu, Qiang) [1] ; Kou, DQ (Kou, Dongquan) [2] ; Lou, SH (Lou, Shenghan) [3] ; Ashrafizadeh, M (Ashrafizadeh, Milad) [4] , [5] , [6] ; Aref, AR (Aref, Amir Reza) [7] , [8] ; Canadas, I (Canadas, Israel) [9] ; Tian, Y (Tian, Yu) [10] ; Niu, XJ (Niu, Xiaojia) [11] , [12] ; Wang, YZ (Wang, Yuzhuo) [11] , [12] ; Torabian, P (Torabian, Pedram) [13] , [14] ; (provided by Clarivate) **Source JOURNAL OF HEMATOLOGY & ONCOLOGY Volume 17 Issue 1 DOI 10.1186/s13045-024-01535-8 Article Number 16 Published APR 2 2024 Indexed 2024-05-01 Document Type Review**

Abstract

Cancer immunotherapy and vaccine development have significantly improved the fight against cancers. Despite these advancements, challenges remain, particularly in the clinical delivery of immunomodulatory compounds. The tumor microenvironment (TME), comprising macrophages, fibroblasts, and immune cells, plays a crucial role in immune response modulation. Nanoparticles, engineered to reshape the TME, have shown promising results in enhancing immunotherapy by facilitating targeted delivery and immune modulation. These nanoparticles can suppress fibroblast activation, promote M1 macrophage polarization, aid dendritic cell maturation, and encourage T cell infiltration. Biomimetic nanoparticles further enhance immunotherapy by increasing the internalization of immunomodulatory agents in immune cells such as dendritic cells. Moreover, exosomes, whether naturally secreted by cells in the body or bioengineered, have been explored to regulate the TME and immune-related cells to affect cancer immunotherapy. Stimuli-responsive nanocarriers, activated by pH, redox, and light conditions, exhibit the potential to accelerate immunotherapy. The co-application of nanoparticles with immune checkpoint inhibitors is an emerging strategy to boost anti-tumor immunity. With their ability to induce long-term immunity, nanoarchitectures are promising structures in vaccine development. This review underscores the critical role of nanoparticles in overcoming current challenges and driving the advancement of cancer immunotherapy and TME modification.

Keywords

Author Keywords

Bioengineered nanostructurescancer immunotherapyImmune evasion nanoparticlesTumor microenvironment

Keywords Plus

IMMUNOGENIC CELL-DEATHMESOPOROUS SILICA NANOPARTICLESMEMBRANE-COATED NANOPARTICLESANTIGEN-PRESENTING CELLSNATURAL-KILLER-CELLSNEUTROPHIL EXTRACELLULAR TRAPSIMMUNE-CHECKPOINT BLOCKADEMYELOID SUPPRESSOR-CELLSVACCINE DELIVERY-SYSTEMPH-SENSITIVE LIPOSOMES

Nanoparticles

5-Platinum-Iron Nanoparticles for Oxygen-Enhanced Sonodynamic Tumor Cell Suppression

By Dong, QY (Dong, Qianya) [1] ; Jiang, ZQ (Jiang, Zhenqi) [1] (provided by Clarivate) **Source INORGANICS Volume 12 Issue 12 DOI 10.3390/inorganics12120331 Article Number 331 Published DEC 2024 Indexed 2025-01-01 Document Type Article**

Abstract

A type of nanoparticle has been developed to simultaneously alleviate tumor hypoxia and enhance the effectiveness of sonodynamic therapy aimed at improving cancer treatment outcomes. Small-sized iron-platinum nanoparticles were prepared using a thermal reduction method, and their particle size and crystal structure were characterized. The ability of these nanoparticles to decompose hydrogen peroxide to produce oxygen and generate singlet oxygen under ultrasound irradiation was further tested. The effect of iron-platinum nanoparticles on inhibition of the proliferation of MCF-7 tumor cells under hypoxic conditions was also evaluated. The prepared iron-platinum nanoparticles effectively decomposed hydrogen peroxide to produce oxygen, reversing the hypoxic environment of tumors. Additionally, they generated singlet oxygen under ultrasound irradiation, which killed tumor cells and inhibited their proliferation. This study successfully developed small-sized iron-platinum nanoparticles that can alleviate tumor hypoxia by decomposing excess hydrogen peroxide in tumor cells to produce oxygen. Under ultrasound irradiation, these nanoparticles generate singlet oxygen, inhibiting tumor growth. The nanoparticles demonstrated good safety and are potentially valuable in enhancing oxygen-enhanced sonodynamic cancer therapy.

Keywords

Author Keywords

platinum-iron nanoparticlesoxygen-enhancedtumor suppressionsonodynamic therapy

Keywords Plus

PHOTODYNAMIC THERAPYCANCERSONOSENSITIZERSHYPOXIA

Nanoparticles

6-Nanoparticles in cancer theragnostic and drug delivery: A comprehensive review

By Al-Thani, AN (Al-Thani, Alshayma N.) [1] ; Jan, AG (Jan, Asma Ghafoor) [1] ; Abbas, M (Abbas, Mohamed) [2] ; Geetha, M (Geetha, Mithra) [2] ; Sadasivuni, KK (Sadasivuni, Kishor Kumar) [2] , [3]
(provided by Clarivate) Source LIFE SCIENCES Volume 352 DOI 10.1016/j.lfs.2024.122899 Article Number 122899 Published SEP 1 2024 Early Access JUL 2024 Indexed 2024-07-22 Document Type Article

Abstract

This comprehensive review provides an in-depth analysis of how nanotechnology has revolutionized cancer theragnostic, which combines diagnostic and therapeutic methods to customize cancer treatment. The study examines the unique attributes, uses, and difficulties linked to different types of nanoparticles, including gold, iron oxide, silica, Quantum dots, Carbon nanotubes, and liposomes, in the context of cancer treatment. In addition, the paper examines the progression of nanotheranostics, emphasizing its uses in precise medication administration, photothermal therapy, and sophisticated diagnostic methods such as MRI, CT, and fluorescence imaging. Moreover, the article highlights the capacity of nanoparticles to improve the effectiveness of drugs, reduce the overall toxicity in the body, and open up new possibilities for treating cancer by releasing drugs in a controlled manner and targeting specific areas. Furthermore, it tackles concerns regarding the compatibility of nanoparticles and their potential harmful effects, emphasizing the significance of continuous study to improve nanotherapeutic methods for use in medical treatments. The review finishes by outlining potential future applications of nanotechnology in predictive oncology and customized medicine.

Keywords

Author Keywords

NanoparticlesCancer cellsDrug deliveryDiagnostic modalitiesTherapeutic functions

Keywords Plus

MESOPOROUS SILICA NANOPARTICLESPHOTOTHERMAL THERAPYGOLD NANOPARTICLESVIVO TOXICITYQUANTUM DOTSNANOTECHNOLOGYDIAGNOSISNANOMATERIALSSYSTEMFUTURE

Nanoparticles

7-Glutathione-Scavenging Celastrol-Cu Nanoparticles Induce Self-Amplified Cuproptosis for Augmented Cancer Immunotherapy

By Lu, S (Lu, Sheng) [1] ; Li, YF (Li, Yifan) [1] ; Yu, YJ (Yu, Yingjie) [1] (provided by Clarivate) **Source ADVANCED MATERIALS Volume 36 Issue 35 DOI 10.1002/adma.202404971 Published AUG 2024 Early Access JUL 2024 Indexed 2024-07-12 Document Type Article**

Abstract

Cuproptosis is a novel copper-dependent programmed cell death. The efficacy of cuproptosis is highly dependent on intracellular copper accumulation and counteracted by a high level of glutathione (GSH) in tumor cells. Here, this work develops a self-amplified cuproptosis nanoparticles (Cel-Cu NP) using celastrol (Cel), a natural product isolated from medical plant. In Cel-Cu NP, Cel serves as a versatile copper ionophore, exhibiting an ideal coordination capacity toward copper ions without compromising the cuproptosis induction. Notably, Cel can simultaneously scavenge GSH content to amplify cuproptosis. Moreover, this self-amplified cuproptosis further activates immunogenic cell death (ICD) to elicit robust immune response. Combining with immune checkpoint blockade, Cel-Cu NP effectively eradicates metastatic tumors in a mouse lung metastasis model. This study provides an efficient nanomedicine by inducing self-amplified cuproptosis for robust immunotherapy.

This work develops a self-amplified cuproptosis nanoparticles (Cel-Cu NP) using celastrol (Cel). In this system, Cel serves as a versatile copper ionophore, exhibiting an ideal coordination capacity toward copper ions without compromising the cuproptosis induction. Notably, Cel can simultaneously scavenge glutathione (GSH) to sensitize cuproptosis. This study provides an efficient nanomedicine by inducing self-amplified cuproptosis for a robust immune response. image

Keywords

Author Keywords

cancer immunotherapycelastrolcuproptosisglutathione-scavengingimmunogenic cell death

Keywords Plus

METAL CHARGE-TRANSFERMECHANISMSTHERAPY

Nanoparticles

8-Application of Fourier Transform Infrared (FTIR) Spectroscopy in Characterization of Green Synthesized Nanoparticles

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By Pasieczna-Patkowska, S (Pasieczna-Patkowska, Sylwia) [1] ; Cichy, M (Cichy, Marcin) [1] ; Flieger, J (Flieger, Jolanta) [2] (provided by Clarivate) Source MOLECULES Volume 30 Issue 3 DOI 10.3390/molecules30030684 Article Number 684 Published FEB 2025 Indexed 2025-02-18 Document Type Review

Abstract

The fundamental principle of Fourier Transform Infrared (FTIR) spectroscopy is based on the vibration and rotation of atoms, and it has become a universal and widely used spectral methodology for the detection of internal molecular structures in a diverse range of fields. A considerable number of review articles pertaining to the applications of FTIR spectroscopy have been published in recent years. Nevertheless, a comprehensive summary of the application of FTIR spectroscopy in nanoparticles' (NPs') green synthesis has yet to be presented. In the present paper, we propose a series of case studies that demonstrate the application of FTIR spectroscopy in the analysis of metal and metal oxide NPs that have been synthesized using green synthesis processes. Furthermore, a summary is presented of the position of functional group bands in FTIR spectra that are responsible for the reduction, capping and stabilization of NPs. In this review, we explore the advantages and limitations of FTIR and propose methodologies for overcoming these challenges. We also present potential solutions for the analysis of complex FTIR spectra. The present summary is intended to serve as a compendium of information for researchers engaged in the field of green synthesis of NPs, utilizing FTIR spectroscopy as a research tool.

Keywords

Author Keywords

FTIRnanoparticlesnanoparticles characterizationgreen synthesis

Keywords Plus

IRON-OXIDE NANOPARTICLESGOLD NANOPARTICLESLEAF EXTRACTSILVER NANOPARTICLESPLATINUM NANOPARTICLESPLANT-EXTRACTSREFLECTION SPECTROSCOPYBIOMEDICAL APPLICATIONSAZADIRACHTA-INDICABIOSYNTHESIS

Nanoparticles

9-Synthesis of green nanoparticles for energy, biomedical, environmental, agricultural, and food applications: A review

By Osman, AI (Osman, Ahmed I.) [1] ; Zhang, YB (Zhang, Yubing) [2] ; Farghali, M (Farghali, Mohamed) [3] , [4] ; Rashwan, AK (Rashwan, Ahmed K.) [5] ; Eltaweil, AS (Eltaweil, Abdelazeem S.) [6] ; Abd El-Monaem, EM (Abd El-Monaem, Eman M.) [6] ; Mohamed, IMA (Mohamed, Israa M. A.) [4] ; Badr, MM (Badr, Mai M.) [7] ; Ihara, I (Ihara, Ikko) [3] ; Rooney, DW (Rooney, David W.) [1] ;
(provided by Clarivate) Source ENVIRONMENTAL CHEMISTRY LETTERS Volume 22 Issue 2 Page 841-887 DOI 10.1007/s10311-023-01682-3 Published APR 2024 Early Access JAN 2024 Indexed 2024-01-31 Document Type Review

Abstract

Nanomaterials have been rapidly developed during the last decades, yet many nanoparticles synthesized by classical methods are toxic and their synthesis procedure is not sustainable. Here we review the green synthesis of nanoparticles from biomass and waste with a focus on synthetic mechanisms and applications in energy production and storage, medicine, environmental remediation, and agriculture and food. Biomass use for synthesis include microorganisms, fungi, plants, and agro-industrial bio-waste. Compared to conventional synthesis, green synthesis allows a 30% reduction in energy consumption, cost savings of up to 40%, and a 50% increase in production output. Biomedical applications comprise antibacterials, anticancers, antioxidants, and drug delivery mechanisms. Carbon quantum dots and photovoltaics are discussed in the energy section. Agricultural and food applications focus on nanofertilization, pest control, and food quality. Environmental remediation includes water and soil purification.

Keywords

Author Keywords

NanoparticlesGreen synthesisNanosynthesis mechanismsNanodrug delivery and anticancerEnvironmental remediationNanofertilizer

Keywords Plus

ZERO-VALENT IRONZINC-OXIDE NANOPARTICLESGRAPHENE QUANTUM DOTSEXTRACT CATALYTIC-ACTIVITYMARINE ENDOPHYTIC FUNGUSMANGIFERA-INDICA LEAVESDEEP EUTECTIC SOLVENTSGRAPE SEED EXTRACTFRUIT PEEL EXTRACTL. LEAF EXTRACT

Nanoparticles

10-Bamboo fiber-derived carbon support for the immobilization of Pt nanoparticles to enhance hydrogen evolution reaction

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By Wu, NT (Wu, Naiteng) [1] ; He, WJ (He, Wenjing) [1] , [2] ; Shi, SC (Shi, Shicheng) [1] ; Yuan, XK (Yuan, Xinke) [1] ; Li, J (Li, Jin) [1] ; Cao, JL (Cao, Jianliang) [2] ; Yuan, CZ (Yuan, Changzhou) [3] ; Liu, XM (Liu, Xianming) [1] **(provided by Clarivate) Source JOURNAL OF COLLOID AND INTERFACE SCIENCE Volume 684 Page 658-667 Part 1 DOI 10.1016/j.jcis.2025.01.071 Published APR 15 2025 Early Access JAN 2025 Indexed 2025-01-29 Document Type Article**

Abstract

Biomass-derived carbon, as an excellent support, has received extensive attention. In this work, carbon matrix obtained from bamboo fiber (BF) is served as a supporting material for the immobilization of platinum (Pt) nanoparticles, leading to a substantial improvement in the hydrogen evolution reaction (HER). This approach leverages the remarkable surface area, outstanding conductivity, and environmentally friendly characteristics of BF-derived carbon, facilitating the dispersion and stability of the Pt nanoparticles. The as-fabricated catalysts deliver an outstanding HER performance, with overpotentials of 14.6, 46.9, and 73.5 mV at current densities of 10, 50, and 100 mA cm-2 in acidic solution, respectively. Theoretical calculations reveal that the interaction between Pt and nitrogen atoms in the support material further enhances the electrocatalytic performance. This interaction strengthens the binding of Pt, leading to the improved stability and activity of the catalyst, which subsequently boosts the efficiency of the electrocatalytic process. These findings underscore the superior HER performance of the enhanced catalyst, highlighting the potential of sustainable, biomass-derived materials in advancing catalytic applications.

Keywords

Author Keywords

BiomassCarbonPlatinumHydrogen evolution reaction

Keywords Plus

BIOMASSCATALYSTS

Nanoparticles

11-Biomimetic copper-doped polypyrrole nanoparticles induce glutamine metabolism inhibition to enhance breast cancer cuproptosis and immunotherapy

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By Zhang, N (Zhang, Ni) [1] ; Ping, W (Ping, Wei) [1] ; Rao, KX (Rao, Kexiang) [4] ; Zhang, ZL (Zhang, Zhenlin) [2] ; Huang, R (Huang, Rong) [2] ; Zhu, DM (Zhu, Daoming) [3] , [4] ; Li, GX (Li, Guoxin) [5] ; Ning, SP (Ning, Shipeng) [2] **(provided by Clarivate) Source JOURNAL OF CONTROLLED RELEASE Volume 371 Page 204-215 DOI 10.1016/j.jconrel.2024.05.045 Published JUL 2024 Early Access MAY 2024 Indexed 2024-06-23 Document Type Article**

Abstract

Cuproptosis, a newly discovered mechanism of inducing tumor cell death, primarily relies on the intracellular accumulation of copper ions. The utilization of Cu-based nanomaterials to induce cuproptosis holds promising prospects in future biomedical applications. However, the presence of high levels of glutathione (GSH) within tumor cells hinders the efficacy of cuproptosis. In this study, we have developed a BPTES-loaded biomimetic Cudoped polypyrrole nanoparticles (CuP) nanosystem (PCB) for enhanced cuproptosis and immune modulation. PCB comprises an internal BPTES and CuP core and an external platelet membrane (PM) that facilitates active targeting to tumor sites following intravenous administration. Subsequently, PCB effectively suppresses glutaminase (GLS1) activity, thereby reducing GSH content. Moreover, CuP catalyze intracellular H2O2, amplifying oxidative stress while simultaneously inducing dihydrolipoyl transacetylase (DLAT) oligomerization through released Cu2+, resulting in cuproptosis. PCB not only inhibits primary tumors but also exhibits inhibitory effects on abscopal tumors. This work represents the first instance where GLS inhibition has been employed to enhance cuproptosis and immunotherapy. It also provides valuable insights into further investigations on cuproptosis.

Keywords

Author Keywords

CuproptosisGlutathionePlatelet membraneTumor immunotherapyCu-doped polypyrrole nanoparticles

Nanoparticles

12-Deciphering composition-structure-taste relationship of black tea-infusion via assessments of nanoparticles by centrifugal treatment

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By Li, YF (Li, Yifan) [1] , [3] ; Pan, WC (Pan, Weichun) [4] ; Feng, ZH (Feng, Zhihui) [1] ; Gu, FN (Gu, Feina) [4] ; Chen, JX (Chen, Jianxin) [1] ; Wang, F (Wang, Fang) [1] ; Wang, JQ (Wang, Jieqiong) [1] ; Zhang, MM (Zhang, Mingming) [1] ; Li, CM (Li, Chunmei) [5] ; Mcclements, DJ (Mcclements, David Julian) [2] ; (provided by Clarivate) **Source LWT-FOOD SCIENCE AND TECHNOLOGY Volume 222 DOI 10.1016/j.lwt.2025.117601 Article Number 117601 Published APR 15 2025 Early Access APR 2025 Indexed 2025-03-24 Document Type Article**

Abstract

Keemun tea infusion was selected as a model system under various centrifugation speeds to build a relationship among chemical composition, properties of nanoparticles in tea infusion (Tea-NPs), and tea tastes via chemical analyses, sensory evaluation, and light scattering techniques. The research results showed that the hydrodynamic radius (Rh) of the Tea-NPs in the black tea infusion ranged from 100 to 250 nm, with a negative charge (-10 to-13 mV). The gyration radius (Rg) and zeta-potential assessments elucidated that Tea-NPs underwent structural modifications, which altered their size, shape, and compactness. High-speed centrifugation caused the dissolution of components such as polysaccharides in the Tea-NPs, and changes in the particle compactness and aggregation altered the structure of the Tea-NPs, resulting in an increase in Rh, while reducing the bitterness and enhancing the overall flavor of the tea infusion. This study highlights the important role of Tea-NPs in tea quality evaluation and their potential to drive innovative methods for improving tea product quality.

Keywords

Author Keywords

Keemun tea infusionTasteNanoparticle propertiesLight scattering techniqueCentrifugal pretreatment

Keywords Plus

GREEN TEACAMELLIA-SINENSISANTIOXIDANTSEXTRACTION

Nanoparticles

13-Role of size, surface charge, and PEGylated lipids of lipid nanoparticles (LNPs) on intramuscular delivery of mRNA

By Kong, WW (Kong, Weiwen) [1] ; Wei, YN (Wei, Yuning) [1] ; Dong, ZR (Dong, Zirong) [1] ; Liu, WJ (Liu, Wenjuan) [1] ; Zhao, JX (Zhao, Jiaxin) [1] ; Huang, Y (Huang, Yan) [2] , [3] ; Yang, JL (Yang, Jinlong) [1] ; Wu, W (Wu, Wei) [1] ; He, HS (He, Haisheng) [1] ; Qi, JP (Qi, Jianping) [1] (provided by Clarivate) **Source JOURNAL OF NANOBIOTECHNOLOGY Volume 22 Issue 1 DOI 10.1186/s12951-024-02812-x Article umber 553 Published SEP 11 2024 Indexed 2024-09-19 Document Type Article**

Abstract

Lipid nanoparticles (LNPs) are currently the most commonly used non-viral gene delivery system. Their physiochemical attributes, encompassing size, charge and surface modifications, significantly affect their behaviors both in vivo and in vitro. Nevertheless, the effects of these properties on the transfection and distribution of LNPs after intramuscular injection remain elusive. In this study, LNPs with varying sizes, lipid-based charges and PEGylated lipids were formulated to study their transfection and in vivo distribution. Luciferase mRNA (mLuc) was entraped in LNPs as a model nucleic acid molecule. Results indicated that smaller-sized LNPs and those with neutral potential presented superior transfection efficiency after intramuscular injection. Surprisingly, the sizes and charges did not exert a notable influence on the in vivo distribution of the LNPs. Furthermore, PEGylated lipids with shorter acyl chains contributed to enhanced transfection efficiency due to their superior cellular uptake and lysosomal escape capabilities. Notably, the mechanisms underlying cellular uptake differed among LNPs containing various types of PEGylated lipids, which was primarily attributed to the length of their acyl chain. Together, these insights underscore the pivotal role of nanoparticle characteristics and PEGylated lipids in the intramuscular route. This study not only fills crucial knowledge gaps but also provides significant directions for the effective delivery of mRNA via LNPs.

Keywords

Author Keywords

Lipid nanoparticlesSizeSurface chargePEGylated lipidsTransfectionDistribution

Nanoparticles

14-Fermented banana feed and nanoparticles: a new eco-friendly, cost-effective potential green approach for poultry industry

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By Saeed, M (Saeed, Muhammad) [1] ; Hassan, FU (Hassan, Faiz-ul) [2] ; Al-Khalaifah, H (Al-Khalaifah, Hanan) [3] ; Islam, R (Islam, Rafiqul) [4] ; Kamboh, AA (Kamboh, Asghar Ali) [5] ; Liu, GQ (Liu, Guiqin) [1]
(provided by Clarivate) Source POULTRY SCIENCE Volume 104 Issue 7 DOI 10.1016/j.psj.2025.105171 Article Number 105171 Published JUL 2025 Early Access APR 2025 Indexed 2025-05-12 Document Type Review

Abstract

The quest for sustainable, alternative, and cost-effective biofeed resources has been driven by the increasing costs and environmental concerns linked to conventional poultry feed. The banana plant (Musa spp.), traditionally valued for its fruit, is gaining recognition as a versatile and sustainable resource for the livestock and poultry industry. Rich in essential nutrients, fibers, and bioactive compounds, banana by-products enhance animal health, improve digestion, and reduce feed costs. Studies reveal that banana plant have potential as natural growth promoters, prebiotics, and antioxidants, contributing to improved feed efficiency and resilience against diseases. The peel of a banana is a good source of vitamins, crude protein (6-9 %), starch (3 %), total nutritional fiber (43.2-49.7 %), and crude fat (3.8-11 %), making it good source of nutrition for animals and birds. In addition, banana's peels contain flavonoids, tannins, phlobatannins, alkaloids, glycosides, and terpenoids. These compounds have antibacterial, growth promoter, antioxidant, stress reducer, anti-cholesterol, antihypertensive, immunostimulants, and anti-inflammatory properties. The banana plant, which is often regarded as agricultural waste, is rich in carbohydrates, fiber, and essential minerals, making it a valuable feed component. Results from experimental studies showed improved feed conversion efficiency, growth performance, and gut health in poultry fed with fermented banana plant-based diets. Fermentation improves the nutritional quality of banana plant biomass by increasing digestibility, reducing anti-nutritional factors, and enriching it with probiotics and bioactive compounds. The fermented banana had a substantial influence on weight gain and feed consumption in chickens. Banana meal may be used into broiler chicken diets at a maximum of 10 % without negatively impacting productivity. Silver nanoparticles (nano-Ag) produced by the banana plant can be used as an alternate growth-promoting supplement for poultry production. This approach offers environmental advantages by minimizing agricultural waste and encouraging more sustainable poultry production practices. Overall, the available studies highlight the considerable promise of fermented banana plants as a sustainable and environmentally friendly option in poultry feeding, tackling both economic and ecological issues faced by the poultry sector.

Keywords

Author Keywords

Banana feedPrebiotics effectsNanoparticlesNatural growth promotersPoultry

Keywords Plus

GROWTH-PERFORMANCEPEEL EXTRACTNUTRIENT DIGESTIBILITYINTESTINAL MORPHOLOGYSILVER NANOPARTICLESBY-PRODUCTSQUALITYMEALSUPPLEMENTATIONSUSTAINABILITY

Nanoparticles

15-Silver Nanoparticles (AgNPs): Comprehensive Insights into Bio/Synthesis, Key Influencing Factors, Multifaceted Applications, and Toxicity-A 2024 Update

By Sati, A (Sati, Abhinav) [1] ; Ranade, TN (Ranade, Tanvi N.) [1] ; Mali, SN (Mali, Suraj N.) [2] ; Yasin, HKA (Yasin, Haya Khader Ahmad) [3] , [4] ; Pratap, A (Pratap, Amit) [1] (provided by Clarivate) **Source ACS OMEGA Volume 10 Issue 8 Page 7549-7582 DOI 10.1021/acsomega.4c11045 Published FEB 18 2025 Early Access FEB 2025 Indexed 2025-02-26 Document Type Review**

Abstract

Silver nanoparticles (AgNPs) are widely recognized for their unique optical, electronic, and antibacterial properties, enabling their use in biosensing, photonics, electronics, drug delivery, and antimicrobial treatments. Green chemistry-based biological synthesis methods offer an eco-friendly alternative to traditional chemical techniques. Among metallic nanoparticles (NPs) and metal oxides, those derived from plant extracts exhibit notable medicinal properties. Due to their exceptional stability and low chemical reactivity, AgNPs are particularly well-suited for various biological applications. AgNPs can be synthesized through chemical, physical, or biological methods, each with distinct benefits and challenges. Chemical and physical approaches often involve complex purification, reactive reagents, and high energy demands, while biological methods, though slower, provide sustainable solutions. The chosen synthesis method strongly influences the stability, size, and purity of the resulting NPs. This review emphasizes the importance of selecting appropriate synthesis methods to optimize the characteristics and functionality of silver NPs. It consolidates research spanning the past two decades, including the most recent findings from 2024. A comprehensive electronic search of databases such as PubMed, Scopus, ScienceDirect, Cochrane, and Google Scholar was conducted to provide an up-to-date overview of advances in the synthesis and applications of silver nanoparticles.

Keywords

Keywords Plus

GREEN SYNTHESISANTIBACTERIAL ACTIVITYLEAF EXTRACTPHYSICOCHEMICAL PROPERTIESELECTROCHEMICAL DETECTIONNITRATE CONCENTRATIONLARVICIDAL ACTIVITYGOLD NANOPARTICLESMEDIATED SYNTHESISALCOHOL HYDROGELS

Nanoparticles

16-Platinum Nanoparticles Regulated V_2C MXene Nanoplatforms with NIR-II Enhanced Nanozyme Effect for Photothermal and Chemodynamic Anti-Infective Therapy

By He, XJ (He, Xiaojun) [1] ; Lv, Y (Lv, Ya) [2] ; Lin, YL (Lin, Yanling) [3] ; Yu, H (Yu, Hong) [2] ; Zhang, YP (Zhang, Yipiao) [4] ; Tong, YH (Tong, Yuhua) [5] ; Zhang, CW (Zhang, Chunwu) [2] (provided by Clarivate) **Source ADVANCED MATERIALS Volume 36 Issue 25 DOI 10.1002/adma.202400366 Published JUN 2024 Early Access MAR 2024 Indexed 2024-03-23 Document Type Article**

Abstract

Given the challenge of multidrug resistance in antibiotics, non-antibiotic-dependent antibacterial strategies show promise for anti-infective therapy. V2C MXene-based nanomaterials have demonstrated strong biocompatibility and photothermal conversion efficiency (PCE) for photothermal therapy (PTT). However, the limitation of V2C MXene's laser irradiation to the near-infrared region I (NIR-I) restricts tissue penetration, making it difficult to achieve complete bacterial eradication with single-effect therapeutic strategies. To address this, Pt nanoparticles (Pt NPs) are attached to V2C, forming artificial nanoplatforms (Pt@V2C). Pt@V2C exhibits enhanced PCE (59.6%) and a longer irradiation laser (NIR-II) due to the surface plasmon resonance effect of Pt NPs and V2C. Notably, Pt@V2C displays dual enzyme-like activity with chemodynamic therapy (CDT) and NIR-II enhanced dual enzyme-like activity. The biocatalytic mechanism of Pt@V2C is elucidated using density functional theory. In an in vivo animal model, Pt@V2C effectively eliminates methicillin-resistant Staphylococcus aureus from deep-seated tissues in subcutaneous abscesses and bacterial keratitis environments, accelerating abscess resolution and promoting wound and cornea healing through the synergistic effects of PTT/CDT. Transcriptomic analysis reveals that Pt@V2C targets inflammatory pathways, providing insight into its therapeutic mechanism. This study presents a promising therapeutic approach involving hyperthermia-amplified biocatalysis with Pt NPs and MXene nanocomposites.

Keywords

Author Keywords

chemodynamic therapymethicillin-resistant Staphylococcus aureusnear-infrared II irradiationtranscriptomicsV2C MXene

Keywords Plus

NANOSHEETS

Nanoparticles

17-Review of Gold Nanoparticles: Synthesis, Properties, Shapes, Cellular Uptake, Targeting, Release Mechanisms and Applications in Drug Delivery and Therapy

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By Georgeous, J (Georgeous, Joel) [1] ; Alsawaftah, N (Alsawaftah, Nour) [2] , [3] ; Abuwatfa, WH (Abuwatfa, Waad H.) [2] , [3] ; Husseini, GA (Husseini, Ghaleb A.) [1] , [2] , [3] , [4] (provided by Clarivate) **Source PHARMACEUTICS Volume 16 Issue 10 DOI 10.3390/pharmaceutics16101332 Article Number 1332 Published OCT 2024 Indexed 2024-11-06 Document Type Review**

Abstract

The remarkable versatility of gold nanoparticles (AuNPs) makes them innovative agents across various fields, including drug delivery, biosensing, catalysis, bioimaging, and vaccine development. This paper provides a detailed review of the important role of AuNPs in drug delivery and therapeutics. We begin by exploring traditional drug delivery systems (DDS), highlighting the role of nanoparticles in revolutionizing drug delivery techniques. We then describe the unique and intriguing properties of AuNPs that make them exceptional for drug delivery. Their shapes, functionalization, drug-loading bonds, targeting mechanisms, release mechanisms, therapeutic effects, and cellular uptake methods are discussed, along with relevant examples from the literature. Lastly, we present the drug delivery applications of AuNPs across various medical domains, including cancer, cardiovascular diseases, ocular diseases, and diabetes, with a focus on in vitro and in vivo cancer research.

Keywords

Author Keywords

gold nanoparticlesdrug deliverynanotechnologycancer treatmenttargeted delivery

Keywords Plus

IN-VITRONANOSHELLSSYSTEMFUNCTIONALIZATIONTEMPERATURERECEPTORNANORODSBARRIERCELLSTIME

Nanoparticles

18- Withania coagulans-mediated green synthesis of silver nanoparticles: characterization and assessment of their phytochemical, antioxidant, toxicity, and antimicrobial activities

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By Khan, A (Khan, Amjid) [1] , [2] ; Younis, T (Younis, Tahira) [1] ; Anas, M (Anas, Muhammad) [1] ; Ali, M (Ali, Muhammad) [3] ; Shinwari, ZK (Shinwari, Zabta Khan) [1] , [4] ; Khalil, AT (Khalil, Ali Talha) [5] ; Munawar, KS (Munawar, Khurram Shahzad) [6] , [7] ; Mohamed, HEA (Mohamed, Hamza Elsayed Ahmed) [8] , [9] ; Hkiri, K (Hkiri, Khaoula) [8] , [9] ; Maaza, M (Maaza, Malik) [8] , [9] ; **(provided by Clarivate) Source BMC PLANT BIOLOGY Volume 25 Issue 1 DOI 10.1186/s12870-025-06533-7 Article Number 574 Published MAY 2 2025 Indexed 2025-05-10 Document Type Article**

Abstract

BackgroundIn this study, we report the biofabrication of silver nanoparticles (Ag-NPs) using aqueous leaf extracts of Withania coagulans, which act as both reducing and capping agents. The goal was to synthesize and characterize the silver nanoparticles and evaluate their biological properties.ResultsThe silver nanoparticles were characterized by multiple techniques including UV-visible spectroscopy, X-ray diffraction (XRD), Fourier-transform infrared spectroscopy (FTIR), Raman spectroscopy, scanning electron microscopy (SEM), energy-dispersive spectroscopy (EDS), high-resolution transmission electron microscopy (HRTEM), zeta potential, dynamic light scattering (DLS), thermogravimetric analysis (TGA), and differential scanning calorimetry (DSC). A surface plasmon resonance peak was observed at 420 nm, and the XRD pattern indicated highly crystalline Ag-NPs with a crystallite size of 39.76 nm. SEM and HRTEM revealed irregular morphology with an average particle diameter of 26.63 nm. Zeta potential of -21.4 mV indicated relatively stable nanoparticles. FTIR spectra displayed significant peaks at 3269, 2921, 1628, 1513, and 1385 cm(-)1. Thermal stability was confirmed via TGA and DSC. Bioassays including total phenolics, total flavonoids, ferric reducing antioxidant power, and DPPH assays showed higher antioxidant potential in Ag-NPs compared to extracts, though phenolic and flavonoid content was lower. Biocompatibility tests such as hemolysis (IC50 = 141.466 mu g/mL) and brine shrimp lethality assay (IC50 = 721.76 mu g/mL) indicated moderate cytotoxicity. Phytotoxicity assays revealed higher toxicity of Ag-NPs against radish compared to control. Significant antibacterial activity was observed against Klebsiella pneumoniae and Salmonella typhi (29 +/- 0.01 mm and 28 +/- 1.00 mm inhibition zones at 25 mu g/mL, respectively).ConclusionsThe Withania coagulans leaf-extract-mediated silver nanoparticles exhibit remarkable antioxidant, phytochemical, and antimicrobial properties, suggesting potential for commercial applications in various biomedical and agricultural fields.

Keywords

Author Keywords

Antimicrobial activityAntioxidantGreen synthesisNanotechnologySilver nanoparticles

Keywords Plus

GROWTHCYTOTOXICITY

Nanoparticles

19-Plasmonic silver and gold nanoparticles: shape- and structure-modulated plasmonic functionality for point-of-caring sensing, bio-imaging and medical therapy

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By Hang, YJ (Hang, Yingjie) [1] ; Wang, AY (Wang, Anyang) [1] ; Wu, NQ (Wu, Nianqiang) [1]
(provided by Clarivate) Source CHEMICAL SOCIETY REVIEWS Volume 53 Issue 6 Page 2932-2971 DOI 10.1039/d3cs00793f Published MAR 18 2024 Early Access FEB 2024 Indexed 2024-03-09 Document Type Review

Abstract

Silver and gold nanoparticles have found extensive biomedical applications due to their strong localized surface plasmon resonance (LSPR) and intriguing plasmonic properties. This review article focuses on the correlation among particle geometry, plasmon properties and biomedical applications. It discusses how particle shape and size are tailored via controllable synthetic approaches, and how plasmonic properties are tuned by particle shape and size, which are embodied by nanospheres, nanorods, nanocubes, nanocages, nanostars and core-shell composites. This article summarizes the design strategies for the use of silver and gold nanoparticles in plasmon-enhanced fluorescence, surface-enhanced Raman scattering (SERS), electroluminescence, and photoelectrochemistry. It especially discusses how to use plasmonic nanoparticles to construct optical probes including colorimetric, SERS and plasmonic fluorescence probes (labels/reporters). It also demonstrates the employment of Ag and Au nanoparticles in polymer- and paper-based microfluidic devices for point-of-care testing (POCT). In addition, this article highlights how to utilize plasmonic nanoparticles for in vitro and in vivo bio-imaging based on SERS, fluorescence, photoacoustic and dark-field models. Finally, this article shows perspectives in plasmon-enhanced photothermal and photodynamic therapy.

Silver and gold nanoparticles have found extensive biomedical applications due to their strong localized surface plasmon resonance (LSPR) and intriguing plasmonic properties.

Keywords

Keywords Plus

SURFACE-ENHANCED RAMANDARK-FIELD MICROSCOPYCORE-SHELL NANOCUBESLATERAL FLOW ASSAYPHOTOTHERMAL THERAPYPHOTODYNAMIC THERAPYMETAL NANOPARTICLESAG NANOCUBESQUANTITATIVE-ANALYSISOPTICAL-PROPERTIES

Nanoparticles

20-A review on green synthesis of silver nanoparticles (SNPs) using plant extracts: a multifaceted approach in photocatalysis, environmental remediation, and biomedicine

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By Shahzadi, S (Shahzadi, Sehar) [1] ; Fatima, S (Fatima, Sehrish) [1] ; ul Ain, Q (ul Ain, Qurat) [1] ; Shafiq, Z (Shafiq, Zunaira) [1] ; Janjua, MRSA (Janjua, Muhammad Ramzan Saeed Ashraf) [1] (provided by Clarivate) **Source RSC ADVANCES Volume 15 Issue 5 Page 3858-3903 DOI 10.1039/d4ra07519f Published JAN 29 2025 Indexed 2025-02-13 Document Type Review**

Abstract

A sustainable and viable alternative for conventional chemical and physical approaches is the green production of silver nanoparticles (SNPs) using plant extracts. This review centers on the diverse applications of plant-mediated SNPs in biomedicine, environmental remediation, and photocatalysis. Ocimum sanctum (tulsi), Curcuma longa (turmeric), and Azadirachta indica (neem) and many others are plant extracts that have been used as stabilizing and reducing agents because of their extensive phytochemical profiles. The resulting SNPs have outstanding qualities, such as better photocatalytic degradation of organic dyes like methylene blue, antibacterial efficacy towards multidrug-resistant pathogens, biocompatibility for possible therapeutic applications, and regulated magnitude (10-50 nm), enhanced rigidity, and tunable surface plasmon resonance. Significant effects of plant extract type, amount, and synthesis parameters on the physical and functional characteristics of SNPs are revealed by key findings. Along with highlighting important issues and potential paths forward, this review also underlines the necessity of scalable production, thorough toxicity evaluations, and investigating the incorporation of SNPs into commercial applications. This work highlights how plant-based SNPs can be used to address global environmental and biological concerns by straddling the division between sustainable chemistry and nanotechnology.

Keywords

Keywords Plus

SURFACE-PLASMON RESONANCELEAF EXTRACTIN-VITROANTIBACTERIAL ACTIVITYGOLD NANOPARTICLESCATALYTIC-ACTIVITYANTIMICROBIAL ACTIVITYANTICANCER ACTIVITYMEDIATED SYNTHESISAQUEOUS EXTRACT

21-From livestream to table: psychological drivers of purchase intention in restaurant livestreaming

By Zhang, QC (Zhang, Qingchuo) [1] ; Huang, R (Huang, Rong) [2] ; Chen, Q (Chen, Qian) [1] ; Zhang, JH (Zhang, Jinhua) [2] (provided by Clarivate) **Source BRITISH FOOD JOURNAL Volume 127 Issue 11 Page 4161-4186 DOI 10.1108/BFJ-06-2025-0747 Published NOV 11 2025 Early Access AUG 2025 Indexed 2025-08-31 Document Type Article**

Abstract

Purpose - Restaurant livestreaming, where consumers interact with real-time digital content that promotes physical dining experiences, has emerged as a distinctive form of digital marketing. It integrates online engagement with offline consumption in a novel way. Design/methodology/approach - This study builds upon the stimulus-organism-response (S-O-R) framework. It incorporates insights from flow theory and perceived value theory to examine how emotional immersion and cognitive evaluation influence consumer purchase intentions in the context of restaurant livestreaming. A structural model is then tested using survey data collected from 482 livestream consumers. Findings - Using a sequential mixed methods design, this study first identifies key environmental stimuli through in-depth interviews. These stimuli include perceived livestreamer authenticity, perceived benefits and visual effects. The structural model results show that both livestreamer authenticity and perceived benefits significantly enhance flow experience. In addition, perceived benefits increase perceived value. Flow experience and perceived value subsequently have a positive impact on purchase intentions. Furthermore, prior knowledge plays a moderating role by strengthening or weakening consumers' psychological responses to livestreaming stimuli. Originality/value - This study contributes to consumer psychology by illuminating how emotional immersion and rational evaluation jointly drive decision-making in hybrid online-offline consumption contexts. Practical implications are offered for restaurant marketers seeking to leverage livestreaming as a strategic communication and engagement tool.

Keywords

Author Keywords

Restaurant livestreamingConsumer psychologyPurchase intentionFlow theoryPerceived valueS-O-R modelHybrid consumption

Keywords Plus

PRIOR KNOWLEDGEMODERATING ROLESOCIAL MEDIACONSUMERSBEHAVIOREXPERIENCEPREFERENCEMODELFLOW

Nanoparticles

22-Ultrasensitive electrochemical detection of gallic acid in beverages based on nitrogen-doped multi-walled carbon nanotube networks embellished with cobalt 2-methylimidazole nanoparticles

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By Zhao, HY (Zhao, Hongyuan) [1] , [3] , [4] , [5] ; Han, JL (Han, Jiale) [2] ; Zhao, MY (Zhao, Mengyuan) [1] , [2] ; Hui, ZZ (Hui, Zhenzhen) [1] , [3] ; Li, ZR (Li, Zirong) [1] , [3] ; Komarneni, S (Komarneni, Sridhar) [4] , [5] **(provided by Clarivate) Source FOOD CHEMISTRY Volume 472 DOI 10.1016/j.foodchem.2025.142993 Article Number 142993 Published APR 30 2025 Early Access JAN 2025 Indexed 2025-02-07 Document Type Article**

Abstract

This work presents a convenient and easy-to-operate method for synthesizing the functionally integrated nanocomposite of nitrogen-doped multi walled carbon nanotube networks (N-CNTs) and cobalt 2-methylimidazole (ZIF-67) nanoparticles. The N-CNTs@ZIF-67 nanocomposite was utilized to design a novel electrochemical sensing platform for detecting gallic acid (GA). The N-CNTs@ZIF-67 modified glass carbon electrode (GCE) demonstrated high sensitivity for GA electrochemical detection (LOD: 10.17 nM, detection concentration: 0.5-20 mu M). N-CNTs provided efficient electron transport channels for the GA electrochemical detection reaction, which improved the transfer rate of electrons/ions at the interface of sensing electrode/electrolyte. ZIF-67 nanoparticles with highly porous structure could adsorb GA molecules and promote the oxidation reaction. Besides that, N-CNTs provided more active sites on carbon nanotube networks by nitrogen-doping, which significantly enhanced the catalytic activity. The prepared N-CNTs@ZIF-67/GCE sensor exhibited favorable GA sensing detection performance, realizing an accurate analysis of GA in beverage samples (Recovery: 96.77-107.93 %, RSD: 1.07-4.38 %).

Keywords

Author Keywords

Cobalt 2-methylimidazoleNitrogen-doped carbon nanotube networksNanocompositeGallic acidElectrochemical sensorBeverage

Keywords Plus

SENSOR

Nanoparticles

23-Room-temperature fabrication of zeolitic imidazolate framework-8 nanoparticles combined with graphitized and carbonylated carbon nanotubes networks for the ultrasensitive gallic acid electrochemical detection

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By Zhao, HY (Zhao, Hongyuan) [1] , [3] ; Zhao, MY (Zhao, Mengyuan) [1] , [2] ; Han, JL (Han, Jiale) [2] ; Li, ZR (Li, Zirong) [1] , [3] ; Tang, J (Tang, Jing) [1] , [3] ; Wang, ZK (Wang, Zhankui) [2] ; Wang, GF (Wang, Guifang) [4] ; Komarneni, S (Komarneni, Sridhar) [5] , [6] (provided by Clarivate) **Source FOOD CHEMISTRY Volume 465 Part 1 DOI 10.1016/j.foodchem.2024.142019 Article Number 142019 Published FEB 15 2025 Early Access NOV 2024 Indexed 2024-11-30 Document Type Article**

Abstract

Gallic acid (GA) has important application value in several fields of foods, medicines, and chemical engineering. However, the excessive intake of GA may cause gastrointestinal discomfort and nerve damage. Herein, an economical room-temperature fabrication strategy was reported for the preparation of zeolitic imidazolate framework-8 (ZIF-8) nanoparticles combined with graphitized and carbonylated carbon nanotubes (GCMCN) networks, which were used to achieve the ultrasensitive electrochemical detection of GA. The GCMCN@ZIF-8 nanocomposite modified electrode realized an accurate and rapid analysis of GA (Linear concentration range: 0.1-20 mu M, LOD: 4.77 nM). GCMCN networks with graphitization and carboxylation boosted the electrical conductivity of electrode modification layer and enhanced the electrochemical interface area between sensing electrode and electrolyte. ZIF-8 nanoparticles with more active interaction sites and high porosity possessed high adsorption capacity for GA molecules. The fabricated electrochemical sensing platform exhibited good GA quantitative analysis property in food samples (Recovery: 93.88-106.73 %, RSD: 1.04-3.73).

Keywords

Author Keywords

Electrochemical sensorGallic acidGraphitized and carbonylated carbonnanotubesRoom-temperature fabricationZeolitic-imidazolate-framework-8

Keywords Plus

SENSOR

Nanoparticles

24-Room-temperature fabrication of zeolitic imidazolate framework-8 nanoparticles combined with graphitized and carbonylated carbon nanotubes networks for the ultrasensitive gallic acid electrochemical detection

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By Zhao, HY (Zhao, Hongyuan) [1] , [3] ; Zhao, MY (Zhao, Mengyuan) [1] , [2] ; Han, JL (Han, Jiale) [2] ; Li, ZR (Li, Zirong) [1] , [3] ; Tang, J (Tang, Jing) [1] , [3] ; Wang, ZK (Wang, Zhankui) [2] ; Wang, GF (Wang, Guifang) [4] ; Komarneni, S (Komarneni, Sridhar) [5] , [6] (provided by Clarivate) **Source FOOD CHEMISTRY Volume 465 Part 1 DOI 10.1016/j.foodchem.2024.142019 Article Number 142019 Published FEB 15 2025 Early Access NOV 2024 Indexed 2024-11-30 Document Type Article**

Abstract

Gallic acid (GA) has important application value in several fields of foods, medicines, and chemical engineering. However, the excessive intake of GA may cause gastrointestinal discomfort and nerve damage. Herein, an economical room-temperature fabrication strategy was reported for the preparation of zeolitic imidazolate framework-8 (ZIF-8) nanoparticles combined with graphitized and carbonylated carbon nanotubes (GCMCN) networks, which were used to achieve the ultrasensitive electrochemical detection of GA. The GCMCN@ZIF-8 nanocomposite modified electrode realized an accurate and rapid analysis of GA (Linear concentration range: 0.1-20 mu M, LOD: 4.77 nM). GCMCN networks with graphitization and carboxylation boosted the electrical conductivity of electrode modification layer and enhanced the electrochemical interface area between sensing electrode and electrolyte. ZIF-8 nanoparticles with more active interaction sites and high porosity possessed high adsorption capacity for GA molecules. The fabricated electrochemical sensing platform exhibited good GA quantitative analysis property in food samples (Recovery: 93.88-106.73 %, RSD: 1.04-3.73).

Keywords

Author Keywords

Electrochemical sensorGallic acidGraphitized and carbonylated carbonnanotubesRoom-temperature fabricationZeolitic-imidazolate-framework-8

Keywords Plus

SENSOR

Nanoparticles

25-A review on the encapsulation of " eco-friendly " compounds in natural polymer-based nanoparticles as next generation nano-agrochemicals for sustainable agriculture and crop management

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By Mondejar-López, M (Mondejar-Lopez, Maria) [1] ; García-Simarro, MP (Garcia-Simarro, Maria Paz) [1] , [2] ; Navarro-Simarro, P (Navarro-Simarro, Pablo) [1] ; Gómez-Gómez, L (Gomez-Gomez, Lourdes) [1] , [3] ; Ahrazem, O (Ahrazem, Oussama) [1] , [4] ; Niza, E (Niza, Enrique) [1] , [3] , [4]
(provided by Clarivate) Source INTERNATIONAL JOURNAL OF BIOLOGICAL MACROMOLECULES Volume 280 Part 3 DOI 10.1016/j.ijbiomac.2024.136030 Article Number 136030 Published NOV 2024 Early Access SEP 2024 Indexed 2024-10-12 Document Type Review

Abstract

Crop management techniques and sustainable agriculture offer a comprehensive farming method that incorporates social, economic, and ecological factors. Sustainable agriculture places a high priority on soil health, water efficiency, and biodiversity conservation in order to develop resilient and regenerative food systems that can feed both the current and future generations. Our goal in this review is to give a thorough overview of current developments in the use of polysaccharides as raw materials for the encapsulation of natural chemicals in nanoparticles as novel crop protection products. The search for recent research articles and latest reviews has been carried out through pubmed, google scholar, BASE as search engines. Offer cutting-edge solutions for sustainable crop management that satisfy the demands of an expanding population, comply with changing legal frameworks, and address environmental issues by encasing natural compounds inside polysaccharide-based nanoparticles. A variety of natural substances, such as essential oils, plant extracts, antimicrobials compounds and miRNA, can be included in these nanoparticles. These materials have many advantages, such as biocompatibility, biodegradability and controlled release of active compounds. Thanks to their action mechanism, they are able to mediate hormone signaling and gene expression in different plant physiological aspects, as well as enhance their tolerance to abiotic stress conditions. Sustainable agriculture can be supported by this type of treatments, correctly developing food safety through the production of non-toxic nanoparticles, low-cost industrial scale-up and the use of biodegradable materials. Polysaccharide-based nanoparticles have a wide range of uses in agriculture: they improve crop yields, encourage "eco-friendly" farming methods and can decrease the concentrations of active ingredient used, providing an accurate and affective dosage without damaging further species, as well as avoiding treatment resistance risks. These nanoparticles can also reduce the negative effects of chemical fertilizers and pesticides, contributing to the environmentally friendly agricultural development. Furthermore, the application of polysaccharide-based nanoparticles is consistent with the expanding trend of green and sustainable agriculture.

Keywords

Author Keywords

NanotechnologyNatural polymersAgrochemicals

Keywords Plus

CONTROLLED-RELEASESILVER NANOPARTICLESESSENTIAL OILSCHITOSANPLANTSNANOCAPSULESDELIVERYSYSTEMSNANOTECHNOLOGYANTIFUNGAL

Nanoparticles

26-Photothermal therapy of tuberculosis using targeting pre-activated macrophage membrane-coated nanoparticles

By Li, B (Li, Bin) [1] , [2] , [3] , [4] ; Wang, W (Wang, Wei) [1] ; Zhao, L (Zhao, Lu) [3] , [4] ; Wu, YX (Wu, Yunxia) [3] , [4] ; Li, XX (Li, Xiaoxue) [1] ; Yan, DY (Yan, Dingyuan) [5] ; Gao, QX (Gao, Qiuxia) [3] , [4] ; Yan, Y (Yan, Yan) [6] ; Zhang, J (Zhang, Jie) [7] ; Feng, Y (Feng, Yi) [1] ; **(provided by Clarivate) Source NATURE NANOTECHNOLOGY Volume 19 Issue 6 DOI 10.1038/s41565-024-01618-0 Published JUN 2024 Early Access FEB 2024 Indexed 2024-03-04 Document Type Article**

Abstract

Conventional antibiotics used for treating tuberculosis (TB) suffer from drug resistance and multiple complications. Here we propose a lesion-pathogen dual-targeting strategy for the management of TB by coating Mycobacterium-stimulated macrophage membranes onto polymeric cores encapsulated with an aggregation-induced emission photothermal agent that is excitable with a 1,064 nm laser. The coated nanoparticles carry specific receptors for Mycobacterium tuberculosis, which enables them to target tuberculous granulomas and internal M. tuberculosis simultaneously. In a mouse model of TB, intravenously injected nanoparticles image individual granulomas in situ in the lungs via signal emission in the near-infrared region IIb, with an imaging resolution much higher than that of clinical computed tomography. With 1,064 nm laser irradiation from outside the thoracic cavity, the photothermal effect generated by these nanoparticles eradicates the targeted M. tuberculosis and alleviates pathological damage and excessive inflammation in the lungs, resulting in a better therapeutic efficacy compared with a combination of first-line antibiotics. This precise photothermal modality that uses dual-targeted imaging in the near-infrared region IIb demonstrates a theranostic strategy for TB management.

Tuberculosis is a major global health issue. Here the authors report Mycobacterium-pre-activated macrophage membrane-coated photothermal nanoparticles for targeted tuberculous granuloma and pathogen dual imaging and antibacterial photothermal therapy.

Keywords

Keywords Plus

GOLD NANORODSBACTERIARECEPTORRIFAMPICININFECTIONSELF

Nanoparticles

27-Strong coupling Fe2VO4 nanoparticles/3D *N*-doped interconnected porous carbon derived from MOFs by confined adsorption-assembly-pyrolysis for greatly boosting oxygen reduction

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By Liu, LL (Liu, Ling-Ling) [1] ; Liu, L (Liu, Lu) [1] , [2] ; Wang, CY (Wang, Chen-Yang) [1] ; Zhang, L (Zhang, Lu) [1] ; Feng, JJ (Feng, Jiu-Ju) [1] ; Gao, YJ (Gao, Yi-Jing) [1] , [2] ; Wang, AJ (Wang, Ai-Jun) [1]
(provided by Clarivate) Source JOURNAL OF COLLOID AND INTERFACE SCIENCE Volume 684 Page 10-20 Part 2 DOI 10.1016/j.jcis.2025.01.052 Published APR 15 2025 Early Access JAN 2025 Indexed 2025-02-21 Document Type Article

Abstract

Low-cost and effective electrocatalysts are critical for energy storage and conversion. Herein, iron(III) and vanadium(III) acetylacetonates were first adsorbed and confined in porous zeolitic imidazolate framework-8 (ZIF8), which further cross-linked together by the methanol-induced-assembly. Following the pyrolysis, the Fe2VO4 nanoparticles were efficiently encapsulated within three-dimensional (3D) N-doped interconnected porous carbon, termed Fe2VO4/NIPC. The obtained Fe2VO4/NIPC displayed outstanding catalytic properties in the alkaline media for oxygen reduction reaction with a half-wave potential of 0.86 V. In the parallel, density functional theory (DFT) calculations were performed to illustrate the catalytic mechanism. Moreover, the Fe2VO4/NIPC assembled Zn-air battery showed a high peak power density of 107.7 mW cm-2 and excellent long-cycle stability over a duration of 250 h, which outperformed commercial Pt/C catalyst in the control group. The strong coupling and synergistic effects between the Fe2VO4 nanoparticles and N-doped carbon improved the catalytic perfor- mance, coupled by promoting the stability. This study opens a prospect way to develop high-efficiency carbon- based electrocatalystsin energy storage and conversion devices.

Keywords

Author Keywords

Confined adsorptionPyrolysisOxygen reduction reactionTransition metal oxidesZinc-air batteries

Keywords Plus

IRONELECTROCATALYSTSFECO