

DAFTAR PUSTAKA

- Abdullah, N. I. S. B., Ahmad, M. B., & Shameli, K. (2015). Biosynthesis of silver nanoparticles using *Artocarpus elasticus* stem bark extract. *Chemistry Central Journal*, 9(1), 1–7.
- Ahmed, S., Saifullah, Ahmad, M., Swami, B. L., & Ikram, S. (2016). Green synthesis of silver nanoparticles using *Azadirachta indica* aqueous leaf extract. *Journal of Radiation Research and Applied Sciences*, 9(1), 1–7.
- Alahmad, A., Feldhoff, A., Bigall, N. C., Rusch, P., Scheper, T., & Walter, J. G. (2021). *Hypericum perforatum* L.-mediated green synthesis of silver nanoparticles exhibiting antioxidant and anticancer activities. *Nanomaterials*, 11(2), 1–26.
- Alhakmani, F., Kumar, S., & Khan, S. A. (2013). Estimation of total phenolic content, in-vitro antioxidant and anti-inflammatory activity of flowers of *Moringa oleifera*. *Asian Pacific Journal of Tropical Biomedicine*, 3(8), 623–627.
- Alibe, I. M., Matori, K. A., Sidek, H. A. A., Yaakob, Y., Rashid, U., Alibe, A. M., Zaid, M. H. M., Nasir, S., & Nasir, M. M. (2019). Effects of polyvinylpyrrolidone on structural and optical properties of willemite semiconductor nanoparticles by polymer thermal treatment method. *Journal of Thermal Analysis and Calorimetry*, 136(6), 2249–2268.
- Allen, E., Smith, P., & Henshaw, J. (2001). Prepared for A Review of Particle Agglomeration. *AEA Technology*, 20166(1).
- Almeida, I. L. S., Filho, N. R. A., Alves, M. I. R., Carvalho, B. G., & Coelho, N. M. M. (2012). Removal of BTEX from aqueous solution using *Moringa oleifera* seed cake. *Environmental Technology (United Kingdom)*, 33(11), 1299–1305.
- Al-Saidi, W. A., Feng, H., & Fichthorn, K. A. (2012). Adsorption of polyvinylpyrrolidone on Ag surfaces: Insight into a structure-directing agent. *Nano Letters*, 12(2), 997–1001.
- Amendola, V., & Meneghetti, M. (2009). Laser ablation synthesis in solution and size manipulation of noble metal nanoparticles. *Physical Chemistry Chemical Physics*, 11(20), 3805–3821.
- Anwar, F., Latif, S., Ashraf, M., & Gilani, A. H. (2007). *Moringa oleifera*: a food plant with multiple medicinal uses. *Phyther Res*, 21(1), 17–25.

- Atawodi, S. E., Atawodi, J. C., Idakwo, G. A., Pfundstein, B., Haubner, R., Wurtele, G., Bartsch, H., & Owen, R. W. (2010). Evaluation of the polyphenol content and antioxidant properties of methanol extracts of the leaves, stem, and root barks of *Moringa oleifera* Lam. *Journal of Medicinal Food*, 13(3), 710–716.
- Banerjee, S., Saha, A. K., Show, B., Ganguly, J., Bhattacharyay, R., Datta, S. K., Saha, H., & Mukherjee, N. (2015). A regular rippled pattern formed by the molecular self-organization of polyvinylpyrrolidone encapsulated Ag nanoparticles: A high transmissive coating for efficiency enhancement of c-Si solar cells. *RSC Advances*, 5(8), 5667–5673.
- Berawi, K. N., Wahyudo, R., Pratama, A. A., Fisiologi, B., Kedokteran, F., Lampung, U., Kedokteran, F., & Lampung, U. (2019). *Potensi Terapi Moringa oleifera (Kelor) pada Penyakit Degeneratif Therapeutic Potentials of Moringa oleifera (Kelor) in Degenerative Disease. 3*, 210–214.
- Bere, M. L., Sibarani, J., & Manurung, M. (2019). Sintesis nanopartikel perak (NPAg) menggunakan estrak air daun kemangi (*Ocimum sanctum* Linn.) dan aplikasinya dalam fotodegradasi zat warna metilen biru. *Cakra Kimia (Indonesian E-Journal of Applied Chemistry)*, 7(2), 155–164.
- Berthomieu, C., & Hienerwadel, R. (2009). Fourier transform infrared (FTIR) spectroscopy. *Photosynthesis Research*, 101(2–3), 157–170.
- Berthomieu, C., & Hienerwadel, R. (2009). Fourier transform infrared (FTIR) spectroscopy. *Photosynthesis Research*, 101(2–3), 157–170.
- Beyene, H. D., Werkneh, A. A., Bezabh, H. K., & Ambaye, T. G. (2017). Synthesis paradigm and applications of silver nanoparticles (AgNPs), a review. *Sustainable Materials and Technologies*, 13(January), 18–23.
- Bindhu, M. R., Umadevi, M., Esmail, G. A., Al-Dhabi, N. A., & Arasu, M. V. (2020). Green synthesis and characterization of silver nanoparticles from *Moringa oleifera* flower and assessment of antimicrobial and sensing properties. *Journal of Photochemistry and Photobiology B: Biology*, 205.
- Brodowska, K. M. (2017). Natural flavonoids: classification, potential role, and application of flavonoid analogues. *European Journal of Biological Research*, 7(2), 108–123.
- Cahya, B. T. (2016). *carbon emission disclosure : ditinjau dari Media exposure, kinerja lingkungan dan karakteristik perusahaan. 05(02)*, 170–188.
- Chem Zipper Team (2019). Face Centered Unit Cell (FCC/CCP). Diakses tanggal 19 Oktober 2021, dari <https://www.chemzipper.com/2019/04/face-centred->

unit-cell-fcccp.html?m=0.

- ChemScr. 2021. *Polyvinylpyrrolidone*. Diakses tanggal 19 Oktober 2021, dari https://www.chemsrc.com/en/cas/9003-39-8_390973.html.
- D'Amato, R., Falconieri, M., Gagliardi, S., Popovici, E., Serra, E., Terranova, G., & Borsella, E. (2013). Synthesis of ceramic nanoparticles by laser pyrolysis: From research to applications. *Journal of Analytical and Applied Pyrolysis*, 104, 461–469.
- Dachriyanus. (2004). *Analisis Struktur Senyawa Organik Secara Spektroskopi*. Padang : Universitas Andalas.
- Das, S., Parida, U. K., Birendra, &, & Bindhani, K. (2013). Green Biosynthesis of Silver Nanoparticles Using Moringa Oleifera L. Leaf. *International Journal of Nanotechnology and Application*, 3(2), 2277–4777.
- El-Nour, K. M. M., Eftaiha, A., Al-Warthan, A., & Ammar, R. A. A. (2010). Synthesis and applications of silver nanoparticles. *Arabian Journal of Chemistry*, 3(3), 135–140.
- Fabian, C., & Sierra, E. (2019). *Fundamentals of transmission electron microscopy , the technique with the best resolution in the world. February*.
- Farghaly, F. A., & Nafady, N. A. (2015). Green Synthesis of Silver Nanoparticles Using Leaf Extract of Rosmarinus officinalis and Its Effect on Tomato and Wheat Plants. *Journal of Agricultural Science*, 7(11), 277–287.
- Gámez, L. L. S., Risco, M. L., & Cano, R. E. S. (2015). Comparative study between M. oleifera and aluminum sulfate for water treatment: case study Colombia. *Environmental Monitoring and Assessment*, 187(10).
- Gilbert, A. S. (2017). IR Spectral Group Frequencies of Organic Compounds. In *Encyclopedia of Spectroscopy and Spectrometry* (3rd ed.). Elsevier Ltd.
- Gosens, I., Post, J. A., de la Fonteyne, L. J. J., Jansen, E. H. J. M., Geus, J. W., Cassee, F. R., & de Jong, W. H. (2010). Impact of agglomeration state of nano- and submicron sized gold particles on pulmonary inflammation. *Particle and Fibre Toxicology*, 7(1), 37.
- Horikoshi, S., & Serpone, N. (2013). Introduction to Nanoparticles. *Microwaves in Nanoparticle Synthesis: Fundamentals and Applications*, 1–24.
- Hou, J., Wang, Y., Xue, H., & Dou, Y. (2018). Biomimetic growth of hydroxyapatite on electrospun CA/PVP core-shell nanofiber membranes. *Polymers*, 10(9).

- Ijaz, I., Gilani, E., Nazir, A., & Bukhari, A. (2020). Detail review on chemical, physical and green synthesis, classification, characterizations and applications of nanoparticles. *Green Chemistry Letters and Reviews*, 13(3), 59–81.
- Iravani, S., & Zolfaghari, B. (2013). Green synthesis of silver nanoparticles using *Pinus eldarica* bark extract. *BioMed Research International*, 2013.
- Ismul, A. H., Sumariah, Dahlan, M., & Mohtar. 2011. Penentuan struktur kristal al mg alloy dengan difraksi neutron. *Jurnal Fisika*, 14: 41-48.
- Jaiswal, D., Rai, P. K., Mehta, S., Chatterji, S., Shukla, S., Rai, D. K., Sharma, G., Sharma, B., khair, S., & Watal, G. (2013). Role of *Moringa oleifera* in regulation of diabetes-induced oxidative stress. *Asian Pacific Journal of Tropical Medicine*, 6(6), 426–432.
- Jalab, J., Abdelwahed, W., Kitaz, A., & Al-Kayali, R. (2021). Green synthesis of silver nanoparticles using aqueous extract of *Acacia cyanophylla* and its antibacterial activity. *Heliyon*, 7(9), e08033.
- Jiang, X. C., Chen, W. M., Chen, C. Y., Xiong, S. X., & Yu, A. B. (2011). Role of Temperature in the Growth of Silver Nanoparticles Through a Synergetic Reduction Approach. *Nanoscale Research Letters*, 6(1), 1–9.
- Kamaruddin, Edikresnha, D., Sriyanti, I., Munir, M. M., & Khairurrijal. (2017). Synthesis of Polyvinylpyrrolidone (PVP)-Green Tea Extract Composite Nanostructures using Electrohydrodynamic Spraying Technique. *IOP Conference Series: Materials Science and Engineering*, 202(1).
- Kandasamy, S., & Prema, R. S. (2015). Methods of synthesis of nano particles and its applications. *Journal of Chemical and Pharmaceutical Research*, 7(3), 278–285.
- Keat, C. L., Aziz, A., Eid, A. M., & Elmarzughi, N. A. (2015). Biosynthesis of nanoparticles and silver nanoparticles. *Bioresources and Bioprocessing*, 2(1).
- Khalil, A. M., & Elkaliuoby, M. I. (2018). Synergistic Antibacterial Effect of Silver Nanoparticles and Extremely Low-Frequency Pulsed Magnetic Fields on *Klebsiella pneumoniae*. *Journal of Applied Biology & Biotechnology*, 6(6), 39–45.
- Kočevar, N., Glavač, I., & Kreft, S. (2007). Flavonoidi. *Farmacevtski Vestnik*, 58(4), 145–148.

- Koczur, K. M., Mourdikoudis, S., Polavarapu, L., & Skrabalak, S. E. (2015). Polyvinylpyrrolidone (PVP) in nanoparticle synthesis. *Dalton Transactions*, 44(41), 17883–17905.
- Krutyakov, Y. A., Kudrinskiy, A. A., Olenin, A. Y., & Lisichkin, G. V. (2008). Synthesis and properties of silver nanoparticles: advances and prospects. *Russian Chemical Reviews*, 77(3), 233–257.
- Kumari, B. (2018). “a Review on Nanoparticles: Their Preparation Method and Applications.” *Indian Research Journal of Pharmacy and Science*, 5(2), 1420–1426.
- Lal, H. M., Thomas, S., Li, T., & Maria, H. J. (2021). *Polymer Nanocomposites Based on Silver Nanoparticles*.
- Liu, W. W., Aziz, A., Chai, S. P., Mohamed, A. R., & Hashim, U. (2013). Synthesis of single-walled carbon nanotubes: Effects of active metals, catalyst supports, and metal loading percentage. *Journal of Nanomaterials*, 2013.
- Mahmudin, L., Darwis, D., Suharyadi, E., Utomo, A. B. S., & Abraha, K. (2021). The effect of the concentration of the stabilizer in the formation of a silver nanoparticle on the phenomenon of Surface Plasmon Resonance (SPR) as an active material for biosensor. *Journal of Physics: Conference Series*, 1763(1).
- Mahmudin, L., Suharyadi, E., Utomo, A. B. S., & Abraha, K. (2015). Optical Properties of Silver Nanoparticles for Surface Plasmon Resonance (SPR)-Based Biosensor Applications. *Journal of Modern Physics*, 06(08), 1071–1076
- Malina, D., Sobczak-Kupiec, A., Wzorek, Z., & Kowalski, Z. (2012). Silver nanoparticles synthesis with different concentrations of Polyvinylpyrrolidone. *Digest Journal of Nanomaterials and Biostructures*, 7(4), 1527–1534.
- Mansha, M., Khan, I., Ullah, N., & Qurashi, A. (2017). Synthesis, characterization and visible-light-driven photoelectrochemical hydrogen evolution reaction of carbazole-containing conjugated polymers. *International Journal of Hydrogen Energy*, 42(16), 10952–10961.
- Marinsek, J. (2016). *THE NATURE OF MOLECULAR BONDING Covalent, ionic and metallic bonding models cannot explain the dynamic stability of molecules. January*.

- Marrufo, T., Nazzaro, F., Mancini, E., Fratianni, F., Coppola, R., De Martino, L., Agostinho, A. B., & De Feo, V. (2013). Chemical composition and biological activity of the essential oil from leaves of *Moringa oleifera* Lam. cultivated in Mozambique. *Molecules*, 18(9), 10989-11000.
- Mazumder, A., Davis, J., Rangari, V., & Curry, M. (2013). Synthesis, Characterization, and Applications of Dendrimer-Encapsulated Zero-Valent Ni Nanoparticles as Antimicrobial Agents. *ISRN Nanomaterials*, 2013, 1–9.
- Mehta, B., K., Chhajlani, M., & Shrivastava, B., D. (2017). *Green synthesis of silver nanoparticles and their characterization by XRD*.
- Mehwish, H. M., Rajoka, M. S. R., Xiong, Y., Cai, H., Aadil, R. M., Mahmood, Q., He, Z., & Zhu, Q. (2021). Green synthesis of a silver nanoparticle using *Moringa oleifera* seed and its applications for antimicrobial and sun-light mediated photocatalytic water detoxification. *Journal of Environmental Chemical Engineering*, 9(4), 105290.
- Mensah, J. K., Ikhajiagbe, B., Edema, N. E., & Emokhor, J. (2012). Phytochemical , nutritional and antibacterial properties of dried leaf powder of *Moringa oleifera* (Lam) from Edo Central Province , Nigeria. *J. Nat. Prod. Plant Resour.*, 2(1), 107–112.
- Midelet, J., El-Sagheer, A. H., Brown, T., Kanaras, A. G., & Werts, M. H. V. (2017). The Sedimentation of Colloidal Nanoparticles in Solution and Its Study Using Quantitative Digital Photography. *Particle and Particle Systems Characterization*, 34(10).
- Mohammed, A., Mahrous, H., & Mohammed, A. B. A. (2020). *Antibacterial Activities of Bio Synthetic Silver Nanoparticles Against E . Coli Atcc 8739 Using Moringa Oleifera Stem Extract*. 5(7), 55–65.
- Moodley, J. S., Krishna, S. B. N., Pillay, K., Ser Shen, & Govender, P. (2018). Green synthesis of silver nanoparticles from *Moringa oleifera* leaf extracts and its antimicrobial potential. *Advances in Natural Sciences: Nanoscience and Nanotechnology*, 9(1).
- Mosiori, C. O., Oeba, D. A., & Shikambe, R. (2017). Determination of Planck's Constant using Light Emitting Diodes. *Path of Science*, 3(10), 2007–2012.
- Nanjwade, B. K., Bechra, H. M., Derkar, G. K., Manvi, F. V., & Nanjwade, V. K. (2009). Dendrimers : A Novel Drug Delivery System. *International Journal of Pharmacy Life Sciences*. 38(3), 96-185.
- Nanopartz, 2021 online at <https://www.nanopartz.com/gold-nanoparticles-properties-centrifuge-speeds.asp>

- Natsuki, J. (2015). A Review of Silver Nanoparticles: Synthesis Methods, Properties and Applications. *International Journal of Materials Science and Applications*, 4(5), 325.
- Niasari, M. S., Davar, F., & Mir, N. (2008). Synthesis and characterization of metallic copper nanoparticles via thermal decomposition. *Polyhedron*, 27(17), 3514–3518.
- Prociak, J. P., & Banach, M. (2016). Silver nanoparticles - A material of the future...? *Open Chemistry*, 14(1), 76–91.
- Rahma, A., Munir, M. M., Khairurrijal, Prasetyo, A., Suendo, V., & Rachmawati, H. (2016). Intermolecular Interactions and the Release Pattern of Electrospun Curcumin-Polyvinylpyrrolidone) Fiber. *Biological and Pharmaceutical Bulletin*, 39(2), 163–173.
- Rai, M., Yadav, A., & Gade, A. (2009). Silver nanoparticles as a new generation of antimicrobials. *Biotechnology Advances*, 27(1), 76–83.
- Raj, A., Lawrence, R., Lawrence, K., & Silas, N. (2018). *Green Synthesis and Characterization of Silver Nanoparticles From Leaf Extracts of Rosa indica and its Antibacterial Activity Against Human Pathogen Bacteria*.
- Ramadon, D., & Mun'im, A. (2015). Pemanfaatan Nanoteknologi dalam Sistem Penghantaran Obat Baru untuk Produk Bahan Alam (Utilization of Nanotechnology in Drug Delivery System for Natural Products). *Jurnal Ilmu Kefarmasian Indonesia*, 14(2), 118–127.
- Redha, A. (2010). Flavonoid: Struktur, Sifat Antioksidatif dan Peranannya Dalam Sistem Biologis. *Jurnal Berlin*, 9(2), 196–202. <https://doi.org/10.1186/2110-5820-1-7>
- Redwig, R. (2020). Face Centered Cubic Structure (FCC). Diakses pada tanggal 19 Oktober 2021, dari <https://www.e-education.psu.edu/matse81/node/2133>
- Reminus, O. & Coenelius, W. Phytochemical analysis of moringa oleifera (leaves and flowers) and the functional group (2019). *Global Scientific Journal*. 1. 7(6), 41–51.
- Rupiasih, N. N., Aher, A., Gosavi, S., & Vidyasagar, P. B. (2013). Green synthesis of silver nanoparticles using latex extract of Thevetia peruviana: A novel approach towards poisonous plant utilization. *Journal of Physics: Conference Series*, 423(1).

- Saifuddin, N., Wong, C. W., & Yasumira, A. A. N. (2009). Rapid biosynthesis of silver nanoparticles using culture supernatant of bacteria with microwave irradiation. *E-Journal of Chemistry*, 6(1), 61–70.
- Sapana, M. M., Sonal, C. G., & D, R. P. (2012). Use of Moringa Oleifera (Drumstick) seed as Natural Absorbent and an Antimicrobial agent for Ground water Treatment. *Research Journal of Recent Sciences Res.J.Recent Sci*, 1(3), 31–40.
- Sathyavathi, R., Bala Murali Krishna, M., & Narayana Rao, D. (2011). Biosynthesis of silver nanoparticles using Moringa oleifera leaf extract and its application to optical limiting. *Journal of Nanoscience and Nanotechnology*, 11(3), 2031–2035.
- Sharma, A., Patel, V. K., & Ramteke, P. (2009). Identification of vibriocidal compounds from medicinal plants using chromatographic fingerprinting. *World J Microbiol Biotechnol*, 25(1), 19–25.
- Sholikhah, U. N., Pranowo, D., Arvianto, R. I., Sarmini, E., & Widyaningrum, T. (2020). Purification method of silver nanoparticles (AgNPs) and its identification using UV-vis spectrophotometer. *Key Engineering Materials*, 840 KEM, 484–491.
- Sibiya, P. N., & Moloto, M. J. (2014). Effect of precursor concentration and pH on the shape and size of starch capped silver selenide (Ag₂Se) nanoparticles. *Chalcogenide Letters*, 11(11), 577–588.
- Simpson, C. A., Salleng, K. J., Cliffler, D. E., & Feldheim, D. L. (2013). In vivo toxicity, biodistribution, and clearance of glutathione-coated gold nanoparticles. *Nanomedicine: Nanotechnology, Biology, and Medicine*, 9(2), 257–263.
- Singh, B. N., Singh, B. R., Singh, R. L., Prakash, D., Dhakarey, R., Upadhyay, G., & Singh, H. B. (2009). Oxidative DNA damage protective activity, antioxidant and anti-quorum sensing potentials of Moringa oleifera. *Food and Chemical Toxicology*, 47(6), 1109–1116.
- Singh, R. S. G., Negi, P. S., & Radha, C. (2013). Phenolic composition, antioxidant and antimicrobial activities of free and bound phenolic extracts of Moringa oleifera seed flour. *Journal of Functional Foods*, 5(4), 1883–1891.
- Slistan-Grijalva, A., Herrera-Urbina, R., Rivas-Silva, J. F., Ávalos-Borja, M., Castellón-Barraza, F. F., & Posada-Amarillas, A. (2008). Synthesis of silver nanoparticles in a polyvinylpyrrolidone (PVP) paste, and their optical properties in a film and in ethylene glycol. *Materials Research Bulletin*,

43(1), 90–96.

- Some, S., Bulut, O., Biswas, K., Kumar, A., Roy, A., Sen, I. K., Mandal, A., Franco, O. L., İnce, İ. A., Neog, K., Das, S., Pradhan, S., Dutta, S., Bhattacharjya, D., Saha, S., Das Mohapatra, P. K., Bhuimali, A., Unni, B. G., Kati, A., ... Ocsoy, I. (2019). Effect of feed supplementation with biosynthesized silver nanoparticles using leaf extract of *Morus indica* L. V1 on *Bombyx mori* L. (Lepidoptera: Bombycidae). *Scientific Reports*, 9(1).
- Song, Y. J., Wang, M., Zhang, X. Y., Wu, J. Y., & Zhang, T. (2014). Investigation on the role of the molecular weight of polyvinyl pyrrolidone in the shape control of highyield silver nanospheres and nanowires. *Nanoscale Research Letters*, 9(1), 1–8.
- Sozer, N. & Kokini, J. L., (2009). Nanotechnology and its applications in the food sector. *National Library of Medicine*, 27(2), 82-89.
- Stanford, A. L., & Tanner, J. M. (1985). Early Quantum Physics. *Physics for Students of Science and Engineering*, 691–716.
- Sujitha, V., Murugan, K., Paulpandi, M., Panneerselvam, C., Suresh, U., & Roni, M. (2015) Green-synthesized silver nanoparticles as a novel control tool against dengue virus (DEN-2) and its primary vector *Aedes aegypti*. *Parasitol Res*, 114(9), 3315-3325.
- Suriati, G., Mariatti, M., & Azizan, A. (2014). Synthesis of silver nanoparticles by chemical reduction method: Effect of reducing agent and surfactant concentration. *International Journal of Automotive and Mechanical Engineering*, 10(1), 1920–1927.
- Tai, C. Y., Tai, C. Te, Chang, M. H., & Liu, H. S. (2007). Synthesis of magnesium hydroxide and oxide nanoparticles using a spinning disk reactor. *Industrial and Engineering Chemistry Research*, 46(17), 5536–5541.
- Thakkar, K. N., Mhatre, S. S., & Parikh, R. Y. (2010). Biological synthesis of metallic nanoparticles. *Nanomedicine: Nanotechnology, Biology, and Medicine*, 6(2), 257–262.
- Theivasanthi, T., & Alagar, M. (2012). Electrolytic Synthesis and Characterizations of Silver Nanoparticle. *Nano Biomedicine and Engineering*, 4(2).
- Theivasanthi, T., & Alagar, M. (2012). Silver Nanoparticle Synthesize. *Nano Biomedicine and Engineering*, 4(2).

- Tran, Q. H., Nguyen, V. Q., & Le, A. (2013). Silver nanoparticles : synthesis, properties, toxicology, applications, and perspectives. *Advances in Natural Sciences: Nanoscience and Nanotechnology*, 9(4), 49501.
- Udvardi, B., Kovács, I. J., Fancsik, T., Kónya, P., Bátori, M., Stercel, F., Falus, G., & Szalai, Z. (2017). Effects of Particle Size on the Attenuated Total Reflection Spectrum of Minerals. *Applied Spectroscopy*, 71(6), 1157–1168.
- Varthini, T., Bai, G. M. C. V., & Mani, R. J. (2018). *Green Synthesis of Silver Nanoparticles Using Seed Extract of Moringa Oleifera Medicinal Plant*. 5(6), 664–666.
- Wang, H., Qiao, X., Chen, J., Wang, X., & Ding, S. (2005). Mechanisms of PVP in the preparation of silver nanoparticles. *Materials Chemistry and Physics*, 94(2–3), 449–453.
- Wang, Q., Yang, X., & Wang, K. (2007). Enhanced surface plasmon resonance for detection of DNA hybridization based on layer-by-layer assembly films. *Sensors and Actuators, B: Chemical*, 123(1), 227–232
- Wang, Z., Gao, H., Zhang, Y., Liu, G., Niu, G., & Chen, X. (2018). Functional ferritin nanoparticles for biomedical applications. *HHS Public Access*. 11(4), 633–646.
- Xu, W., Ling, P., & Zhang, T. (2013). Polymeric Micelles, a Promising Drug Delivery System to Enhance Bioavailability of Poorly Water-Soluble Drugs. *Journal of Drug Delivery*, 2013(1), 1–15.
- Yerragopu, P. S., Hiregoudar, S., Nidoni, U., Ramappa, K. T., Sreenivas, A. G., & Doddagoudar, S. R. (2020). Chemical Synthesis of Silver Nanoparticles Using Tri-sodium Citrate, Stability Study and Their Characterization. *International Research Journal of Pure and Applied Chemistry*, March, 37–50.
- Yu, H., Bai, X., Qian, G., Wei, H., Gong, X., Jin, J., & Li, Z. (2019). Impact of ultraviolet radiation on the aging properties of SBS-modified asphalt binders. *Polymers*, 11(7).
- Zafar, S., & Zafar, A. (2019). Biosynthesis and Characterization of Silver Nanoparticles Using Phoenix dactylifera Fruits Extract and their In Vitro Antimicrobial and Cytotoxic Effects. *The Open Biotechnology Journal*, 13(1), 37–46.
- Zhang, Z., Zhao, B., & Hu, L. (1996). PVP protective mechanism of ultrafine silver powder synthesized by chemical reduction processes. *Journal of Solid State Chemistry*, 121(1), 105–110.

Zhou, Y., Kong, Y., Kundu, S., Cirillo, J. D., & Liang, H. (2012). Antibacterial activities of gold and silver nanoparticles against *Escherichia coli* and *Bacillus Calmette-Guérin*. *Journal of Nanobiotechnology*, 10, 1–9.