ابحاث التنمية المستدامة

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Title	**Characterization and cost analysis of a modified silica gel-based adsorption desalination application**
Authors	**Alsaman, A.S., Askalany, A.A., Ibrahim, E.M.M., (...), Ali, E.S., Ahmed, M.S.**
Journal	**Journal of Cleaner Production 379,134614**
Abstract	**This study aims to reduce adsorption desalinated water cost by innovative employing silica gel/CaCl2 composite and novel silica gel/(NH4)2CO3 activated materials. Raw silica gel (SG), which served as the host matrix, was acid-treated and impregnated with CaCl2 and (NH4)2CO3. The prepared samples characteristics (XRD, N2 adsorption, water vapor adsorption) have been investigated and compared to the raw SG. A simulation model has been used to investigate the impact of the study samples on adsorption desalination (AD) system performance with and without heat recovery (HR). The study also includes a cost analysis of the AD water production system (using the tested materials) that uses solar energy or a waste heat source. The SG/CaCl2 achieved the highest water adsorption (0.95 kgH2O/kg) with a SDWP of 23.3 m3/ton per day, SCP 660 W/kg, and COP 0.71. With HR, the system could produce 35 m3/ton of SG/CaCl2 per day SDWP. The study concluded that the tested samples outperform the raw material as the total production cost of AD water using SG/CaCl2 has been reduced to approximately 37% using solar energy and 60% using waste heat as a regenerative heat source.**

Title	**Heat and mass transfer for MHD peristaltic flow in a micropolar nanofluid: mathematical model with thermophysical features**
Authors	**Abd-Alla, A.M., Abo-Dahab, S.M., Thabet, E.N., Abdelhafez, M.A.**
Journal	**Scientific reports 12(1), pp. 21540**
Abstract	**According to a survey of the literature, nanofluids are superior to traditional fluids at transferring heat. A detailed analysis of the models mentioned above is crucial since there are large gaps in the illumination of current solutions for improving heat transfer in nanomaterials. The ongoing investigation's purpose is to ascertain the tiny size gold particles drift in free with the heat and mass transfer, buoyancy forces, thermophoresis, and Brownian motion of a micropolar nanofluid being transported through a porous medium in an asymmetric channel with a uniform magnetic field using a long-wavelength and low Reynolds number approximation. The resulting dimensionless nonlinear governing equations have been numerically solved using a MATLAB software and the Runge-Kutta-Fehlberg integration scheme. Two comparisons with previously investigated problems are also made to confirm our findings, and an excellent concurrence is discovered. As a result, trustworthy results are being given. Numerical solutions are used to describe the effects of different thermal-fluidic parameters on velocity profiles, temperature, concentration, micropolar rotation, pressure gradient, shear stress, heat flux, and nanoparticle volume flux, etc. Tables, graphs, and bar charts are used to present and discuss numerical results that have been produced. A comparison of the resulting numerical solution to earlier literature also reveals a satisfactory level of agreement. Insight into real-world applications such nanofluidic, energy conservation, friction reduction, and power generation are provided by this work. Furthermore, the Brownian and thermophoresis parameters behave significantly differently in a concentration field. On the other hand, the study puts forward an important note that for peristaltic flow of a micropolar fluid with nanoparticles can be controlled by suitably adjusting the micropolar parameter, thermophoresis parameter, nanoparticle Grashof number, and Brownian motion parameter.**

Title	**Bioremoval of Cylindrospermopsis raciborskii cells and cylindrospermopsin toxin in batch culture by the yeast Aureobasidium pullulans**
Authors	**Mohamed, Z., Alamri, S., Hashem, M., Mostafa, Y.**
Journal	**Environmental Science and Pollution Research 29(60), pp. 90140-90146**
Abstract	**This study describes the ability of a yeast strain, Aureobasidium pullulans KKUY0701 isolated from eutrophic lake to eliminate Cylindrospermopsis raciborskii and cylindrospermopsin (CYN) toxin. The anti-cyanobacterial activity of this yeast strain was evaluated by growing with living cells and filtrate of C. raciborskii. CYN bioremoval was assayed using living and heat-inactivated yeast cells. Both living cells and filtrate of this yeast strain were able to suppress the growth of C. raciborskii, with total cell death occurring at day 2 and day 3, respectively. Living and inactivated yeast cells, but not yeast filtrate, reduced CYN concentrations released into cyanobacterial cultures, indicating that this toxin might be removed from the culture medium via absorption onto yeast surface rather than enzymatic biodegradation. The adsorption experiments also confirmed the elimination of CYN by living and heat-inactivated yeast. Nevertheless, inactivated yeast exhibited higher capacity (K = 3.3) and intensity (n = 1.4) than living yeast (K = 1.9, n = 1) for CYN adsorption. The study suggests that this yeast strain could be employed for bioremediation of Cylindrospermopsis blooms in freshwaters. Additionally, heat-inactivated yeast biomass could be used in slow sand filters for elimination of CYN in drinking water treatment plants.**

Title	**Cooling technologies for enhancing photovoltaic–thermal (PVT) performance: a state of the art**
Authors	**Ghazy, M., Ibrahim, E.M.M., Mohamed, A.S.A., Askalany, A.A.**
Journal	**International Journal of Energy and Environmental Engineering 13(4), pp. 1205-1235**
Abstract	**Although photovoltaic cells are good technology that converts sunlight into electricity, it suffers from low efficiency in hot weather conditions. Photovoltaic–thermal technologies (PV/T) have addressed the problem of overheating PV cells utilizing several cooling methods. These technologies can improve the electrical efficiency of PV cells and provide thermal energy simultaneously. This work presents an updated review of the most critical PV cooling technologies and their impact on electrical and thermal efficiency, in addition to the performance formulas for each technology. An analytical comparison of the results of the studies conducted on each technique is presented to determine the best performance obtained. The strengths and weaknesses are presented and the most effective techniques that can be relied upon to develop and popularize PV systems in the future.**

Title	**Stochastic optimal reactive power dispatch at varying time of load demand and renewable energsy resources using an efficient modified jellyfish optimizer**
Authors	**Gami, F., Alrowaili, Z.A., Ezzeldien, M., (...), Oda, E.S., Mohamed, S.A.**
Journal	**Neural Computing and Applications 34(22), pp. 20395-20410**
Abstract	**Solving the optimal reactive dispatch (ORPD) is a strenuous task to assign the best operating point of the electrical system components to obtain the most secure and stable state of system. This problem became more complex problem due the variation of the load demand or inclusion the renewable energy resources (RERs). The aim of this paper is solving the ORPD problem using a modified jellyfish search optimizer (MJSO) under deterministic and probabilistic states of the load demand and the RERs. The MJSO is based on boosting the exploration and exploitation phases of the standard jellyfish search optimizer (JSO) using two strategies. The first strategy is enhancing the exploration process by using a chaotic mutation while the second strategy is implemented for the exploitation process using a spiral orientation motion of the populations around the sorted jellyfish. Three uncertain parameters are considered including the load demand, the solar irradiance, and the wind speed which are represented using the Weibull, the Beta, and the normal probability density functions, respectively. The Monte Carlo simulation along with scenario-based reduction to generate a set of scenarios for the stochastic ORPD. To verify the effectiveness of the MJSO for solving the ORPD problem, it is tested on IEEE 30-bus system and the obtained results are compared with other well-known optimization techniques. The obtained results and the comparison with other techniques indicate that the proposed MJSO algorithm provides effective and robust high-quality solution when solving the ORPD at deterministic state. In addition of that the expected power loss is decreased considerably with application the proposed technique for solving the ORPD at stochastic state.**

Title	**Potential bioactivity of Phoenix dactylifera fruits, leaves, and seeds against prostate and pancreatic cancer cells**
Authors	**Ghazzawy, H.S., Gouda, M.M., Awad, N.S., (...), Gabr, G.A., Hikal, D.M.**
Journal	**Frontiers in Nutrition 9,998929**
Abstract	**The use of functional foods' phytochemicals in the chemoprevention of different cancer diseases has become one of the hot scientific areas in the clinical nutrition field. For instance, the Khalas palm cultivar (KPC; Phoenix dactylifera) is one of the natural sustainable resources that have high bioactivity and functionality. This study aimed to investigate the antiproliferative activity and mode of action of KPC's different parts on prostate (Pc3) and pancreatic (panc1) cancer cells at a molecular level. In the methods, KPC's leaves, seeds, and fruits' chemical composition and phytochemical analysis were analyzed. Also, the cytotoxic effects of each extract were assessed against pc3 and panc1 cell lines. Besides, induction of apoptosis, cell cycle analysis, and gene expression of both Cap3 and Cap9 were studied. The obtained results indicated that KPC leaves extract exhibited the highest significant ($P < 0.01$) anti-proliferation activity against the utilized cancer cell lines compared to fruits and seeds extracts. Also, there were significant ($P < 0.05$) differences in the phenolic contents, flavonoid of compounds, and antioxidant power of the leaves when compared to the seeds and fruits. Additionally, the highest cytotoxic effect (lowest IC50) was recorded with leave extract than seeds and fruits. Meanwhile, the seeds extract induced ($P < 0.05$) the apoptosis and arrested cells in the G2/M phase as well as up-regulated the gene expression of the apoptotic-related genes (Casp3 and Casp9) compared to the control group. In conclusion, this study showed that the presence of bioactive components in the KPC different parts extracts have the significant ability to induce the apoptotic pathway that could down-regulate the proliferation of prostate (pc3) and pancreatic (panc1) cancer cells. The pathway mechanism of action was induced by the phytol molecule presented in its leaves extract.**

Title	**Synthesis, characterization, and DFT study of linear and non-linear optical properties of some novel thieno[2,3-b]thiophene azo dye derivatives**
Authors	**Shokr, E.K., Kamel, M.S., Abdel-Ghany, H., El- Remaily, M.A.E.A.A.A., Abdou, A.**
Journal	**Materials Chemistry and Physics 290,126646**
Abstract	**Some novel thieno[2,3-b]thiophene-2,5-dicarbonitrile derivatives namely; 3,4-bis(2-hydroxynaphthalen-1-yl)diazenyl)thieno[2,3-b]thiophene-2,5-dicarbonitrile, 3,4-bis(4-aminonaphthalen-1-yl)diazenyl)thieno[2,3-b]thiophene-2,5-dicarbonitrile and 3,4-bis(4-(dimethylamino)phenyl) diazenyl)thieno[2,3-b]thiophene-2,5-dicarbonitrile have been synthesized and characterized by FT-IR and NMR spectroscopies. Thin films of the synthesized thieno[2,3-b]thiophene-2,5-dicarbonitrile derivatives have been deposited by the thermal evaporation method and characterized by UV-VIS-NIR spectroscopy. Their spectral dependences of absorption, dielectric, dispersion and allied parameters have been investigated, discussed, and compared with published results. The high absorption coefficient (∼105cm−1) at a solar maximum wavelength (λ≅500nm) and the band and optical gap energies of 2.95 and 2.15 eV, respectively manifested by the present samples make them suitable to be applied in optoelectronic devices, especially as solar absorber material. The revealed high values of non-linear refractive index n2 and 3rd order non-linear susceptibility revealed by these organic compound films, which are significantly higher than those of chalcogenide and oxide materials recommend them as promising NLO-elements. These results have been insured by geometry optimization and NLO calculations using Density Functional Theory with B3LYP method in the level of 6–311 G (d,p).**

Title	**A new source of representative secondary PET nanoplastics. Obtention, characterization, and hazard evaluation**
Authors	**Villacorta, A., Rubio, L., Alaraby, M., (...), Marcos, R., Hernández, A.**
Journal	**Journal of Hazardous Materials439,129593**
Abstract	**Micro and nanoplastics (MNPLs) are emergent environmental pollutants requiring urgent information on their potential risks to human health. One of the problems associated with the evaluation of their undesirable effects is the lack of representative samples, matching those resulting from the environmental degradation of plastic wastes. To such end, we propose an easy method to obtain polyethylene terephthalate nanoplastics from water plastic bottles (PET-NPLs) but, in principle, applicable to any other plastic goods sources. An extensive characterization indicates that the proposed process produces uniform samples of PET-NPLs of around 100 nm, as determined by using AF4 and multi-angle and dynamic light scattering methodologies. An important point to be highlighted is that to avoid the metal contamination resulting from methods using metal blades/burrs for milling, trituration, or sanding, we propose to use diamond burrs to produce metal-free samples. To visualize the toxicological profile of the produced PET-NPLs we have evaluated their ability to be internalized by cells, their cytotoxicity, their ability to induce oxidative stress, and induce DNA damage. In this preliminary approach, we have detected their cellular uptake, but without the induction of significant biological effects. Thus, no relevant increases in toxicity, reactive oxygen species (ROS) induction, or DNA damage -as detected with the comet assay- have been observed. The use of representative samples, as produced in this study, will generate relevant data in the discussion about the potential health risks associated with MNPLs exposures**

Title	**Eco-friendly and regiospecific intramolecular cyclization reactions of cyano and carbonyl groups in N,N-disubstituted cyanamide**
Authors	**Moustafa, A.H., Ahmed, W.W., Awad, M.F., (...), Khodairy, A., Amer, A.A.**
Journal	**Molecular Diversity 26(5), pp. 2813-2823**
Abstract	**Eco-friendly, low-cost and high-yielding synthetic route toward imidazoles and oxazoles has been developed. 1-(4,6-Dimethylpyrimidin-2-yl)-2-(alkylamino)-1,5-dihydro-4H-imidazol-4-one 3a–c have been synthesized via regiospecific reaction of ethyl 2-(N-(4,6-dimethylpyrimidin-2-yl)cyanamide)acetate 1 with primary aliphatic amines in water as green solvent. While, the reaction between 4,6-dimethylpyrimidin-2-yl(2-oxo-2-phenylethyl)cyanamide 2 and primary aliphatic amines using water and/or iso-propanol as green solvents afforded 3-(4,6-dimethylpyrimidin-2-yl)-5-phenyl-1,3-oxazole-2(3H)-imine 6 and 1-(4,6-dimethylpyrimidin-2-yl)-N-alkyl-4-phenyl-1H-imidazol-2-amine 7a–d, respectively. Graphical abstract: [Figure not available: see fulltext.]**

Title	**Electrochemical Impedance Investigation of Dye-Sensitized Solar Cells Based on Electrospun TiO2 Nanofibers Photoanodes**
Authors	**Abd El-Lateef, H.M., Khalaf, M.M., Dao, V.-D., Mohamed, I.M.A.**
Journal	**Materials 15(17),6175**
Abstract	**This work investigates an electrochemical impedance analysis based on synthesized TiO2 nanofibers (NFs) photoanodes, which were fabricated via electrospinning and calcination. The investigated photoanode substrate NFs were studied in terms of physicochemical tools to investigate their morphological character, crystallinity, and chemical contents via scanning electron microscope (SEM), X-ray photoelectron spectroscopy (XPS), and X-ray diffraction (XRD) analyses. As a result, the studied photoanode substrate NFs were applied to fabricate dye-sensitized solar cells (DSCs), and the electrochemical impedance analysis (EIS) was studied in terms of equivalent circuit fitting and impacts of N-doping, the latter of which was approved via XPS analysis. N-doping has a considerable role in the enhancement of charge transfers, which could be due to the strong interactions between active-site N atoms and the used photosensitizer.**

Title	**Inhibition of The Growth and Toxicity of Cyanobacterium Chroococcus minutus Using Extremely Low Frequency Electromagnetic Fields**
Authors	**Mohamed, Z.A., Hosny, A.A., Bakr, A.A.**
Journal	**Egyptian Journal of Botany 62(3), pp. 817-824**
Abstract	**THE EFFECTS of extremely low-frequency electromagnetic fields (ELF-EMFs) on the growth and synthesis of microcystins (MCs) production of the harmful cyanobacterium Chroococcus minutus were examined by exposing cyanobacterial cells to various ELF-EMF frequencies (0.1–1Hz) for various exposure times (10–60min). C. minutus cultures exposed to ELF-EMF at a frequency of 0.5Hz for 40min had significantly fewer cells than the control. Under these conditions, intracellular and extracellular (MCs) and chlorophyll-a concentrations also decreased significantly. Within 48h, no extracellular MCs were detected in cultures exposed to ELF-EMF for 60min. This study offers an eco-friendly technique for removing harmful cyanobacterial toxins from water resources. By degrading extracellular MCs after cell lysis, ELF-EMF is non-destructive, non-reactive and safe for the environment. In addition, it prevents additional aquatic environmental pollution input.**

Title	**Landslides and flood multi-hazard assessment using machine learning techniques**
Authors	**Youssef, A.M., Mahdi, A.M., Pourghasemi, H.R.**
Journal	**Bulletin of Engineering Geology and the Environment 81(9),370**
Abstract	**Saudi Arabia is affected by various types of natural hazards that affect people's lives and property. In this paper, the effects of landslides and floods in Wadi Dawqah in Bahah region, Saudi Arabia, are studied. Mountainous regions are exposed to natural hazards that require modeling to produce multi-hazard maps. Three models were used in this study: logistic regression (LR), random forest (RF), and support vector machine (SVM). Seventeen influencing factors are used to map multi-hazards using inventory data. The effectiveness and significance of the factors were determined for both landslides and floods. Model results were compared using area under the curve (AUC), overall hazard accuracy, mean absolute error, root mean square error, and kappa index. The results show that RF has the best performance in predicting landslides with a high AUC of 94.9%, while SVM, LR, and RF have high prediction for floods (AUC of 92.7%, 98%, and 98.7%, respectively). Since RF has the highest values for both landslides and floods, other statistical comparisons show that the overall accuracy is 94% and 99%, the kappa index is 0.870 and 0.978, the MAE values are 0.064 and 0.010, and finally the RMSE values are 0.253 and 0.10 for landslides and floods, respectively. Accordingly, the models RF for landslides and LR, SVM, and RF for floods were used to generate three multi-hazard maps for Wadi Dawqah basin. As a preliminary step, the map produced could provide a cornerstone for planners and decision making for future development.**

Title	**Antibacterial, antioxidant and anticancer of fermentation by Bacillus subtilis on bagasse and wheat bran**
Authors	**El-Mongy, M.A., Hamouda, R.A., Ali, S.G., Sedeek, E.A., Mahmoud, E.A.**
Journal	**Current Chemistry Letters 11(4), pp. 383-392**
Abstract	**Bagasse and wheat bran are agrowaste and cause different environmental problems. These compounds contain highly valuable compounds that can be recycled by microorganisms. This work was carried out to evaluate the effect of fermentation by Bacillus subtilis on biological activity and chemical components of bagasse and wheat bran. The results demonstrated the antimicrobial activity of fermented wheat bran and bagasse against eight selected microbial pathogens exhibited high activity of fermented wheat bran and mix, fermented bagasse showed less antimicrobial activity. Fermented wheat bran and bagasse samples had the highest antioxidant activity values (16.45 and 14.94 %) in comparison with the unfermented samples (6.20 and 3.97 %) respectively. Concentration of protein, ash, oil, and carbohydrates in fermented wheat bran were 5.34 %, 7.30%, 2.36% and 10.6%, whereas in bagasse they were 2.45%, 1.68%, 1.51% and 3.25 respectively. The moisture contents in bagasse 73.1% were more than in wheat bran 63.88%.**

Title	**Solar powered adsorption desalination system employing CPO-27(Ni)**
Authors	**Ghazy, M., Askalany, A.A., Ibrahim, E.M.M., (...), Ali, E.S., AL-Dadah, R.**
Journal	**Journal of Energy Storage 53,105174**
Abstract	**Adsorption-based desalination system (ADS) is an alternative technology to the traditional water desalination systems as low-temperature sources can operate it. Also, ADSs use environmentally friendly materials, limiting global warming and environmental pollution. This work investigates the performance parameters of ADS powered by an evacuated thermal solar collector theoretically and experimentally. The system uses an advanced sorption material of metal-organic frameworks called CPO-27(Ni). The study estimates optimal operating conditions of ADS under the climate of Egypt. A mathematical model is carried out using MATLAB integrated with TRNSYS software. The study investigates high system performance through two modes; without heat recovery (Mode-1) and heat recovery (Mode-2). The ADS performance is evaluated by specific daily water production (SDWP) and gain output ratio (GOR) parameters. The results show a remarkable superiority for mode-2 as it achieved 10 (m3/ton-day) SDWP and 0.4 GOR, while mode-1 achieved about 5 (m3/ton-day) SDWP and 0.23 GOR at the optimum operating conditions. The improvement ratio using mode-2 reached 88 % of SDWP and 79 % of GOR. Also, the validation results showed a good qualitative and quantitative agreement between the experimental and theoretical data.**

Title	**Experimental investigation of hybrid photovoltaic solar thermal collector (PV/T)-adsorption desalination system in hot weather conditions**
Authors	**Ghazy, M., Ibrahim, E.M.M., Mohamed, A.S.A., Askalany, A.A.**
Journal	**Energy 254,124370**
Abstract	**Solar photovoltaic is one of the most famous renewable energy collectors and the most prevalent. The drawback that restricts the widespread use of photovoltaic cells is their relatively low efficiency in hot weather conditions. The current work investigates effect of cooling photovoltaic cells using an adsorption desalination/cooling system (ADS). The proposed system is a new application that simultaneously produces electrical power and desalinated water. Photovoltaic cells are cooled by chilled water produced during the desalination process of the ADS to improve the efficiency of photovoltaic cells and maximize the utilization of the ADS. A sheet and tube thermal collector is fabricated to cool the rear PV panel (PV/T). It is found that the proposed system positively affects the performance of both PV cells and the desalination system. The results showed that the PV/T's electrical and thermal efficiencies are 11.5% and 77.5%, respectively, at 1000 W/m2 solar radiation and 45 °C ambient temperature. Performance parameters of the ADS are 6.3 (m3/ton-day) specific daily water productions, 152.2 W/kg specific cooling power, and 0.25 coefficient of performance. There is an improvement in the electrical power, specific daily water productions, coefficient of performance, and specific cooling power by 17.5%, 19.69%, 9.9%, and 6.13%, respectively.**

Title	**Advanced machine learning algorithms for flood susceptibility modeling — performance comparison: Red Sea, Egypt**
Authors	**Youssef, A.M., Pourghasemi, H.R., El-Haddad, B.A.**
Journal	**Environmental Science and Pollution Research 29(44), pp. 66768-66792**
Abstract	**Floods are among the most devastating environmental hazards that directly and indirectly affect people's lives and activities. In many countries, sustainable environmental management requires the assessment of floods and the likely flood-prone areas to avoid potential hazards. In this study, the performance and capabilities of seven machine learning algorithms (MLAs) for flood susceptibility mapping were tested, evaluated, and compared. These MLAs, including support vector machine (SVM), random forest (RF), multivariate adaptive regression spline (MARS), boosted regression tree (BRT), functional data analysis (FDA), general linear model (GLM), and multivariate discriminant analysis (MDA), were tested for the area between Safaga and Ras Gharib cities, Red Sea, Egypt. A geospatial database was developed with eleven flood-related factors, namely altitude, slope aspect, lithology, land use/land cover (LULC), slope length (LS), topographic wetness index (TWI), slope angle, profile curvature, plan curvature, stream power index (SPI), and hydrolithology units. In addition, 420 actual flooded areas were recorded from the study area to create a flood inventory map. The inventory data were randomly divided into training group with 70% and validation group with 30%. The flood-related factors were tested with a multicollinearity test, the variance inflation factor (VIF) was less than 2.135, the tolerance (TOL) was more than 0.468, and their importance was evaluated with a partial least squares (PLS) method. The results show that RF performed the best with the highest AUC (area under curve) value of 0.813, followed by GLM with 0.802, MARS with 0.801, BRT with 0.777, MDA with 0.768%, FDA with 0.763, and SVM with 0.733. The results of this study and the flood susceptibility maps could be useful for environmental mitigation, future development activities in the area, and flood control areas.**

Title	**Experimental investigation of sodium polyacrylate-based innovative adsorbent material for higher desalination and cooling effects**
Authors	**Alsaman, A.S., Ibrahim, E.M.M., Salem Ahmed, M., (...), Farid, A.M., Askalany, A.A.**
Journal	**Energy Conversion and Managemen 266,115818**
Abstract	**This study explores enhancing adsorption system's performance utilizing sodium polyacrylate (SP) as an adsorbent for the first time. Four innovated SP samples are explored: raw SP, SP/HCl, SP/(NH4)2CO3), and SP/CaCl2 composite for adsorption desalination and cooling applications. Different characterization methods, including X-ray diffraction, nitrogen adsorption isotherm, and water adsorption (isotherms and kinetics) of SP samples, are investigated. Water adsorption experimental results onto SP samples and their numerical fitting with the Dubinin-Astakhov equilibrium model for isotherms and linear driving force model for kinetics have been expressed. The composite SP/CaCl2 had the highest experimental adsorption uptake of 1.26 kgH2O/kg among the studied samples. At 85 °C regeneration temperature, water desalination production per day (SDWP) achieves 15 m3/ton, with a cooling power of 425 W/kg. SDWP could reach 41 m3/ton of SP/CaCl2 per day with heat recovery. The system can obtain an SDWP of 45 m3/ton per day at a regeneration temperature of 95 °C. The findings show that the system can run efficiently using renewable energy, waste heat, or geothermal energy as heat sources.**

Title	**Quantum coherence and parameter estimation for mixed entangled coherent states**
Authors	**Algarni, M., Berrada, K., Abdel-Khalek, S.**
Journal	**Modern Physics Letters A37(24),2250159**
Abstract	**We study the temporal evolution of quantum coherence and parameter estimation for two-mode coherent-state superposition by using the master equation. Analytic expressions are provided and numerically displayed, which can illustrate the reliance of the coherence and Fisher information during the dynamics. Generally, we find that the amount of the quantum measures has the same behavior during the time variation, and displays a different order that depends on the different strength regimes of the input radiation fields and then disappears at infinite times. We show that these measures start from maximal value at the initial instant and decrease the time goes on. Moreover, we can observe that these measures can be protected resisted from the environment effect during the dynamics, showing an important feature of coherence and Fisher information. The obtained results can be assumed more practical in the characterization of the behavior of the coherence and Fisher information under the effect of the environment. Our observations can provide significant implications in harnessing these phenomena in quantum optics and information.**

Title	**Energy aware fault tolerant clustering with routing protocol for improved survivability in wireless sensor networks**
Authors	**Mansour, R.F., Alsuhibany, S.A., Abdel-Khalek, S., (...), Obaid, A.J., Gupta, D.**
Journal	**Computer Networks 212,109049**
Abstract	**Wireless Sensor Networks (WSN) remain a hot research topic due to its wide range of application areas like environmental monitoring, military surveillance, healthcare, and disaster management. Network survivability is one of the challenging issues in WSN that needs to be maximized for long-run operation of the network. It can be proficiently improved by effective utilization of available energy since the nodes in WSN operate only via in-built batteries. The studies conducted earlier have mainly focused on the design of clustering and routing protocols to reduce energy consumption in the network. With this motivation, the current research paper presents a novel Energy-Aware Fault Tolerant Clustering with Routing for Improved Survivability (EAFTC-RIS) technique in WSN. The proposed EAFTC-RIS technique intends to select the Cluster Heads (CHs) and optimal routes to the destination in an optimal manner with fault tolerant mechanism. The proposed EAFTC-RIS technique primarily designs Moth Flame Optimization (MFO)-based clustering scheme for CH selection and cluster construction. Also, fault tolerant mechanism is considered to further enhance the survivability of the network. In addition, Social Spider Optimization (SSO)-based routing approach is also employed for optimal selection of routes in WSN. Clustering, routing, and fault tolerant mechanism designs, with multiple input variables, result in enhanced network survivability. The proposed EAFTC-RIS technique was validated for its performance and the outcomes were inspected under various aspects. The simulation outcomes demonstrate the superiority of EAFTC-RIS technique over recent approaches namely, EAFTC-RIS, FUCCAR-GWSO, FBECS, MLSLEEP, and Bee Cluster.**

Title	**Efficient and Recoverable Bio-Organic Catalyst Cysteine for Synthesis, Docking Study, and Antifungal Activity of New Bio-Active 3,4-Dihydropyrimidin-2(1 H)-ones/thiones under Microwave Irradiation**
Authors	**Elkanzi, N.A.A., Kadry, A.M., Ryad, R.M., (...), Ali El-Remaily, M.A.E.A.A., Ali, A.M.**
Journal	**ACS Omega 7(26), pp. 22839-22849**
Abstract	**An eco-friendly green bio-organic catalyst and low-cost 3,4-dihydropyrimidin-2(1H)-ones/thione derivatives 4-7 have been synthesized using a high-yield, synthetic method via a one-pot, three-component process between 4-formylphenyl-4-methylbenzenesulfonate (1), thiourea, or urea and ethyl acetoacetate or acetylacetone under microwave irradiation in aqueous media of water and ethanol (3:1 ratio) as a green solvent in the presence of cysteine as a new green bio-organic catalyst. The reaction between compound 1, 4-(carbamothioylhydrazono) methyl]phenyl 4-methyl benzenesulfonate (3c), and ethyl acetoacetate or acetylacetone under the same condition afforded novel pyrimidines. Similarly, compound 1 was allowed to react with a mixture of 4-(carbamothioylhydrazono)methyl]phenyl 4-methyl benzenesulfonate (3c) and ethyl acetoacetate or acetylacetone under the same condition to afford pyrimidine derivatives 8 and 9. Excellent yields (90-98%) were obtained within short reaction times, and problems associated with the toxic solvents used (cost, safety, and pollution) were avoided. The structures of the new compounds were elucidated by elemental and spectral analyses. All compounds were studied using molecular docking, and their antifungal activity was investigated.**

Title	**Enhanced Nitrate Ions Remediation Using Fe0 Nanoparticles from Underground Water: Synthesis, Characterizations, and Performance under Optimizing Conditions**
Authors	**Abdel-Lateef, H.M., Khalaf, M.M., Al-Fengary, A.E.-D., Elrouby, M.**
Journal	**Materials 15(14),5040**
Abstract	**The presence of nitrates in water in large amounts is one of the most dangerous health issues. The greatest risk posed by nitrates is hemoglobin oxidation, which results in Methemoglobin in the human body, resulting in Methemoglobinemia. There are many ways to eliminate nitrates from underground water. One of the most effective and selective methods is using zero-valent iron (ZVI) nanoparticles. ZVI nanoparticles can be easily synthesized by reducing ferric or ferrous ions using sodium borohydride. The prepared ZVI nanoparticles were examined by scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDX), electron microscopy (TEM), X-ray diffraction (XRD), Brunauer–Emmett–Teller (BET) surface area, and zeta potential. We aim to eliminate or reduce the nitrates in water to be at the acceptable range, according to the world health organization (WHO), of 10.0 mg/L. Nitrate concentration in water after and before treatment is measured using the UV scanning method at 220 nm wavelength for the synthetic contaminated water and electrochemical method for the naturally contaminated water. The conditions were optimized for obtaining an efficient removing process. The removal efficiency reaches about 91% at the optimized conditions.**

Title	**Experimental and In-Silico Computational Modeling of Cerium Oxide Nanoparticles Functionalized by Gelatin as an Eco-Friendly Anti-Corrosion Barrier on X60 Steel Alloys in Acidic Environments**
Authors	**Abd El-Lateef, H.M., Gouda, M., Khalaf, M.M., (...), Shalabi, K., El-Shishtawy, R.M.**
Journal	**Polymers 14(13),2544**
Abstract	**An eco-friendly and a facile route successfully prepared novel cerium oxide nanoparticles functionalized by gelatin. The introduced CeO2@gelatin was investigated in terms of FE-SEM, EDX, TEM, chemical mapping, FT-IR, and (TGA) thermal analyses. These characterization tools indicate the successful synthesis of a material having CeO2 and gelatin as a composite material. The prepared composite CeO2@gelatin was used as an environment-friendly coated film or X60 steel alloys in acidizing oil well medium. Moreover, the effect of CeO2 percent on film composition was investigated. LPR corrosion rate, Eocp-time, EIS, and PDP tools determined the corrosion protection capacity. The CeO2@gelatin composite exhibited high protection capacity compared to pure gelatin; in particular, 5.0% CeO2@gelatin coating film shows the highest protection capacity (98.2%), with long-term anticorrosive features. The % CeO2@gelatin-coated films formed the protective adsorbed layer on the steel interface by developing a strong bond among nitrogen atoms in the CeO2@gelatin film and the electrode interface. Surface morphology using FESEM measurements confirmed the high efficiency of the fabricated CeO2@gelatin composite on the protection X60 steel alloys. DFT calculations and MC simulations were explored to study the relations between the protection action and the molecular construction of the coated systems, which were in good alignment with the empirical findings.**

Title	**Optimization strategy for green synthesis of silver nanoparticles (AgNPs) as catalyst for the reduction of 2,4-dinitrophenol via supported mechanism**
Authors	**Abu-Dief, A.M., Abdel-Rahman, L.H., Sayed, M.A.A.–E., (...), Khalifa, M.E., El-Metwaly, N.M.**
Journal	**Applied Physics A: Materials Science and Processing 128(7),595**
Abstract	**Here, we examine the biogenic fabrication of silver nanoparticles (AgNPs) utilizing a simple and environmental friendly method. Silver nanoparticles were synthesized using medicinal plants extracts such as Flamboyant (Delonix regia (DRE)) and Moringa oleifera (MOE). The maximum absorbance (λmax) of UV–Vis. analysis at 442 and 459 nm indicates the formation of MOEAgNPs and DREAgNPs, respectively. The AgNPs are confirmed by UV–Vis spectroscopy, Fourier transform infrared spectroscopy (FT-IR), Transmission Electron Microscopy (TEM) and XRD techniques. (FT-IR) FT-IR spectra indicate the functional groups of phytochemical compounds in silver nanoparticles (DREAgNPs, MOEAgNPs). The generation of spherical MOEAgNPs and DREAgNPs with a majority particle size of 50 and 100 nm, respectively, was confirmed by TEM analysis. The XRD pattern of AgNPs has FCC form and crystalline lattice at 2θ of 38°, 44°, 64° and 77° corresponding to (111), (200), (220), and (311) reflections of AgNPs. The findings indicate that the ideal conditions for the synthesis process were 2 mMAg+ concentration, reaction time is 24 h and 60 °C for extraction. The reduction of 2,4-dinitrophenol to 2,4-diaminophenol using NaBH4 was carried out under the catalytic influence of AgNPs. The rate constant k (1st cycle) was found to be 42 × 10−3 min− 1 and 26 × 10– 3 min− 1 for the reaction in presence of MOEAgNPs and DREAgNPs, respectively. The recyclability of the prepared AgNPs was tested for 7 cycles without loss in its activity until cycle 5. The activation energy (Ea) for reduction of 2,4-dinitrophenol that catalyzed by MOEAgNPs or DREAgNPs, respectively, was 36.4 or 31.7 kJmol− 1. The successes of AgNPs in the catalytic role were supported through DFT studies. Graphical abstract: [Figure not available: see fulltext.].**

Title	**Black seed and rosemary nanoformulations as green insecticides for the granary weevil, Sitophilus granarius (L.) (Coleoptera: Curculionidae)**
Authors	**Ali, S.A., Khairy, M., Ibrahim, A.A., Zohry, N.M.H.**
Journal	**Journal of Food Science 87(7), pp. 3095-3106**
Abstract	**Abstract: The development of nano-insecticides has attracted much interest in the last decade because it has the potential to result in an alternative pest-management strategy and also reduce the risk of chemically based insecticides. Herein, native rosemary (Rosmarinus officinalis) and black seed (Nigella sativa) oils were utilized for preparing their nanoemulsions by spontaneous emulsification method in the presence of tween 80 as a structure-directing agent. The prepared nanoemulsions were explored for granary weevil, Sitophilus granarius (L.), adults control and compared with their oils. Within the typical droplet sizes of 100 and 224 nm, both rosemary and black seed nanoemulsions were found to be physically and thermodynamically stable. The insecticidal activity of the nanoemulsions was higher than that of the crude oils. After 24 h of exposure, the LD50 values of rosemary and black seed nanoemulsions were estimated to be 102.56 and 35.08 µg/g, respectively, compared to 188.95 and 210.09 µg/g of their oils. These results revealed that the droplet size and chemical composition of the nanoemulsion are the significant factors that affect their toxicity. Surprisingly, the nanoemulsions had no effect on seed germination at LD50 or even LD99. The utilization of such nanoformulations might open up a new avenue for ecofriendly pest control that is not damaging to humans or the environment, as well as a growing agricultural economy. Practical Application: The loss of cereals in postharvesting is one of the major challenges in the world because up to 50% of harvested grains might be destroyed. The intensive usage of chemicals caused harmful effects on humans and the environment. Thus, we prepared rosemary and black seed nanoemulsions and applied them for the grain weevil, S. granarius, control. The results showed superior toxicological efficacy without any effects on seed germination compared with their native oils. Such green strategy could be used instead of chemical insecticides to be environmentally safe for animals and humans.**

Title	**Correction to: Heavy metal pollution in Manzala Lake sediments, Egypt: sources, variability, and assessment (Environmental Monitoring and Assessment, (2022), 194, 6, (436), 10.1007/s10661-022-10081-0)**
Authors	**Redwan, M., Elhaddad, E.**
Journal	**Environmental Monitoring and Assessment 194(7),461**
Abstract	**Upon publication of the original article, it was noticed that in the HTML version, the winter and summer symbols of Figs. 2 and 3 were the wrong way round. The corrected Figs. 2 and 3 are shown in the next page. (Figure presented.) (Figure presented.).**

Title	**Electron Density and Optoelectronic Properties of Copper Antimony Sulphur Ternary Compounds for Photovoltaic Applications**
Authors	**Khairy, M., Jiang, P., Boulet, P., Record, M.-C.**
Journal	**Journal of Electronic Materials51(7), pp. 3903-3918**
Abstract	**Design of efficient solar energy-conversion materials has attracted much interest in the last few decades. Among these materials, copper-based semiconducting chalcogenides have been employed as alternatives for copper indium gallium selenide thin-film solar cells due to their low toxicity and earth-abundant absorber components. In the present manuscript, structural, electronic, quantum theory of atoms in molecules (QTAIM) topological, and optical properties of ternary chalcogenide CuSbS2, Cu3SbS3, and Cu3SbS4 have been investigated using the full potential linear augmented plane wave method. An indirect band gap is observed for CuSbS2 with Eg = 1.18 eV and a direct band gap is found for Cu3SbS3, and Cu3SbS4 with Eg = 1.28 and 1.0 eV, respectively. The valence band maximum of CuSbS2, Cu3SbS3, and Cu3SbS4 are mainly predominated by a strong Cu-3d and S-3p orbitals hybridization. The conduction band of CuSbS2 and Cu3SbS3 are mainly characterized by Sb-5p orbital and S-3p orbital mixing. However, conduction band of Cu3SbS4 is dominated by the mixing of Sb-5s and S-3p orbitals. It is found that the Cu-S and Sb-S bonds lie in the transit closed-shell zone, between the typical ionic and covalent bonds, the Cu-S bonds being more ionic in nature and the Sb-S bonds being more covalent. The optical properties of CuSbS2, Cu3SbS3, and Cu3SbS4 in terms of absorption coefficient, extinction coefficient, refractive index, and reflectivity have been investigated. It is found that Cu3SbS4 is probably less suitable for optical application than CuSbS2 and Cu3SbS3 as the chemical bonds in Cu3SbS4 are seemingly less polarizable, as assumed from the QTAIM analysis, which seems to be correlated with a lower absorption coefficient.**

Title	**Poly(m-toluidine)/rolled graphene oxide nanocomposite photocathode for hydrogen generation from wastewater**
Authors	**Rabia, M., Hadia, N.M.A., Farid, O.M., (...), Mohamed, S.H., Shaban, M.**
Journal	**International Journal of Energy Research46(9), pp. 11943-11956**
Abstract	**This study provides hydrogen gas fuel as a renewable energy source. The production of H2 was carried out through the photocatalytic decomposition of sewage water using highly efficient poly(m-toluidine) (PMT)/rolled graphene oxide (roll-GO) as photoelectrode. The preparation of PMT thin film was carried out on glass using the in situ electropolymerization reaction from an acid medium. Then, the roll-GO was deposited on this thin film using the casting method from the GO solution. The full characteristic analyses Fourier-transform infrared, X-ray diffraction, scanning electron microscope, transmitted electron microscope, and UV-Vis spectroscopy confirmed the chemical structural, morphological, and optical properties of the prepared nanomaterials. The morphology characteristic confirmed the formation of nanopores PMT, rolled GO, and rolled porous nanocomposite. The bandgap values for PMT, roll-GO, and PMT/roll-GO nanomaterials were 2.38, 2.67, and 1.65 eV, respectively. The hydrogen generation was carried out through the photoelectrode glass/PMT/roll-GO with a current density (Jph) value of 0.08 mA.cm−2 at +1 V, with hydrogen moles of 10 µmole/h.cm−2. The Jph values changed from 0.078 to 0.053 mA.cm−2 with changing the monochromatic light wavelengths from 390 to 636 nm, respectively. Moreover, the Jph values increased from 0.078 to 0.295 mA.cm−2 which is followed by an increase in the temperature from 20°C to 60°C, respectively. The thermodynamic parameters were calculated, in which the Ea, ΔS*, and ΔH* values were 27.3 kJ/mol, 188.3 J/mol.K, and 24.7 kJ/mol, respectively. The wettability was studied for the PMT and PMT/roll-GO films, in which the contact angles were changed from 92° to 41°, respectively. Finally, the mechanism was used for the explanation of the water-splitting reaction using the PMT/roll-GO photoelectrode under the light.**

Title	**Composite adsorbent materials for desalination and cooling applications: A state of the art**
Authors	**Alsaman, A.S., Ibrahim, E.M.M., Ahmed, M.S., Askalany, A.A.**
Journal	**International Journal of Energy Research 46(8), pp. 10345-10371**
Abstract	**Adsorption technology is very attractive for producing desalinated water and cooling with no harmful impact on the environment. The performance of adsorption water applications (desalination and cooling) depends on the adsorption characteristics. Many adsorption systems designs were investigated worldwide, employing different adsorbent materials to develop a cost-effective and high-performance system. This review presents and summarizes the studies in adsorption and the corresponding applications in desalination and cooling and compares the adsorption properties of composite adsorbents. The review focuses on the composite materials and how they were synthesized while comparing them in terms of the amount of adsorption. The reviewed materials have been classified according to the basic host, such as silica gel, zeolite, carbon, metal-organic frameworks (MOF), and vermiculite. The review contains more than 70 composites. The maximum reached water vapor uptake is 1.92 kg/kg of PHTS/CaCl2-20 wt% composite at 0.9 P/Ps. The highest available desorption amount is 1.48 kg/kg of MOF composite for desalination applications and 0.87 kg/kg of vermiculite composite for cooling applications.**

Title	**Superhydrophobic films-based nonanyl carboxy methylcellulose grafted polyacrylamide for AISI-stainless steel corrosion protection: Empirical explorations and computational models**
Authors	**Abd El-Lateef, H.M., Gouda, M., Shalabi, K., Al-Omair, M.A., Khalaf, M.M.**
Journal	**Journal of Molecular Liquids356,119063**
Abstract	**The current work offers an alternate environmental and facile technique to fabricate a thin coating based on the superhydrophobic film of Nonanyl carboxy methylcellulose grafted polyacrylamide (NCMC-g-PAAm-SB) which could be applied as protective layers for AISI-stainless steel corrosion. FTIR and FESEM apparatuses were used to characterize the synthesized NCMC-g-PAAm-SB. Furthermore, water uptake measurements were tested to prove the hydrophobicity character of NCMCPAAm. The thermal permanence of the NCMC-g-PAAm-SB was detected by thermo-gravimetric examination (TGA) display thermal steadiness up to 250 °C. The anticorrosive performance of the pristine and coated AISI-steel was estimated in a combination of diverse chloride solution, 3.5% NaCl + 1.0 M HCl. PDP, EIS, and potential-time experiments were performed to assess the corrosion protection features. Moreover, LPR corrosion rate tests were completed for the long-term to determine the stability of coating films in the corrosive medium. The impact of the film thickness (number of coating layers) on the corrosion characteristics was inspected. The total polarization resistance increased to 1560.3 Ω cm2 for AISI-steel coated with the NCMC-g-PAAm-SB five layers compared to 55.8 Ω cm2 for pristine AISI-steel, displayed outstanding anticorrosion behavior with 96.4% of protection capacity. FESEM was utilized to describe the surface topology of the uncoated and coated AISI-steel samples before and after exposure in the aggressive medium. The computational models were accomplished to extremely examine the corrosion protection coating mechanism of AISI-steel. Owing to their remarkable physicochemical characteristics, such superhydrophobic films are an economically and innovative accessible substitute to progress the stainless of AISI-steel corrosion resistance and can be utilized in steel protection in acidic chloride environments.**

Title	**Microplastic and Nanoplastic Interactions with Plant Species: Trends, Meta-Analysis, and Perspectives**
Authors	**Azeem, I., Adeel, M., Ahmad, M.A., (...), Ming, X., Rui, Y.**
Journal	**Environmental Science and Technology Letters** **9(6), pp. 482-492**
Abstract	**The ubiquitous presence of nanoplastics (NPx) and microplastics (MPx) in the environment has been demonstrated, and as such, the exposure scenarios, mechanisms of plant response, and ultimate risk must be determined. Here, we performed a meta-analysis of the most recent literature investigating the effect of MPx/NPx on plant species under laboratory and field conditions so as to evaluate the current state of knowledge. Effects of MPx/NPx exposure in plants vary as a function of plant species, and interestingly, nonsignificant responses are reported in staple crops. We found that NPx (<100 nm) more negatively affected plant development parameters, photosynthetic pigments, and biochemical indicators than did MPx (>100 nm). Surprisingly, NPx exposure exhibited negligible effects on germination rate, although root morphology was negatively affected. Alternatively, MPx negatively affected (14%) germination and generally exhibited nonsignificant effects on root morphology. The effect of MPx/NPx on plant health decreases with increasing exposure time. No specific trends were evident for the production of biochemical enzymes as related to MPx/NPx concentration or size. Furthermore, we provided a framework for additional investigative work to address the knowledge gaps and to enable accurate assessment of the fate and risk of these materials to environmental and human health.**

Title	**Heavy metal pollution in Manzala Lake sediments, Egypt: sources, variability, and assessment**
Authors	**Redwan, M., Elhaddad, E.**
Journal	**Environmental Monitoring and Assessment 194(6),436**
Abstract	**The environmental pollution of lake systems due to anthropogenic factors is of growing concern worldwide. Manzala Lake is the largest northern coastal-deltaic lakes of Egypt and has socioeconomic impacts. In this study, the concentrations and origins of seven heavy metals (HMs) and the organic content in the Manzala Lake sediments were explored during the winter and summer. The concentration of the HMs and the organic content were quantified using inductively coupled plasma and loss-on-ignition techniques. Pearson's correlation coefficient (PCC) and principal component analysis (PCA) were applied to evaluate the sources of the metals in the sediments. The HMs and organic matter were enriched during the winter season. The average concentrations of the HMs in the sediments conformed to the following sequence: Fe (14.13) > Mn (0.8) > Cu (0.11) > Zn (0.11) > Ni (0.06) > Pb (0.5) > Cd (0.002) (mg/kg). Sediment quality protocols showed that Mn, Cd, Cu, and Ni pose a significant threat to the aquatic environment in Manzala Lake. The geoaccumulation index (Igeo) values indicated pollution of the sediments with most metals, excluding Fe and Ni. The periodic mean Igeo pollution level followed the sequence Cd > Cu > Zn > Mn > Pb > Ni > Fe. The greatest pollution load index noted during the winter season was principally induced by Cd and Cu. The overall ecological risk index was moderate, with Cd being the most prominent HM. PCA combined with PCC showed that the HM enrichments in the southern (Bahr Al-Baqar Drain [S1], Bashteer [S3], Legan [S5], and Al-Ginka [S8]) and the extreme northeastern (El-Qapouti [S6]) parts of Manzala Lake sediments were mainly due to the discharge from different drains (industrial, agricultural, and municipal wastes) and the industrial region in Port Said, respectively. The lower HM concentrations from the extreme northern parts (Al-Boghaz [S2], Al-Temsah [S4], Al-Hamra [S7], and Al-Kowar [S9]) were due to their isolation from urban areas compared with the other localities. Extensive waste disposal was responsible for the HM pollution in the Manzala Lake sediments. Advanced treatment technologies and monitoring of the pollution in the water and sediments of Manzala Lake are required to decrease the accumulation of the heavy metals.**

Title	**Simple development of eco-friendly dye-sensitized solar cells via controlling thickness of TiO2 nanoparticles and viscosity of electrolyte: Experimental study and DFT calculations**
Authors	**Al Bin saleh, H., Abd El-Lateef, H.M., Bakir, E.**
Journal	**Inorganic Chemistry Communications140,109472**
Abstract	**The pigments (N3 dye, anthocyanin, and oleandrin) that absorb light in the visible region, change electrolyte viscosity KI/I2 by adding polyethylene glycol (PEG), and the painting method of TiO2 using the spray and doctor-blade methods was studied. The ultraviolet–visible (UV–VIS) spectra of natural dyes showed strong bands in the visible regions at 350–450 nm. The Fourier-transform infrared (FTIR) spectra confirmed the formation of the N3-triodide complex which was not observed for the other natural dyes. The impact of the changing of viscosity by the addition of PEG improved the current flow in dye-sensitive solar cells (DSSCs). Scanning electron microscopy (SEM) images showed a homogenous and thin film of TiO2 by using the spray method. The efficiency of N3-DSSCs jumped and reached 0.2770% by the sprayed method in PEG-KI/I2 electrolyte. The efficiencies of 0.195 and 0.089 % for BB and NO-DSSCs were recorded in PEG-KI/I2 electrolytes, respectively. A low-cost carbon counter electrode was used in fabricating for DSSCs. The reduction in the values of RSH (shunt resistance) had a negative impact on the performance of DSSCs. Density functional theory (DFT) calculations were studied for optimized geometry of the three dyes. The chemical potential μ of N3 was greater than that of anthocyanin, and oleandrin which reflects the ability of electrons to exchange with TiO2. The Eg (energy gap) of N3 got to a height that slowed the rate of recombination of electron-hole of dye. The electronic chemical potential (μ) and energy gap (Eg) are effective to improve the efficiency of DSSCs.**

Title	**Promoted catalytic potential in sulfides oxidation and biological screening of green Pd (II) and Co (II) complexes of salicylidene isatin hydrazone ligand**
Authors	**Adam, M.S.S., Makhlouf, M.M., Mohamed, M.A., Desoky M. Mohamad, A.**
Journal	**Applied Organometallic Chemistry36(6),e6688**
Abstract	**Mononucleating complexes of isatin hydrazone sodium sulfonate ligand (HLn) with palladium (II) and cobalt (II) ions: The complexes were synthesized within 1:1 and 2:1 molar ratio of HLn with Pd2+and Co2+ion in PdLn and Co (Ln)2, respectively. The catalytic reactivity of both complexes was examined in the oxidation of sulfides (diphenyl sulfide, dps, and methylphenyl sulfide, mps) using hydrogen peroxide under aerobic conditions. Oxoproducts, dipheylsufoxide, dpo, and methyl phenyl sulfoxide, mpo, are the chemoselective products with detection of large amounts of the unselective further oxidation products of dioxoproducts (dipheylsufone, dpn, and methylphenyl sulfone, mpn). The homogenous catalyst of Co (Ln)2revealed more efficient action compared to that of PdLn depending on the high electrochemical reversible potential of the central metal ion in the catalytic reaction within the electron and/or oxygen transfer system. Exploring the importance of the M2+ion in the coordinated ligand, the bio-reactivity of HLn, PdLn, and Co (Ln)2was illustrated within some commonly well-known bacteria and fungi strains. Additionally, they were involved as anticancer reagents against some human cancer cell lines in vitro. Both metal complexes presented high inhibited action versus the growth of the studied microorganism and cancer. The interaction effect of Pd2+and Co2+ions in their pincer complexes was tested with calf thymus DNA spectroscopically and via the viscosity changes.**

Title	**Interactive effects of dietary betaine and chromium picolinate on the immunomodulation, antioxidative response and disease resistance of Nile tilapia (Oreochromis niloticus)**
Authors	**Risha, E., Ahmed, F., Khaled, A.A., (...), Akhtar, N., Zahran, E.**
Journal	**Aquaculture Research53(9), pp. 3464-3477**
Abstract	**Fish feed additives are recently encouraged to improve cultured fish health and production. Dietary supplementation with betaine (Bet) and chromium picolinate (Cr-Pic) is known for its high quality for the benefit of aquaculture. A total of 180 healthy and equal-sized O. niloticus were fed on a non-supplemented basal diet, or a basal diet supplemented with Bet (10g/kg dry feed) (Bet group) or Cr-Pic (800 µg/kg dry feed) (Cr-Pic group) or their combination at the same dosing regimens (Bet + Cr-Pic group) for 6 weeks feeding trial. Our findings revealed that dietary supplementation with Bet and/or Cr-Pic enhanced the non-specific immune parameters of O. niloticus in different manners in all supplemented groups compared to the control group. Bet + Cr-Pic group came over the other two groups and recorded the more pronounced highest level of these immune-relevant parameters. In addition, the antioxidative activity of the serum and tissue homogenates of all the supplemented fish was enhanced. The muscular malondialdehyde (MDA) was significantly decreased, with a nominal decrease in the hepatic one; whereas antioxidant enzyme activities (catalase/CAT), reduced glutathione/GSH), glutathione peroxidase/GPx) and superoxide dismutase/SOD) were all increased significantly in the muscular and hepatic tissues of the supplemented fish groups compared to the control group. The serum cortisol level was significantly decreased in all supplemented groups compared to the control group. Therefore, dietary supplementation with Bet and Cr-Pic combination is a promising feed additive for their additive effects improving fish immune response and antioxidative status and aquaculture sustainability.**

Title	**Effect of Azospirillum and Azotobacter Species on the Performance of Cherry Tomato under Different Salinity Levels | [Auswirkungen von Azospirillum- und Azotobacter-Spezies auf die Leistung von Kirschtomaten bei unterschiedlichen Versalzungsgraden]**
Authors	**El-Beltagi, H.S., Ahmad, I., Basit, A., (...), Kandeel, M., Zohaib Ikram, M.**
Journal	**Gesunde Pflanzen 74(2), pp. 487-499**
Abstract	**Abiotic stress has a negative impact on plant physiology, influencing the overall growth and development of plant crops. Saline stress is one of the most serious environmental issues limiting crop plant production. Biofertilizers are reparative elements used in soil to increase tolerance to salinity and drought stress. We investigated the effect of salinity stress on qualitative and quantitative characteristics of cherry tomato plants (Lycopersicon esculentum cerasiforme) with biofertilizer application 0, 15 and 30 days after transplanting in this study. After different days of transplantation, different levels of salinity (0, 50, 100, and 150 mM) were used with biofertilizer (Azospirillum sp. and Azotobacter sp.) application (0, 15 and 30 days). The salinity (150 mM NaCl) significantly affected the studied variables, which were recorded with minimum levels of leaf area (52.42 cm2), root length (6.54 cm), fresh root weight (13.64 g), yield (6.52 tons/ha), leaf chlorophyll content (36.11 mg/m2) and maximum levels of total soluble solids (TSS, 8.87 °Brix). Control samples had higher leaf area (58.35 cm2), root length (15.23 cm), fresh root weight (17.86 g), yield (9.39 tons/ha), leaf chlorophyll content (44.09 mg/m2), and lower TSS (7.93 °Brix). Plants that received biofertilizer (15 days after transplanting) had higher plant height (73.41 cm), stem diameter (0.74 cm), leaf area (61.16 cm2), root length (15.35 cm), fresh root weight (18.38 g), root dry matter (60.41%), yield (10.43 t/ha), leaf chlorophyll content (42.55 mg/m2), fruit dry matter content (10.12 g), pH 4.52, and TSS (9.30 °Brix). The minimum plant height (51.33 cm), stem diameter (0.55 cm), leaf area (49.60 cm2), root length (7.04 cm), fresh root weight (12.76 g), root dry matter (42.16 g), yield (5.15 tons/ha), leaf chlorophyll content (35.18 mg/m2), fruit dry matter content (6.59 g), pH 4.27 and TSS (7.55 °Brix) were recorded in plants with no application of biofertilizer. The present study revealed that most growth and quality variables were negatively affected by salinity except for TSS, which showed positive effect with application of 150 mM of NaCl. Biofertilizer application at 15 days significantly influences the quantitative and qualitative attributes of cherry tomato under different levels of salinity.**

Title	**Dietary Feeding Lycopene, Citric Acid, and Chlorella Alleviated the Neurotoxicity of Polyethylene Microplastics in African Catfish (Clarias gariepinus)**
Authors	**Hamed, M., Soliman, H.A.M., Eid, Z., Al Naggar, Y., Sayed, A.E.-D.H.**
Journal	**Frontiers in Environmental Science 10,869727**
Abstract	**A few studies assessed how natural products can protect fish from the neurotoxic effects of Microplastics (MPs). Therefore, the goal of this study was to look into the neurotoxicity of PE-MPs on the brain tissue of African catfish (C. gariepinus), and whether dietary feeding on Chlorella, citric acid, and lycopene could help alleviate their toxicity. Five groups of fish were used: The first group received a standard diet (control). The second group was fed 500 mg/kg PE-MP. The third group was fed PE-MP + lycopene (500 mg/kg diet). The fourth group was fed PE-MP + citric acid (30 g/kg diet). And the fifth group was fed PE-MP + Chlorella (50 g/kg diet) for 15 days. The activities of Acetylcholinesterase (Ach), Monoamine Oxidase (MAO), Aldehyde Oxidase (AO), and Nitric Oxide (NO), and the histological effect on brain tissues were then assessed. The activity of the four neurological biomarker enzymes investigated was altered significantly in fish subjected to PE-MP alone compared with the control group. For fish exposed to PE-MP with lycopene, citric acid, or Chlorella, the activities of these neurological enzymes significantly improved particularly with Chlorella compared with fish fed PE-MP individually. Histological investigations illustrated that being subjected to PE-MPs effected cellular alterations in the telencephalon, including diffuse distorted and degraded neurons, encephalomalacia, aggregated neuroglial cells (gliosis), as well as deformed and necrotic neurons, neuropil vacuolation (spongiosis), aggregated neuroglial cells (gliosis), pyknotic neurons, and shrunken Purkinje cells which were found in the cerebellum. Most histological alterations induced by exposure to PE-MP feeding were restored by dietary feeding on Chlorella, citric acid, and lycopene. Accordingly, this study recommends using citric acid, lycopene, and Chlorella as a natural remedy against MP neurotoxicity particularly with Chlorella.**

Title	**Optical and recombination losses in CIGS thin-film solar cell and efficiency enhancement methods**
Authors	**Mohamed, H.A., Shokr, E.K., Wakkad, M.M., Hadia, N.M.A., Taya, Y.A.**
Journal	**Optoelectronics and Advanced Materials, Rapid Communications 16(5-6), pp. 209-219**
Abstract	**A theoretical analysis of the optical and recombination losses effect on the performance of the solar cell with the structure ZnO:Al/CdS/CIGS/Mo/Glass has been accomplished in this work. All the results are carried out on the basis of the variation of Ga-ratio and the low thickness of the absorber layer ranged from 250 nm to 1 μm. The optical parameters (refractive index, extinction coefficient and energy gap) resulting from the experimental investigation of the used materials are the base to calculate the optical losses caused by the reflection at different interfaces and absorption in ZnO:Al and CdS layers. The calculations of the recombination losses at the front and back surface of CIGS are carried out on the basis of some physical parameters of CIGS layer. The effect of antireflection coating layer and the reflectivity from back contact have been studied to improve the performance of CIGS solar cell. The results show that Ga-ratio of 0.3 has the maximum short-circuit current density of 16.46 mA/cm2 and at the same time this ratio represents optical losses of about 35 %, these losses have been increased up to 59.5 due to non-absorption losses. It is found that the thickness of CIGS layer has a significant effect on the performance of this solar cell. Under the consideration of antireflection layer, reflectivity from back contact and at certain parameters of the absorber layer, the recorded efficiency of thin-film CIGS solar cell reached a value of 18.12%.**

Title	**An Experimental Study on Geotechnical Properties and Micro-Structure of Expansive Soil Stabilized with Waste Granite Dust**
Authors	**Abdelkader, H.A.M., Ahmed, A.S.A., Hussein, M.M.A., Ye, H., Zhang, J.**
Journal	**(Sustainability (Switzerland 14(10),6218**
Abstract	**Mining industries around the world produce massive amounts of solid waste that has potential environmental impacts. Therefore, it is necessary to explore alternative solutions to this waste disposal problem and to obtain economic benefits from it. Up to now, no significant attempts have been made to use granite dust (GD) as a soil stabilizer. GD is a by-product produced in large amounts during the cutting and processing of granite rocks at manufacturing factories. Thus, an attempt has been made here to define the role of GD in enhancing the geotechnical behaviour of expansive soil in order to make it suitable for construction. Moreover, the aim of this study is to evaluate the micro-level alterations occurring in the soil to elucidate the stabilization mechanism of granite dust–soil interaction. Comprehensive geotechnical tests, such as Atterberg limits, compaction characteristics, unconfined compressive strength (UCS), California bearing ratio (CBR), and swelling percentage, as well as microstructural analysis, such as X-ray diffraction, scanning electron microscopy, energy, and Fourier transform infrared, have been performed on natural and stabilized expansive soils using different portions of GD ranges from 0% to 30% with an increment of 5%. The results showed that the GD can be effectively used to improve soil plasticity and to control the swelling behaviour. Additionally, the results indicated that both UCS and CBR increase with increasing the content of GD, and that this increase reaches the maximum value at 20% of GD, after which it decreases. Hence, this amount can be taken as the optimum value of GD. The micro-analyses confirmed that the apparent formation of some new peaks, changes in the soil morphology, and alterations in the parent elements are the major factors in controlling the interactive behaviour of soil-GD mixes.**

Title	**Nanostructured P-doped activated carbon with improved mesoporous texture derived from biomass for enhanced adsorption of industrial cationic dye contaminants**
Authors	**Khalil, K.M.S., Elhamdy, W.A., Mohammed, K.M.H., Said, A.E.-A.A.**
Journal	**Materials Chemistry and Physics 282,125881**
Abstract	**Developing of high-performance carbonaceous materials from biomass is a significant contemporary research subject to meet the increasing demand for functional adsorbents with low price, high available and sustainability for adsorptive removal processes of industrial pollutants. The present work investigates formation of nanostructured surface modified P-doped activated carbon (ACP) materials via thermochemical activation of orange peel (OP) biomass residual materials, by phosphoric acid, H3PO4. Different impregnation ratios of phosphoric acid to OP (w/w) were investigated at different activation temperatures (400–800 °C). The formed ACP materials were characterized by TGA−DTA, FTIR−ATR, Raman spectroscopy, XRD, N2 gas adsorption/desorption, HR−TEM microscopy, EDX and elemental surface mapping. The results indicated that ACP materials were structured in the form of plate-like nanoparticles of amorphous graphite that composed of few graphene layers. The ACP materials exhibited high surface area (up to 1700 m2/g) with high contribution from mesoporosity (up to 94%) of slit-like pore shape. The point of zero charge was found at pH of 6.3, which permits application at neutral adsorption conditions. The formed ACP adsorbents exhibited distinguished adsorption capacities, qads, for methylene blue (MB) with successful recyclability. The adsorption capacities were enhanced (up to qads = 452 mg/g) for the materials formed at high acid impregnation ration and activated at high temperatures. The adsorption process of MB was spontaneous, fits with the Langmuir adsorption isotherm and pseudo-second-order kinetic. The high adsorption capacities for the ACP adsorbents were correlated with their micro/nano-structures, which were dominated by nano plate−like amorphous graphite particles composed of few graphene−like layers.**

Title	**Regression Modeling Strategies to Predict and Manage Potato Leaf Roll Virus Disease Incidence and Its Vector**
Authors	**Ali, Y., Raza, A., Aatif, H.M., (...), Amer, M.A., Moustafa, M.**
Journal	**(Agriculture (Switzerland12(4),550**
Abstract	**The potato leaf roll virus (PLRV) disease is a serious threat to successful potato production and is mainly controlled by integrated disease management; however, the use of chemicals is excessive and non-judicious, and it could be rationalized using a predictive model based on meteorological variables. The goal of the present investigation was to develop a disease predictive model based on environmental responses viz. minimum and maximum temperature, rainfall and relative humidity. The relationship between epidemiological variables and PLRV disease incidence was determined by correlation analysis, and a stepwise multiple regression was used to develop a model. For this purpose, five years (2010–2015) of data regarding disease incidence and epidemiological variables collected from the Plant Virology Section Ayub Agriculture Research Institute (AARI) Faisalabad were used. The model exhibited 94% variability in disease development. The predictions of the model were evaluated based on two statistical indices, residual (%) and root mean square error (RMSE), which were ≤±20, indicating that the model was able to predict disease development. The model was validated by a two-year (2015–2017) data set of epidemiological variables and disease incidence collected in Faisalabad, Pakistan. The homogeneity of the regression equations of the two models, five years ($Y = -47.61 - 0.572x1 + 0.218x2 + 3.78x3 + 1.073x4$) and two years ($Y = -28.93 - 0.148x1 + 0.510x2 + 0.83x3 + 0.569x4$), demonstrated that they validated each other. Scatter plots indicated that minimum temperature (5–18.5◦C), maximum temperature (19.1–34.4◦C), rainfall (3–5 mm) and relative humidity (35–85%) contributed significantly to disease development. The foliar application of salicylic acid alone and in combination with other treatments significantly reduced the PLRV disease incidence and its vector population over control. The salicylic acid together with acetamiprid proved the most effective treatment against PLRV disease incidence and its vector M. persicae.**

Title	**Removal of the Harmful Nitrate Anions from Potable Water Using Different Methods and Materials, Including Zero-Valent Iron**
Authors	**Abd El-Lateef, H.M., Khalaf, M.M., Al-Fengary, A.E.-D., Elrouby, M.**
Journal	**Molecules 27(8),2552**
Abstract	**Drinking water containing nitrate ions at a higher concentration level of more than 10 mg/L, according to the World Health Organization (WHO), poses a considerable peril to humans. This danger lies in its reduction of nitrite ions. These ions cause methemoglobinemia during the oxidation of hemoglobin into methemoglobin. Many protocols can be applied to the remediation of nitrate ions from hydra solutions such as Zn metal and amino sulfonic acid. Furthermore, the electrochemical process is a potent protocol that is useful for this purpose. Designing varying parameters, such as the type of cathodic electrode (Sn, Al, Fe, Cu), the type of electrolyte, and its concentration, temperature, pH, and current density, can give the best conditions to eliminate the nitrate as a pollutant. Moreover, the use of accessible, functional, and inexpensive adsorbents such as granular ferric hydroxide, modified zeolite, rice chaff, chitosan, perlite, red mud, and activated carbon are considered a possible approach for nitrate removal. Additionally, biological denitrification is considered one of the most promising methodologies attributable to its outstanding performance. Among these powerful methods and materials exist zero-valent iron (ZVI), which is used effectively in the deletion process of nitrate ions. Non-precious synthesis pathways are utilized to reduce the Fe2+ or Fe3+ ions by borohydride to obtain ZVI. The structural and morphological characteristics of ZVI are elucidated using UV–Vis spectroscopy, zeta potential, XRD, FE-SEM, and TEM. The adsorptive properties are estimated through batch experiments, which are achieved to control the feasibility of ZVI as an adsorbent under the effects of Fe0 dose, concentration of NO_3^- ions, and pH. The obtained literature findings recommend that ZVI is an appropriate applicant adsorbent for the remediation of nitrate ions.**

Title	**Landslide susceptibility mapping using CNN-1D and 2D deep learning algorithms: comparison of their performance at Asir Region, KSA**
Authors	**Youssef, A.M., Pradhan, B., Dikshit, A., (...), Matar, S.S., Mahdi, A.M.**
Journal	**Bulletin of Engineering Geology and the Environment81(4),165**
Abstract	**To be proactive in mountain hazard mitigation, landslide disaster assessments are becoming increasingly urgent. In this study, three modeling techniques, namely, support vector machine (SVM), convolutional neural network (CNN-1D), and (CNN-2D), were applied and their outcomes were compared for landslide susceptibility mapping at Asir Region, Saudi Arabia. As a first step, a landslide inventory map was developed from various data sources. A total of 181 landslide points were identified and divided into 70% training and 30% validation datasets. Thirteen landslide indicator factors (LIFs) were used, including elevation, aspect, distance to fault, geology, land use, plan and profile curvature, distance to road, slope length (LS), stream power index (SPI), topographic witness index (TWI), slope angle, and distance to streams. Experimental results of model accuracy using receiver operating characteristics and area under the curve (ROC, AUC), mean absolute error (MAE), and kappa index (K) showed that the CNN-1D and CNN-2D models (ROC = 86% and 89%, respectively) were more accurate than conventional machine learning model (SVM) (ROC = 82%) in predicting landslides spatially. Specifically, the results showed that CNN-1D and CNN-2D were 4.9% and 7.9% better than support vector machine (SVM) in terms of ROC, and that CNN-2D was 3.5% better than CNN-1D. Moreover, other statistical indices showed that CNN-2D produce the highest value of kappa index (0.855) and lowest value of mean absolute error (0.072), whereas SVM provides the lowest value of kappa index (0.562) and highest value of mean absolute error (0.223). Results indicate that the CNN-2D model is the optimal model for landslide susceptibility mapping. The generated hazard maps are a crucial step in landslide prevention and management to identify the future landslides and avoid potentially problematic areas.**

Title	**A Survey of IoT-Based Fall Detection for Aiding Elderly Care: Sensors, Methods, Challenges and Future Trends**
Authors	**Karar, M.E., Shehata, H.I., Reyad, O.**
Journal	**(Applied Sciences (Switzerland12(7),3276**
Abstract	**Remote monitoring of a fall condition or activities and daily life (ADL) of elderly patients has become one of the essential purposes for modern telemedicine. Internet of Things (IoT) and artificial intelligence (AI) techniques, including machine and deep learning models, have been recently applied in the medical field to automate the diagnosis procedures of abnormal and diseased cases. They also have many other applications, including the real-time identification of fall accidents in elderly patients. The goal of this article is to review recent research whose focus is to develop AI algorithms and methods of fall detection systems (FDS) in the IoT environment. In addition, the usability of different sensor types, such as gyroscopes and accelerometers in smartwatches, is described and discussed with the current limitations and challenges for realizing successful FDSs. The availability problem of public fall datasets for evaluating the proposed detection algorithms are also addressed in this study. Finally, this article is concluded by proposing advanced techniques such as lightweight deep models as one of the solutions and prospects of futuristic smart IoT-enabled systems for accurate fall detection in the elderly.**

Title	**Green Biogenic Synthesis of Silver Nanoparticles Using Aqueous Extract of Moringa Oleifera: Access to a Powerful Antimicrobial, Anticancer, Pesticidal and Catalytic Agents**
Authors	**Abdel-Rahman, L.H., Al-Farhan, B.S., Abou El-ezz, D., (...), Zikry, M.M., Abu-Dief, A.M.**
Journal	**Journal of Inorganic and Organometallic Polymers and Materials 32(4), pp. 1422-1435**
Abstract	**In this study, we look into the biogenic synthesis of (AgNPs) utilizing a simple and environmentally friendly method based on an aqueous extract of Moringa Oleifera (MO). The synthesized MOAgNPs were characterized using a UV–Visible spectrophotometry, X-ray diffraction (XRD), Fourier transform infrared (FT-IR) spectra and TEM image which confirmed the spherical shape of MOAgNPs with particle size range of 5–50 nm with an average particle size of 38.7 nm. Significantly, the prepared MOAgNPs showed high pesticidal activity towards Spodoptera littoralis. MOAgNPs also exhibited strong antibacterial activities against Gram-positive and Gram-negative bacteria. The prepared MOAgNPs were screened for their cytotoxic effect against (HCT-116), (HepG-2) and (MCF-7) carcinoma cell lines. Finally, the synthesized MOAgNPs have been used as a catalyst for the reduction of 2,4-Dinitrophenol using NaBH4 to 2,4-Diaminophenol. Taken together, the outstanding catalytic and biological activities of the synthesized MOAgNPs entitled them for applications as catalyst, pesticidal, antibacterial and anticancer agents in medical applications.**

Title	**Formation of improved activated carbons from sugarcane bagasse as environmental materials for adsorption of phenolic pollutants**
Authors	**Khalil, K.M.S., Khairy, M., Allam, O.A.S., Khalil, M.K.**
Journal	**International Journal of Environmental Science and Technology 19(4), pp. 3103-3116**
Abstract	**Phenolic pollutants are very toxic and their removal from aquatic resources is very important. Adsorption by activated carbon, AC, is the best method for removal of phenols from solutions. However, the high cost of AC and difficulty of its regeneration after phenol adsorption puts high demand on low price AC materials. Therefore, sugarcane bagasse as a sustainable, bulky and fibrous biomass was selected for the purpose of low-price AC formation for phenols adsorption. Sugarcane bagasse derived activated carbon, BAC, was achieved via an environmental thermo-chemical activation process using ZnCl2 followed by pyrolysis at different temperatures (400–600 °C). The formed BAC materials were characterized by elemental analysis, simultaneous TGA–DTA, ATR-FTIR, XRD, Raman spectroscopy, SEM, and nitrogen adsorption/desorption techniques. The BAC materials showed several enhanced characteristics including extra high specific surface area (up to 2046 m2/g), improved meso-/microporosity dual system and nanostructured graphitic-like structure composed of few graphene layers. Adsorption removal of phenol as an industrial waste pollutant was investigated from solutions of wide range of concentrations (50–1000 mg/L). The adsorption processes were characterized by (L2) class of adsorption isotherm, Langmuir isotherm model, physical-adsorption thermochemical parameters and pseudo-second-order kinetics. Adsorptions of two other substituted phenols (resorcinol and pyrogallol) were investigated. The adsorption capacity was increased with increasing of intramolecular bonding of the adsorbate in the order of phenol < resorcinol < pyrogallol. The present results emphasized the versatility of the formed BACs as environmentally sustainable adsorbent for phenolic pollutants.**

Title	**Optimized thermoelectric performance in thin (Bi2Se3)1−x(Bi2Te3)x alloyed films**
Authors	**Adam, A.M., Diab, A.K., Ataalla, M., (...), Alharbi, A.N., Elsehly, E.M.**
Journal	**Journal of Alloys and Compounds 898,162888**
Abstract	**Herein, thin films of (Bi2Se3)1−x(Bi2Te3)x were synthesized by thermal evaporation in high vacuum using highly crystalline bulk samples of Bi2Se3 alloyed with Bi2Te3. Preparation and characterization together with probing the thermoelectric properties of thin (Bi2Se3)1−x(Bi2Te3)x films are discussed in this article. Crystal structure, surface morphology, roughness and lattice features of the deposited films were probed via XRD, SEM and HRTEM techniques, which confirmed the perfect crystallinity and the nano-scalability of the prepared thin films. Thermoelectric measurements were carried out for the as-deposited films within a temperature range of 300–473 K. Seebeck coefficient of the studied samples is about two times larger than that of the previously reported bulk samples. The highest power factor was recorded at 131 μW/m K2 at 473 K. The high value of the power factor shows that the materials under the study are promising for applications such as resource recovery of waste and also as nanomaterials for environmental applications. Very low electronic thermal conductivity was obtained due to the small electrical conductivity and due to the scattering of carriers by the tiny grains constituting the prepared films.**

Title	**Advanced Oxidation Processes Using Zinc Oxide Nanocatalyst for Detoxification of Some Highly Toxic Insecticides in an Aquatic System Combined With Improving Water Quality Parameters**
Authors	**Massoud, A., El-Mehasseb, I., Saad Allah, M., (...), S. Ahmed, M., Derbalah, A.S.**
Journal	**Frontiers in Environmental Science 10,807290**
Abstract	**Pesticides are among the major organic pollutants, and their random extensive applications threaten human health and ecosystems. Clearly, detoxification of toxic insecticides from the aquatic system remains a global priority. In the present study, a zinc oxide nanocatalyst was synthesized with suitable properties to achieve complete degradation of some insecticides (dimethoate and methomyl) from aqueous media. The ZnO catalyst was used in normal and in nano-size as a part of an advanced oxidation process in the presence of H2O2 and UV rays. The complete detoxification of the tested pesticides after treatment with the most effective process (ZnO(s)/H2O2/UV) was then examined by exploring the biochemical and histopathological changes in the liver and kidneys of treated rats compared to the control. The effect of water treatment by ZnO (nano)/H2O2/UV on the water quality parameters of treated water was also investigated. Interestingly, the present study reported that the degradation rates of the investigated insecticides were faster using the nano-sized ZnO catalyst than the regular ZnO catalyst. In this respect, complete decomposition of the tested insecticides (100%) under the ZnO(s)/H2O2/UV system was achieved after 320 min of irradiation. The half-lives of the tested insecticides under ZnO(c)/H2O2/UV were 43.86 and 36.28 for dimethoate and methomyl, respectively, while under the ZnO(c)/H2O2/UV system, the half-live values were 27.72 and 19.52 min for dimethoate and methomyl, respectively. On the other hand, there were no significant changes in the biochemical and histological parameters of rats treated with remediated water when compared to the control group. The treatment of water by zinc oxide nanocatalyst improved the quality of water parameters. Collectively, advanced oxidation processes using ZnO nanocatalyst can be considered as a promising treatment technology for the complete detoxification of methomyl and dimethoate in water. However, further research is warranted for the identification of the potential breakdown products.**

Title	**Study of Optical, Electrical and Photocatalysis Properties of SrMnO3 Synthesized by Solid-State Reaction**
Authors	**Ahmed, M.R., Ali, H.M., Hasaneen, M.F., Etman, A., Abdel Hakeem, A.M.**
Journal	**Information Sciences Letters11(2), pp. 457-463**
Abstract	**SrMnO3 was prepared by solid-state reaction method to obtain powder then thin films by a thermal evaporation method. XRD diffraction, Optical and electrical properties were investigated. Photocatalysis process was implemented as an interesting application of SrMnO3. XRD diffraction results were used to study the compound structure and to calculate some other parameters such as crystallite size, D, microstrain, e, and dislocation density, d. XRD results revealed that SrMnO3 has a polycrystalline structure such as hexagonal structure for SrMnO3 phase and tetragonal structure for MnO2 phase. The optical energy band for the powder and thin film were equal to 2.28 eV and 2.92 eV respectively, which candidates this compound to be a solar cell transparent window, especially for deposited thin films. The electrical resistivity behaved as semiconductor-like where it decreases with the temperature with electrical activation energy equal 0.960 eV when heating and 0.663 eV when cooling. The result of the Methylene blue absorption showed that the SrMnO3 powder does work very well as a Photocatalyst. The efficiency of the powder of SrMnO3 as a Photocatalyst increases with the illumination time and its best value is about 56% at 120 min.**

Title	**Modeling of a solar-powered thermoelectric air-conditioning system using a random vector functional link network integrated with jellyfish search algorithm**
Authors	**Almodfer, R., Zayed, M.E., Elaziz, M.A., (...), Mudhsh, M., Elsheikh, A.H.**
Journal	**Case Studies in Thermal Engineering 31,101797**
Abstract	**In this study, the performance of a solar thermoelectric air-conditioning system (STEACS) is predicted using advanced optimized artificial intelligence models. A STEACS powered by solar PV panels is experimentally tested under different cooling loads varying from 65.0 to 260 W. The obtained experimental data are used to train and test the model. The model consists of a random vector functional link (RVFL) network optimized by one metaheuristic optimizer such as jellyfish search algorithm (JFSA), artificial ecosystem-based optimization (AEO), manta ray foraging optimization (MRFO), and sine cosine algorithm (SCA). The inputs of the model were time, solar irradiance, ambient temperature, wind speed, and humidity. The predicted responses of the investigated system are the input current of PV, the average temperature of the air-conditioned room, the cooling capacity, and the coefficient of performance. The accuracy of the four models is evaluated using eight statistical measures. RVFL-JFSA outperformed the other models in predicting all responses with a correlation coefficient of 0.948–0.999 and, consequently, it is recommended to use it to model STEACS system.**

Title	**Growth inhibition and microcystin accumulation in bush bean (Phaseolus vulgaris L.) plant irrigated with water containing toxic Chrooccocus minutus**
Authors	**Mohamed, Z., Bakr, A., Campos, A., Vasconcelos, V., Nasr, S.A.-M.**
Journal	**Agricultural Water Management261,107381**
Abstract	**Cyanobacterial blooms and microcystins (MCs) in irrigation waters have been recognized as an emergent environmental threat to many terrestrial plants. While several studies addressed the impacts of crude cyanobacterial extracts and dissolved MC-containing water on crop plants, less is known about the effects of irrigation water containing cyanobacterial blooms (i.e., intracellular plus extracellular toxins). In the present study, we investigated the effects of whole culture, cell-free culture filtrate and living cells of the toxic cyanobacterium Chroococcus minutus on growth, physiological parameters and MC accumulation in Phaseolus vulgaris (bush bean) plants. The plants were grown in pots containing agricultural soil, in order to mimic common agricultural practice. After 4 weeks of growth, treated plants exhibited substantial reduction in root and shoot growth, photosynthetic pigments, and protein contents compared to control plants. Treated plants also showed higher lipid peroxidation than control plants. The lowest inhibitory effects were observed in plants treated with culture filtrate containing extracellular MCs only (15.3 µg L−1). The highest inhibitory effects were recorded in plants treated with whole cyanobacterial culture containing both intra- and extracellular MCs (132 µg L−1), indicating the release of intracellular MCs from cells into the rizhosphere and their uptake by plant roots. MC concentrations in immature pods of P. vulgaris plants irrigated with whole culture and living cyanobacterial cells led to estimates of daily MCs intake (0.125–0.391 µg kg−1 body weight) that exceeded the total daily intake guidelines (0.04 µg kg−1 body weight) for human food consumption. This study suggests that irrigation water as well as plants used in human consumption should be regularly monitored for the presence of MCs and other cyanotoxins.**

Title	**A review on security threats, vulnerabilities, and counter measures of 5G enabled Internet-of-Medical-Things**
Authors	**Hasan, M.K., Ghazal, T.M., Saeed, R.A., (...), Abdel-Khalek, S., Alkhassawneh, H.M.**
Journal	**IET Communications16(5), pp. 421-432**
Abstract	**The recent advancements of Internet of Things (IoT) embedded systems, wireless networks, and biosensors those have assisted in the rapid development of implanting wearable sensors are reviewed here. The applications of the internet of medical things (IoMT) that has gained major attention as an ecosystem of connected clinical systems, computing systems, and medical sensors geared towards improving the quality of healthcare services are also reviewed here. The 5G based AI technology can revolute the perception of healthcare and lifestyle. In light of the importance of IoT platforms and 5G networks, the purpose of this proposed research work is to identify threats that could undermine the integrity, privacy, and security of IoMT systems. Also, the novel blockchain-based approaches that can help in improving the confidentiality of IoMT network. It has been discovered that IoMT is vulnerable to various types of attacks, including denial of service (DoS), malware, and eavesdropping attack. In addition, IoMT is exposed to various vulnerabilities, such as security, privacy, and confidentiality. Despite multiple security threats, there are novel cryptographic techniques, such as access control, identity authentication, and data encryption that can help in improving the security and reliability of IoMT devices.**

Title	**The protective role of lycopene against toxic effects induced by the herbicide Harness® and its active ingredient acetochlor on the African catfish Clarias gariepinus (Burchell, 1822)**
Authors	**Sayed, A.E.-D.H., Hamed, M., Soliman, H.A.M., Authman, M.M.N.**
Journal	**Environmental Science and Pollution Research 29(10), pp. 14561-14574**
Abstract	**The effects of Harness® toxicity on fish health are little known. So, current work aimed to study the impact of sub-lethal doses of Harness® (an acetochlor-based herbicide) on the African catfish, Clarias gariepinus, and also investigated the potential role of lycopene (LYCO) administration in alleviating Harness® negative effects. Fish were divided into five groups in triplicates as follows: group 1 (control) received no treatment, group 2 was exposed to 10 µm Harness®/L, group 3 was orally administered 10 mg LYCO/kg body weight and exposed to 10 µm Harness®/L, group 4 was exposed to 100 µm Harness®/L, and group 5 was orally administered 10 mg LYCO/kg body weight and exposed to 100 µm Harness®/L for 2 weeks. Some hemato-biochemical parameters, genotoxicity, and histopathological changes were assessed at the end of this period. Sub-lethal doses of Harness® altered the shape of erythrocytes in contrast to the control sample. Also, hematological parameters of exposed fish exhibited a significant ($P < 0.05$) reduction in the values of red blood cell count (RBCs), hemoglobin (Hb), hematocrit (HCT), and platelets (PL), as well as an insignificant ($P > 0.05$) drop in mean corpuscular volume (MCV). Harness® was also found to cause genotoxicity as well as histopathological alterations. LYCO administration decreased hemato-biochemical changes and returned them to near-normal levels. The findings showed that LYCO administration (10 mg LYCO/kg body weight) decreased Harness® toxicity in C. gariepinus and alleviated its destructive effects.**

Title	**Rapidly, highly yielded and green synthesis of dihydrotetrazolo[1,5-a]pyrimidine derivatives in aqueous media using recoverable Pd (II) thiazole catalyst accelerated by ultrasonic: Computational studies**
Authors	**El-Remaily, M.A.E.A.A.A., Soliman, A.M.M., Khalifa, M.E., (...), El-Dabea, T., Abu-Dief, A.M.**
Journal	**Applied Organometallic Chemistry 36(2),e6320**
Abstract	**Here, we synthesized new thiazole complexes from Cu (II), Fe (III), and Pd (II) ions. Such complexes were characterized to present their chemical formulae, firstly. The octahedral geometry was suggested for the investigated complexes except Pd (II) complex (ARPTPd), which has a square-planer arrangement. ARPTPd was planned to be used as a catalyst for synthesis of dihydrotetrazolo[1,5-a]pyrimidine derivatives at mild conditions. The catalytic activity of ARPTPd complex in four-components reaction approach was deliberately monitored till it reaches the most favorable conditions. The advantages of suggested catalyst were basically summarized by using green solvent (H2O), lower reaction time, and high products yields. Also, the superiority of ARPTPd complex and ultrasonic irradiation towards synthesis of dihydrotetrazolo[1,5-a]pyrimidine derivatives was revealed compared with other Lewis acids, basic, and ionic liquid catalysts. Furthermore, the mildness of conversion and compatibility with different functional groups makes it attractive. In addition, in consecration, computational aspects were often taken according to their effect on the declaration or discrimination of variable functional characteristics. Crystal packing systems of complexes were configured to extract important surface properties. DFT study was also applied to explain the causes behind the superiorly of ARPTPd complex. Also, the optimization process for intermediates was executed to support the suggested mechanism. Finally, this simple, economical, and green catalytic procedure may be applied to the industry in future.**

Title	**Recent Advances and Future Perspectives of Metal-Based Electrocatalysts for Overall Electrochemical Water Splitting**
Authors	**Hayat, A., Sohail, M., Ali, H., (...), Newair, E.F., Orooji, Y.**
Journal	**Chemical Record Article in Press**
Abstract	**Recently, the growing demand for a renewable and sustainable fuel alternative is contingent on fuel cell technologies. Even though it is regarded as an environmentally sustainable method of generating fuel for immediate concerns, it must be enhanced to make it extraordinarily affordable, and environmentally sustainable. Hydrogen (H2) synthesis by electrochemical water splitting (ECWS) is considered one of the foremost potential prospective methods for renewable energy output and H2 society implementation. Existing massive H2 output is mostly reliant on the steaming reformation of carbon fuels that yield CO2 together with H2 and is a finite resource. ECWS is a viable, efficient, and contamination-free method for H2 evolution. Consequently, developing reliable and cost-effective technology for ECWS was a top priority for scientists around the globe. Utilizing renewable technologies to decrease total fuel utilization is crucial for H2 evolution. Capturing and transforming the fuel from the ambient through various renewable solutions for water splitting (WS) could effectively reduce the need for additional electricity. ECWS is among the foremost potential prospective methods for renewable energy output and the achievement of a H2-based economy. For the overall water splitting (OWS), several transition-metal-based polyfunctional metal catalysts for both cathode and anode have been synthesized. Furthermore, the essential to the widespread adoption of such technology is the development of reduced-price, super functional electrocatalysts to substitute those, depending on metals. Many metal-premised electrocatalysts for both the anode and cathode have been designed for the WS process. The attributes of H2 and oxygen (O2) dynamics interactions on the electrodes of water electrolysis cells and the fundamental techniques for evaluating the achievement of electrocatalysts are outlined in this paper. Special emphasis is paid to their fabrication, electrocatalytic performance, durability, and measures for enhancing their efficiency. In addition, prospective ideas on metal-based WS electrocatalysts based on existing problems are presented. It is anticipated that this review will offer a straight direction toward the engineering and construction of novel polyfunctional electrocatalysts encompassing superior efficiency in a suitable WS technique.**

Title	**The mitigating effect of Spirulina (Arthrospira platensis) on the hemotoxicity of gibberellic acid on juvenile tilapia (Oreochromis niloticus)**
Authors	**Sayed, A.E.-D.H., Hamed, M., El-Sayed, A.A.A., Nunes, B., Soliman, H.A.M.**
Journal	**Environmental Science and Pollution Research**
Abstract	**The use of plant growth regulators has led to environmental contamination of water bodies that occur adjacent to agricultural areas. Some of these chemicals are bioactive, not only to plants, but also to non-target exposed biota, namely of the aquatic compartment. Previous work demonstrated the establishment of hepato- and nephrotoxic effects in juvenile tilapia (Oreochromis niloticus) exposed via aquatic media to gibberellic acid (GA3), which is among the most used plant growth regulators, in agricultural practices. Here, we investigated the effect of GA3 on hematological indices, poikilocytosis, nuclear abnormalities, and genotoxic indices measured in Nile tilapia (Oreochromis niloticus), as well as the putative protective effects of dietary supplementation of Spirulina (Arthrospira platensis). Fish were evenly assorted into 5 groups: group I served as a control, and groups II–V were fed diets supplemented with Spirulina at rates of 0 g/kg, 5 g/kg, 20 g/kg, and 100 g/kg, respectively, for 2 months before being exposed to 150 mg/L GA3. The results revealed that GA3 exposure decreased significantly all hematological indices ($P < 0.05$), except leucocytes and mean corpuscular hemoglobin concentration (MCHC), compared to the control group ($P > 0.05$). GA3 exposure increased significantly the percentage of nuclear abnormalities, altered erythrocytes and the percentages of tail DNA, compared to the control group ($P < 0.05$). Spirulina supplementation restored the hematological, poikilocytosis, nuclear abnormalities, and the percentages of tail DNA to near normal levels. The 100 g/kg SP treatment was the most effective in attaining such effect, showing concentration-dependency. The present study reinforces our findings of the toxicity of GA3 on O. niloticus and suggests that the addition of Spirulina to fish diet can mitigate the hemotoxic effects of GA3.**

Title	**Protective efficacy of dietary natural antioxidants on microplastic particles-induced histopathological lesions in African catfish (Clarias gariepinus)**
Authors	**Sayed, A.E.-D.H., Hana, M.N., Hamed, M., (...), Lee, J.-S., Soliman, H.A.M.**
Journal	**Environmental Science and Pollution Research**
Abstract	**Microplastic particles (MPs) are a common environmental pollutant easily ingested by fish in aquaculture. The current study evaluated the protective efficacies of some antioxidant, e.g., lycopene, citric acid, and chlorella, against the toxic effects of MP ingestion by Clarias gariepinus using histopathological biomarkers. Five experimental groups were established, a control group receiving only a standard diet, a group exposed to 500 mg/kg MP concomitant with the standard diet, and three antioxidant groups exposed to MPs plus either lycopene (500 mg/kg), citric acid (30 g/kg), or chlorella (50 g/kg) in the standard diet. After 15 days, fish were sacrificed for histological and histochemical examinations. Histological analysis of the kidney for group 2 (fed 500 mg/kg MPs alone) revealed distributed tissue dissociation, regional glomerular hypertrophy or shrinkage, melanomacrophage accumulation, and expansion of Bowman's space, while liver tissue exhibited dilation and rupture of the central vein wall, hemorrhage, cytoplasmic vacuolation, and cellular necrosis or apoptosis. Fish exposed to MPs also exhibited connective tissue fiber accumulation around renal blood vessels, renal tubules, the central hepatic vein, hepatic blood sinusoids, and serosal, muscle, and submucosal layers of the intestine. In addition, MP exposure reduced carbohydrate (mainly glycogen) contents in the brush borders and basement membranes of renal tubules, glomeruli, and intestinal tissues as well as in the cytoplasm of hepatocytes. These signs of renal, hepatic, and intestinal histopathology were fully or partially reversed by dietary lycopene, chlorella, or citric acid. Enhancing dietary antioxidants is an effective strategy for preventing MP toxicity in Clarias gariepinus in aquaculture.**

Title	**Flood vulnerability mapping and urban sprawl suitability using FR, LR, and SVM models**
Authors	**Youssef, A.M., Pourghasemi, H.R., Mahdi, A.M., Matar, S.S.**
Journal	**Environmental Science and Pollution Research**
Abstract	**Floods are among the most destructive disasters because they cause immense damage to human life, property (land and buildings), and resources. They also slow down a country's economy. Due to the dynamic and complex nature of floods, it is difficult to predict the areas that are prone to flooding. In this study, an attempt was made to create a suitability map for future urban development based on flood vulnerability maps for the catchment area of Taif, Saudi Arabia. Three models were used for this purpose, including bivariate (FR), multivariate (LR), and machine learning (SVM) were used. Thirteen parameters were used as flood-contributing parameters. The inventory map was constructed using field surveys, historical data, analysis of RADAR (Sentinel-1A), and Google Earth imagery collected between 2013 and 2020. In general, 70% flood locations were randomly selected from the flood inventory map to generate the flood susceptibility model, and the remaining 30% of the flood locations were used for model validation. The flood susceptibility map was classified into five zones: very low, low, moderate, high, and very high. The AUC value used to predict the performance of the models showed that the accuracy reached 89.5, 92.0, and 96.2% for the models FR, LR, and SVM, respectively. Accordingly, the flood susceptibility map produced by the SVM model is accurate and was used to produce a flood vulnerability map with the help of urban and road density maps. Then slope and elevation maps were integrated with the flood vulnerability model to produce the final suitability map, which was classified into three zones: isolated zone, low suitability, and high suitability areas. The results showed that the highly suitable areas are located in the east and northeast of the Taif Basin, where the flood risk is low and very low. The results of this work will improve the land use planning of engineers and authorities and take possible measures to reduce the flood hazards in the area.**

Title	**Engineered magnetic nanoparticles for environmental remediation (Book Chapter)**
Authors	**Abdelraheem, W.H.M., Sayed, M., Abu-Dief, A.M.**
Journal	**Fundamentals and Industrial Applications of Magnetic Nanoparticles pp. 499-524**
Abstract	**Recently, there has been an increasing application of engineered magnetic nanoparticles (MNPs) for environmental remediation, especially in water treatment, to secure the public health against the environmental/waterborne diseases. To this context, it is necessary to understand the structure-related mechanisms by which these MNPs interact with various contaminants in the environment during applications. The current chapter provides a holistic overview of current knowledge of using various MNPs in environmental applications, with the emphasis on zero-valent iron, magnetite (Fe3O4), and maghemite (γ-Fe2O3) nanoparticles as the most common and efficient MNPs used. The different accompanying phenomena such aggregation of nanosized MNPs as well as methods for stabilization are presented. Other approaches to improve the catalytic performance of MNPs by functionalizing the surface with active chelating agents are also discussed. Moreover, the removal of heavy metals, radionuclides, pharmaceuticals, and personal care products, per- and polyfluoroalkyl substances, pesticides, dyes, disinfection by-products, and industrial chemicals by MNPs have been thoroughly discussed. This chapter provides an insight into the successful application of MNPs toward sustainable environmental remediations.**

Title	**Synthesis and potential applications of cyclodextrin-based metal–organic frameworks: a review**
Authors	**Xu, Y., Rashwan, A.K., Osman, A.I., (...), Chen, W., Rooney, D.W.**
Journal	**Environmental Chemistry Letters Article in Press**
Abstract	**Metal–organic frameworks are porous polymeric materials formed by linking metal ions with organic bridging ligands. Metal–organic frameworks are used as sensors, catalysts for organic transformations, biomass conversion, photovoltaics, electrochemical applications, gas storage and separation, and photocatalysis. Nonetheless, many actual metal–organic frameworks present limitations such as toxicity of preparation reagents and components, which make frameworks unusable for food and pharmaceutical applications. Here, we review the structure, synthesis and properties of cyclodextrin-based metal–organic frameworks that could be used in bioapplications. Synthetic methods include vapor diffusion, microwave-assisted, hydro/solvothermal, and ultrasound techniques. The vapor diffusion method can produce cyclodextrin-based metal–organic framework crystals with particle sizes ranging from 200 nm to 400 μm. Applications comprise food packaging, drug delivery, sensors, adsorbents, gas separation, and membranes. Cyclodextrin-based metal–organic frameworks showed loading efficacy of the bioactive compounds ranging from 3.29 to 97.80%.**

Title	**Physicochemical, in vitro therapeutic activity, DNA-binding, and in silico molecular docking studies of samarium(III) complexes bearing N,O-chelated Schiff base ligands**
Authors	**Abdel Rahman, L.H., Al-Zaqri, N., Abdelghani, A.A., Abdalla, E.M.**
Journal	**Journal of Coordination Chemistry Article in Press**
Abstract	**Two new Sm(III) complexes, [Sm(L1)2Cl(H2O)]·3H2O and [Sm(L2)2Cl(H2O)]·2H2O, where HL1 is (E)-4-bromo-2-(((4-(2-hydroxyethyl)phenyl)imino)methyl)phenol and HL2 is (E)-2-(((4-(2-hydroxyethyl)phenyl)imino)methyl)-4-methoxyphenol, are reported. From the spectral data, it was deduced that the two Schiff base ligands existed as monobasic bidentate ON bonded to samarium(III) through deprotonated hydroxyl oxygen and azomethine nitrogen adopting an octahedral environment around Sm(III). The optimized structures, molecular electrostatic potential, and the energies HOMO and LUMO were calculated using DFT/B3LYP calculations employing the Gaussian 09 program. The antimicrobial efficacy of complexes and their parent ligands have been tested in vitro against various strains of bacteria and fungus. The antimicrobial activity of the new complexes has been enhanced compared to their parent free ligands. MTT assay was used to assess the in vitro cytotoxicity of the ligands and their Sm(III) complexes against the human breast cancer cell line (MCF-7) and human liver carcinoma cell line (Hep-G2). The CT-DNA binding constants of the interaction have been calculated and follow the order SmL1 > SmL2.**

Title	**Statistical Analysis with Dingo Optimizer Enabled Routing for Wireless Sensor Networks**
Authors	**Alghamdi, A.S., Alharbi, R., Alsuhibany, S.A., Abdel-Khalek, S.**
Journal	**Computers, Materials and Continua 73(2), pp. 2865-2878**
Abstract	**Security is a vital parameter to conserve energy in wireless sensor networks (WSN). Trust management in the WSN is a crucial process as trust is utilized when collaboration is important for accomplishing trustworthy data transmission. But the available routing techniques do not involve security in the design of routing techniques. This study develops a novel statistical analysis with dingo optimizer enabled reliable routing scheme (SADO-RRS) for WSN. The proposed SADO-RRS technique aims to detect the existence of attacks and optimal routes in WSN. In addition, the presented SADO-RRS technique derives a new statistics based linear discriminant analysis (LDA) for attack detection, Moreover, a trust based dingo optimizer (TBDO) algorithm is applied for optimal route selection in the WSN and accomplishes secure data transmission in WSN. Besides, the TBDO algorithm involves the derivation of the fitness function involving different input variables of WSN. For demonstrating the enhanced outcomes of the SADO-RRS technique, a wide range of simulations was carried out and the outcomes demonstrated the enhanced outcomes of the SADO-RRS technique.**

Title	**Geochemical and mineralogical characteristics of some gold mine tailings in the Eastern Desert of Egypt**
Authors	**Redwan, M.**
Journal	**Frontiers of Earth Science Article in Press**
Abstract	**The adverse environmental effects of mine tailings disposal on the surrounding ecosystems are worldwide environmental problems. Due to environmental issues related to tailings discharged on land surface, detailed tailings characterization is a prerequisite for a long-term management solution. The tailings from four gold mines in Egypt, namely Fatira, El Sid, Barramiya, and Atud were investigated for their geochemical-mineralogical features and the effect of weathering behavior on the release of their heavy elements. The tailings samples were investigated by mineralogical (XRD and ESEM-EDS), physical (grain-size distribution) and geochemical (XRF) techniques. Most of the tailings have uniform silt-size with fine to very finesand and clay. Atud tailings have coarse to fine sands. High carbonate, predominantly calcite was found for the samples from Fatira and Atud, calcite-ankerite from El Sid and dolomite from Barramiya with little sulfide-content. High-mean of Cr (569287 mg/kg), Ni (89191 mg/kg) and Co (4221 mg/kg) values are coinciding with the ultramafic nature in Atud and Barramiya tailings. El Sid tailings have a high-mean concentration of Zn (1357 mg/kg) and Pb (1349 mg/kg). Barramiya tailings have a high-mean As concentration (2635 mg/kg). The Fatira tailings are characterized by high-mean values of Sr (444 mg/kg) and Cu (280 mg/kg) arising from auriferous mineralization. High Sr concentrations in Fatira tailings are mainly due to its adsorption to iron oxides. Pyrite oxidation is conceded along the cracks and/or the edges of the crystals in the El Sid, Barramiya and Atud tailings. The Threshold Effect Level (TEL) values indicated high contamination from heavy elements to the neighboring ecosystem. The tailings were deposited downstream into the small wadis. Wind and water erosion can dissolve efflorescent materials enriched in toxic elements like As, Zn, and Pb at tailings surface. The release of contaminants could be catastrophic for the environment without mine site rehabilitation strategies.**

Title	**Task Scheduling Optimization in Cloud Computing by Rao Algorithm**
Authors	**Younes, A., Elnahary, M.Kh., Alkinani, M.H., El-Sayed, H.H.**
Journal	**Computers, Materials and Continua72(3), pp. 4339-4356**
Abstract	**Cloud computing is currently dominated within the space of high-performance distributed computing and it provides resource polling and on-demand services through the web. So, task scheduling problem becomes a very important analysis space within the field of a cloud computing environment as a result of user's services demand modification dynamically. The main purpose of task scheduling is to assign tasks to available processors to produce minimum schedule length without violating precedence restrictions. In heterogeneous multiprocessor systems, task assignments and schedules have a significant impact on system operation. Within the heuristic-based task scheduling algorithm, the different processes will lead to a different task execution time (makespan) on a heterogeneous computing system. Thus, a good scheduling algorithm should be able to set precedence efficiently for every subtask depending on the resources required to reduce (makespan). In this paper, we propose a new efficient task scheduling algorithm in cloud computing systems based on RAO algorithm to solve an important task and schedule a heterogeneous multiple processing problem. The basic idea of this process is to exploit the advantages of heuristic-based algorithms to reduce space search and time to get the best solution. We evaluate our algorithm's performance by applying it to three examples with a different number of tasks and processors. The experimental results show that the proposed approach significantly succeeded in finding the optimal solutions than others in terms of the time of task implementation.**

Title	**Machine learning techniques in internet of UAVs for smart cities applications**
Authors	**Alqurashi, F.A., Alsolami, F., Abdel-Khalek, S., Sayed Ali, E., Saeed, R.A.**
Journal	**Journal of Intelligent and Fuzzy Systems 42(4), pp. 3203-3226**
Abstract	**Recently, there were much interest in technology which has emerged greatly to the development of smart unmanned systems. Internet of UAV (IoUAV) enables an unmanned aerial vehicle (UAV) to connect with public network, and cooperate with the neighboring environment. It also enables UAV to argument information and gather data about others UAV and infrastructures. Applications related to smart UAV and IoUAV systems are facing many impairments issues. The challenges are related to UAV cloud network, big data processing, energy efficiency in IoUAV, and efficient communication between a large amount of different UAV types, in addition to optimum decisions for intelligence. Artificial Intelligence (AI) technologies such as Machine Learning (ML) mechanisms enable to archives intelligent behavior for unmanned systems. Moreover, it provides a smart solution to enhance IoUAV network efficiency. Decisions in data processing are considered one of the most problematic issues related to UAV especially for the operations related to cloud and fog based network levels. ML enables to resolve some of these issues and optimize the Quality of UAV network experience (QoE). The paper provides theoretical fundamentals for ML models and algorithms for IoUAV applications and recently related works, in addition to future trends.**

Title	**Modelling and Digital Mapping of the Infiltration Characteristics of Major Agricultural Soils**
Authors	**Mustafa, A.-R.A., Ali, G.A.M., Hamed, M.H.**
Journal	**International Journal of Thin Film Science and Technology 11(1), pp. 133-141**
Abstract	**A study was attempted to assess the infiltration characteristics of major soils of Sohag governorate, Egypt. Twelve soil profiles were exposed and morphologically examined to represent the soils of the study area. Horizon-wise soil samples were taken and analyzed for physical and chemical properties. The infiltration field measurements were made for five hours using a double-ring infiltrometer, and the empirical Kostiakov's infiltration model was applied. The results indicated that the soils were classified as Aridisols, Entisols, and Vertisols. Initial infiltration rates ranged between 0.80 and 6.67 m/day. The highest values (6.47 and 6.67 m/day) were observed in locations No. 11 and 12, where the coarse texture prevailed. The fine texture soils recorded the lowest values (0.80, 0.81, and 0.82 m/day) in locations No. 8, 4, and 7, respectively. Infiltration rate is classified as very rapid, rapid, moderately rapid, and moderate. A correlation was found between steady infiltration rates and sand, hydraulic conductivity, CaCO3 content, and organic carbon in order r=0.95, 0.93, 0.74, and 0.79. However, were found to be negatively correlated with the infiltration rates (r=-0.80,-0.91,-0.95,-0.97,-0.64,-0.91, respectively. Whereas bulk density showed an insignificant relationship (p=0.05) with infiltration rates in the order of r=0.13. GIS environment was used to generate different maps of soil parameters, and finally, the infiltration map was produced for the study area.**

Title	**Slope Instability Mechanisms in Karst Rocks and Their Impact on Sustainable Development, Egypt**
Authors	**El-Haddad, B.A., Youssef, A.M., El-Shater, A.-H., El-Khashab, M.H.**
Journal	**Advances in Science, Technology and Innovation pp. 3-6**
Abstract	**Recently, Egypt has faced unprecedented development with rapid urban and infrastructure expansion. Vast areas of Egypt are underlain by karst rocks (carbonate and evaporite). Highways and roads constructed along these karst areas are susceptible to slope stability problems. In this work, remote sensing imagery, field investigation, and laboratory studies are applied to analyze and identify unstable areas and their characteristics. Five slope instability mechanisms are categorized including collapses of weak materials from filled cavities, breakdown of cavities, instability due to differential erosions, dissolution along discontinuities, and sliding along weak surfaces. This study could help to understand the causes of slope instability problems, to maintain the sustainability of the infrastructure, and to design appropriate prevention and remediation measures to avoid future problems.**

Title	**Encryption with Image Steganography Based Data Hiding Technique in IIoT Environment**
Authors	**Ragab, M., Alshehri, S., Alhadrami, H.A., (...), Ashary, E.B., Abdel-Khalek, S.**
Journal	**Computers, Materials and Continua 72(1), pp. 1223-1338**
Abstract	**Rapid advancements of the Industrial Internet of Things (IIoT) and artificial intelligence (AI) pose serious security issues by revealing secret data. Therefore, security data becomes a crucial issue in IIoT communication where secrecy needs to be guaranteed in real time. Practically, AI techniques can be utilized to design image steganographic techniques in IIoT. In addition, encryption techniques act as an important role to save the actual information generated from the IIoT devices to avoid unauthorized access. In order to accomplish secure data transmission in IIoT environment, this study presents novel encryption with image steganography based data hiding technique (EISDHT) for IIoT environment. The proposed EIS-DHT technique involves a new quantum black widow optimization (QBWO) to competently choose the pixel values for hiding secrete data in the cover image. In addition, the multi-level discrete wavelet transform (DWT) based transformation process takes place. Besides, the secret image is divided into three R, G, and B bands which are then individually encrypted using Blowfish, Twofish, and Lorenz Hyperchaotic System. At last, the stego image gets generated by placing the encrypted images into the optimum pixel locations of the cover image. In order to validate the enhanced data hiding performance of the EIS-DHT technique, a set of simulation analyses take place and the results are inspected interms of different measures. The experimental outcomes stated the supremacy of the EIS-DHT technique over the other existing techniques and ensure maximum security.**

Title	**MHD convective non-Darcy flow of a nanofluid through a porous stretching sheet with thermal buoyancy and chemical reaction**
Authors	**Abdelhafez, M.A., Abd-Alla, A.M., Abo-Dahab, S.M.**
Journal	**Waves in Random and Complex Media Article in Press**
Abstract	**In this article, magnetohydrodynamic (MHD) the two-dimensional stagnation-point convection flow over a nanofluid through a porous medium due to a solar energy stretching sheet is investigated theoretically. Heat transfer subject to thermal radiation, viscous dissipation, an applied magnetic field, thermal buoyancy, and convective boundary conditions is considered. The governing boundary layer equations are reduced into ordinary differential equations by a similarity transformation. The transformed equations are solved numerically by using an efficient numerical shooting technique with a fourth-fifth order Runge–Kutta method scheme. The effects of the external parameters as jets flow, thermal convective, and mass convective on the flow field and heat transfer characteristics were obtained and discussed. Finally, the results obtained agree with the practical results and applicable in the related fields, especially, medicine, biochemistry, pharmacology, …, etc.**

Title	**Regression models to estimate accumulation capability of six metals by two macrophytes, typha domingensis and typha elephantina, grown in an arid climate in the mountainous region of taif, Saudi Arabia**
Authors	**Al-Sodany, Y.M., Saleh, M.A., Arshad, M., (...), Al-Bakre, D.A., Eid, E.M.**
Journal	**Sustainability (Switzerland14(1),1**
Abstract	**In this study, we explored the capacity for two promising macrophytes, Typha domingensis and Typha elephantina, to be used for the surveillance of contamination by six metals, i.e., Cu, Fe, Mn, Ni, Pb, and Zn, in the mountainous area of Taif City in Saudi Arabia. Regression models were generated in order to forecast the metal concentrations within the plants' organs, i.e., the leaves, flowers, peduncles, rhizomes, and roots. The sediment mean values for pH and the six metals varied amongst the sampling locations for the respective macrophytes, indicating that similar life forms fail to indicate equivalent concentrations. For instance, dissimilar concentrations of the metals under investigation were observed within the organs of the two rooted macrophytes. The research demonstrated that the segregation of metals is a regular event in all the investigated species in which the metal concentrations vary amongst the different plant constituent types. In the current study, T. domingensis and T. elephantina varied in their capacity to absorb specific metals; the bioaccumulation of metals was greater within T. domingensis. The relationships between the observed and model-estimated metal levels, in combination with high R2 and modest mean averaged errors, offered an appraisal of the goodness of fit of most of the generated models. The t-tests revealed no variations between the observed and model-estimated concentrations of the six metals under investigation within the organs of the two macrophytes, which emphasised the precision of the models. These models offer the ability to perform hazard appraisals within ecosystems and to determine the reference criteria for sediment metal concentration. Lastly, T. domingensis and T. elephantina exhibit the potential for bioaccumulation for the alleviation of contamination from metals.**

Title	**Synthesis and characterization of undoped and copper-doped zinc oxide nanowires for optoelectronic and solar cells applications**
Authors	**Hadia, N.M.A., Aljudai, M., Alzaid, M., Mohamed, S.H., Mohamed, W.S.**
Journal	**Applied Physics A: Materials Science and Processing 128(1),17**
Abstract	**This work concentrated on the synthesis of undoped and Cu-doped ZnO nanowires (NWs) by vapor transport method as well as on their physical and chemical characterizations. All X-ray diffraction patterns were indexed to ZnO single phase of hexagonal structure, and no Cu or Cu compounds characteristic peaks were observed. The evaluated Cu at.% was proportional with Cu ratios used in the source alloys. NWs morphology with quite long and smooth surfaces was observed for undoped sample, whereas NWs with agglomerations of particles were observed for higher Cu-doped samples. The overall transmittance decreased with increasing Cu doping ratio with a red shift for the onset of absorption. The optical energy gap was decreased from 3.33 to 3.10 eV upon increasing the Cu ratio from 0 to 5 at.%. Two emission bands were observed in the photoluminescent spectra at 385 and 545 nm, and they were strongly tailored via Cu doping. All the samples exhibited semiconducting behavior with two activation energies. The sensitivity to the NO2 gas was increased with Cu doping ratio. The magnetization measurements revealed ferromagnetic behavior for all the NWs samples at room temperature.**

Title	**Colorimetric detection of Hg2+ ion using fluorescein/thiourea sensor as a receptor in aqueous medium**
Authors	**Bakir, E.M., Sayed, A.R., El-Lateef, H.M.A.**
Journal	**Journal of Photochemistry and Photobiology A: Chemistry 422,113569**
Abstract	**A simple and selective colorimetric method was used for detection of mercury ions (Hg2+) in the aqueous medium and environmental water sample. Fluorescein-thiourea (FLTU) conjugate complex as receptor was prepared by 1:1 M ratio of 10 µmol L−1 fluorescein dye and thiourea in phosphate buffer solution at pH 7.00. The IR spectra of FLTU receptor have illustrated the formation of H-bond between thiourea and fluorescein dye. The receptor fluorescein-thiourea (FLTU) was used as a chemo-sensor highly selectively to detect the Hg2+ ion by changing the receptor color from a yellow color to red through the quenching of fluorescence intensity of the receptor. The lower detection limit (LOD) and quantitation limit (LOQ) of Hg2+ ions with the receptor FLTU are 0.24 and 0.73 nmol L–1 (correlation coefficient R2 = 0.985) as determined through the absorption spectroscopic method, respectively. The mercury ions are promising and could be achieved via the formation of the complex in a 1:1 stoichiometric ratio of receptor to Hg2+ ions.**

Title	**Simultaneous biodegradation of harmful Cylindrospermopsis raciborskii and cylindrospermopsin toxin in batch culture by single Bacillus strain**
Authors	**Mohamed, Z., Alamri, S., Hashem, M.**
Journal	**Environmental Science and Pollution Research 29(4), pp. 5153-5161**
Abstract	**This study investigates the capability of a Bacillus flexus strain isolated from decayed cyanobacterial blooms for the bioremediation of Cylindrospermopsis raciborskii and cylindrospermopsin (CYN) toxin. The algicidal activity of this strain was tested by co-cultivation with C. raciborskii cultures. CYN biodegradation was investigated in the presence of living and heat-inactivated bacterial cells or bacterial filtrate. Living bacterial cells inhibited C. raciborskii growth after 2 days of incubation with complete cell death at day 5. Bacterial filtrate caused a rapid reduction in C. raciborskii growth at the first day, with complete cell lysis at day 3. Only living cells of SSZ01 caused reduction in CYN released into the medium during the bacterial decay of C. raciborskii cells. The biodegradation rate of CYN by SSZ01 relied on initial toxin concentrations. The highest rate (42 µg CYN L−1 day−1) was obtained at the higher initial concentration (300 µg L−1), and the lowest (4µg CYN L−1 day−1) was at lower concentration (50 µg L−1). These results suggest that this bacterial strain could be employed to bioremediate cyanobacterial blooms in freshwaters. Also, the application of this bacterium in slow sand filters would give possibilities for degradation and bioremediation of cyanotoxins in drinking water treatment plants. Graphical abstract: [Figure not available: see fulltext.].**

Title	**Engineered Nanoparticles, Natural Nanoclay and Biochar, as Carriers of Plant-Growth Promoting Bacteria**
Authors	**Pavlicevic, M., Abdelraheem, W., Zuverza-Mena, N., (...), Marmiroli, N., White, J.C.**
Journal	**Nanomaterials 12(24),4474**
Abstract	**The potential of biochar and nanoparticles to serve as effective delivery agents for beneficial bacteria to crops was investigated. Application of nanoparticles and biochar as carriers for beneficial bacteria improved not only the amount of nitrogen-fixing and phosphorus-solubilizing bacteria in soil, but also improved chlorophyll content (1.2–1.3 times), cell viability (1.1–1.5 times), and antioxidative properties (1.1–1.4 times) compared to control plants. Treatments also improved content of phosphorus (P) (1.1–1.6 times) and nitrogen (N) (1.1–1.4 times higher) in both tomato and watermelon plants. However, the effect of biochars and nanoparticles were species-specific. For example, chitosan-coated mesoporous silica nanoparticles with adsorbed bacteria increased the phosphorus content in tomato by 1.2 times compared to a 1.1-fold increase when nanoclay with adsorbed bacteria was applied. In watermelon, the situation was reversed: 1.1-fold increase in the case of chitosan-coated mesoporous silica nanoparticles and 1.2 times in case of nanoclay with adsorbed bacteria. Our findings demonstrate that use of nanoparticles and biochar as carriers for beneficial bacteria significantly improved plant growth and health. These findings are useful for design and synthesis of novel and sustainable biofertilizer formulations.**

Title	**Possible Factors Driving Groundwater Quality and Its Vulnerability to Land Use, Floods, and Droughts Using Hydrochemical Analysis and GIS Approaches**
Authors	**El-Magd, S.A.A., Ahmed, H., Pham, Q.B., (...), Elkhrachy, I., Masoud, A.M.**
Journal	**(Water (Switzerland 14(24),4073**
Abstract	**Land use and climate change always induce significant changes in various parameters of the hydrologic cycle (e.g., surface runoff, infiltration, evapotranspiration). The Wadi El-Assiuti downstream area in the Eastern Desert of Egypt is one of the most promising areas for development that is suffering from insufficient water availability and inadequate water quality for different purposes. The main goal of this research is to evaluate the changes in groundwater quality, land use, and climate in association with geology and flooding during three periods within the years 1997–2019 in the downstream portion of Wadi El-Assiuti in the Eastern Desert of Egypt, using spatiotemporal variation associated with groundwater hydrochemical analysis and GIS techniques. About 133 groundwater samples were collected to examine groundwater quality changes over time. Different groundwater quality indices were calculated, and the results show that TDS levels of groundwater in the study area ranged between 1080–2780 mg/L, 672–4564 mg/L, and 811–6084 mg/L, while SAR levels varied within 6.15–15.34, 1.83–28.87, and 1.43–30.57 for the years 1997, 2007, and 2019, respectively. Both RSBC and SSP values exhibited significantly increasing trends over time. KR values were within 1.36–4.06 in 1997, 0.58–14.09 in 2007, and 0.35–14.92 in 2019; MAR values were within 6.9–45.2 in 1997, 20.79–71.5 in 2007, and 17.71–75.81 in 2019; and PI values were within 60.16–83 in 1997, 45.56–101.03 in 2007, and 42.51–148.88 in 2019. Across the entire study area, ongoing land use changes increased from 1.1% in 1997 to 4.1% in 2019. Findings pointed to the significant contribution of the deep Nubian Sandstone Aquifer to the groundwater aquifer at Wadi El-Assiuti through fractures and deep faults. Given the climatic conditions from 1997–2019, these changes may have affected water quality in shallow aquifers, especially with increasing evaporation. Realizing the spatiotemporal variation of the aquifer recharge system, land use development, and climate change clearly would help in water resource management. This study revealed that flooding events, deep-seated geologic structures, and land use development associated with human activities have the highest impact on groundwater quality.**

Title	**Correction to: Heavy metal pollution in Manzala Lake sediments, Egypt: sources, variability, and assessment (Environmental Monitoring and Assessment, (2022), 194, 6, (436), 10.1007/s10661-022-10081-0)**
Authors	**Redwan, M., Elhaddad, E.**
Journal	**Environmental Monitoring and Assessment 194(7),461**
Abstract	**Upon publication of the original article, it was noticed that in the HTML version, the winter and summer symbols of Figs. 2 and 3 were the wrong way round. The corrected Figs. 2 and 3 are shown in the next page. (Figure presented.) (Figure presented.).**

Title	**Heavy metal pollution in Manzala Lake sediments, Egypt: sources, variability, and assessment**
Authors	**Redwan, M., Elhaddad, E.**
Journal	**Environmental Monitoring and Assessment 194(6),436**
Abstract	**The environmental pollution of lake systems due to anthropogenic factors is of growing concern worldwide. Manzala Lake is the largest northern coastal-deltaic lakes of Egypt and has socioeconomic impacts. In this study, the concentrations and origins of seven heavy metals (HMs) and the organic content in the Manzala Lake sediments were explored during the winter and summer. The concentration of the HMs and the organic content were quantified using inductively coupled plasma and loss-on-ignition techniques. Pearson's correlation coefficient (PCC) and principal component analysis (PCA) were applied to evaluate the sources of the metals in the sediments. The HMs and organic matter were enriched during the winter season. The average concentrations of the HMs in the sediments conformed to the following sequence: Fe (14.13) > Mn (0.8) > Cu (0.11) > Zn (0.11) > Ni (0.06) > Pb (0.5) > Cd (0.002) (mg/kg). Sediment quality protocols showed that Mn, Cd, Cu, and Ni pose a significant threat to the aquatic environment in Manzala Lake. The geoaccumulation index (Igeo) values indicated pollution of the sediments with most metals, excluding Fe and Ni. The periodic mean Igeo pollution level followed the sequence Cd > Cu > Zn > Mn > Pb > Ni > Fe. The greatest pollution load index noted during the winter season was principally induced by Cd and Cu. The overall ecological risk index was moderate, with Cd being the most prominent HM. PCA combined with PCC showed that the HM enrichments in the southern (Bahr Al-Baqar Drain [S1], Bashteer [S3], Legan [S5], and Al-Ginka [S8]) and the extreme northeastern (El-Qapouti [S6]) parts of Manzala Lake sediments were mainly due to the discharge from different drains (industrial, agricultural, and municipal wastes) and the industrial region in Port Said, respectively. The lower HM concentrations from the extreme northern parts (Al-Boghaz [S2], Al-Temsah [S4], Al-Hamra [S7], and Al-Kowar [S9]) were due to their isolation from urban areas compared with the other localities. Extensive waste disposal was responsible for the HM pollution in the Manzala Lake sediments. Advanced treatment technologies and monitoring of the pollution in the water and sediments of Manzala Lake are required to decrease the accumulation of the heavy metals.**

Title	**Heavy metals distribution in the body parts of the cephalopods (Sepia officinalis and Octopus vulgaris) collected from the Mediterranean Sea, Egypt**
Authors	**Ahmed, H.O., Moustafa, A.Y., Abd El-Wakeil, K.F., Omer, M.Y.**
Journal	**Egyptian Journal of Aquatic Biology and Fisheries26(2), pp. 339-349**
Abstract	**The present study aimed to evaluate the level of some heavy metals in two edible cephalopods; Sepia officinalis and Octopus vulgaris and investigate the distribution and accumulation of these metals in different body parts of cephalopods. The concentrations of seven essential and nonessential heavy metals (Mn, Fe, Cu, Ni, Pb, Zn, and Cd) were measured in the body parts (Head, Arms, Mantles, Digestive gland, Ink, and Viscera) of the investigated cephalopods which collected from three sites at Alexandria city from the Mediterranean Sea-Egypt during March 2017. The digestive gland of both species exhibited a similar pattern of some heavy-metal accumulation where it was the major part of the highest concentrations of Cu, Zn, and Cd. The highest concentration of Mn was found in the viscera of both studied species while the highest concentration of Fe was recorded in the viscera of the Sepia and the digestive gland of the octopus. The metal pollution index (MPI) in Octopus (5.95) was slightly higher than recorded in Sepia (4.38). The lowest value of MPI was found in the head and the mantle of sepia while for the octopus the lowest value of MPI was found in their arms and mantle.**