

Practical-1

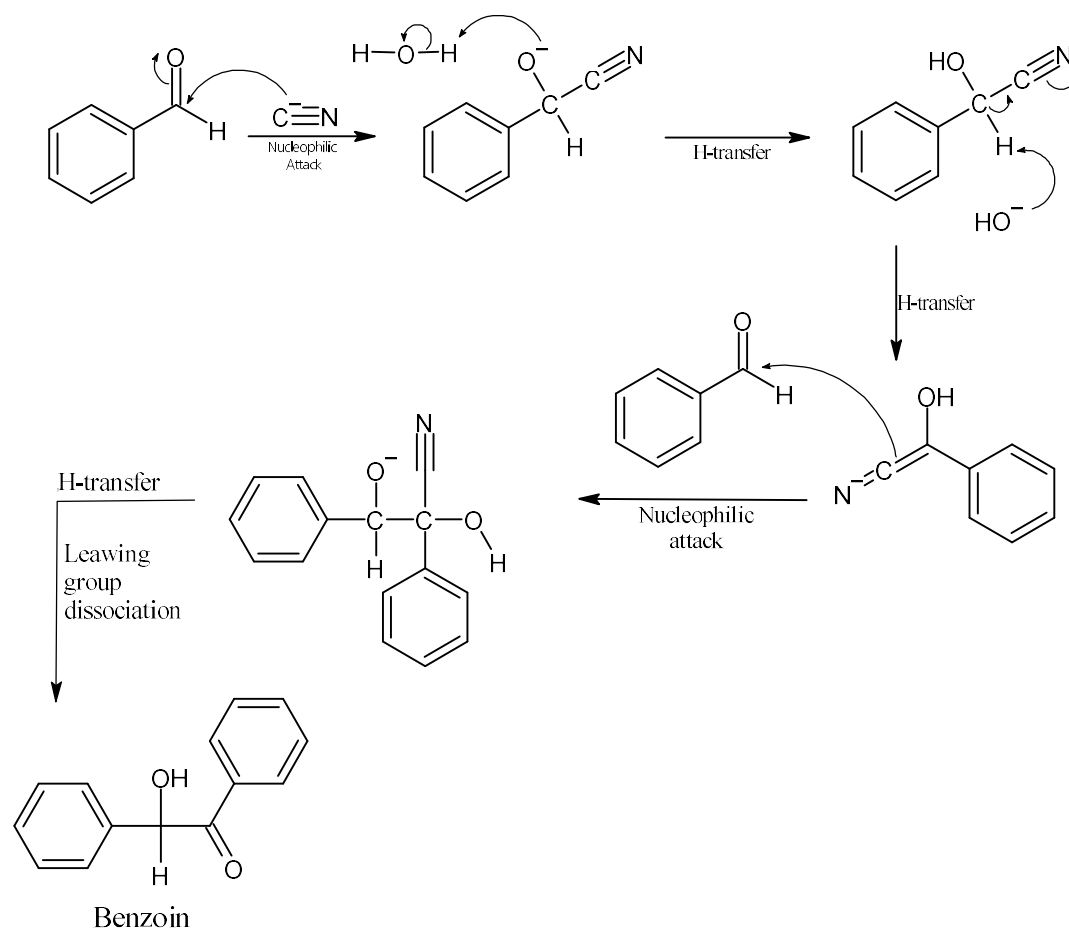
Aim:- To write two chemical equation on chemsketch.

Procedure :-

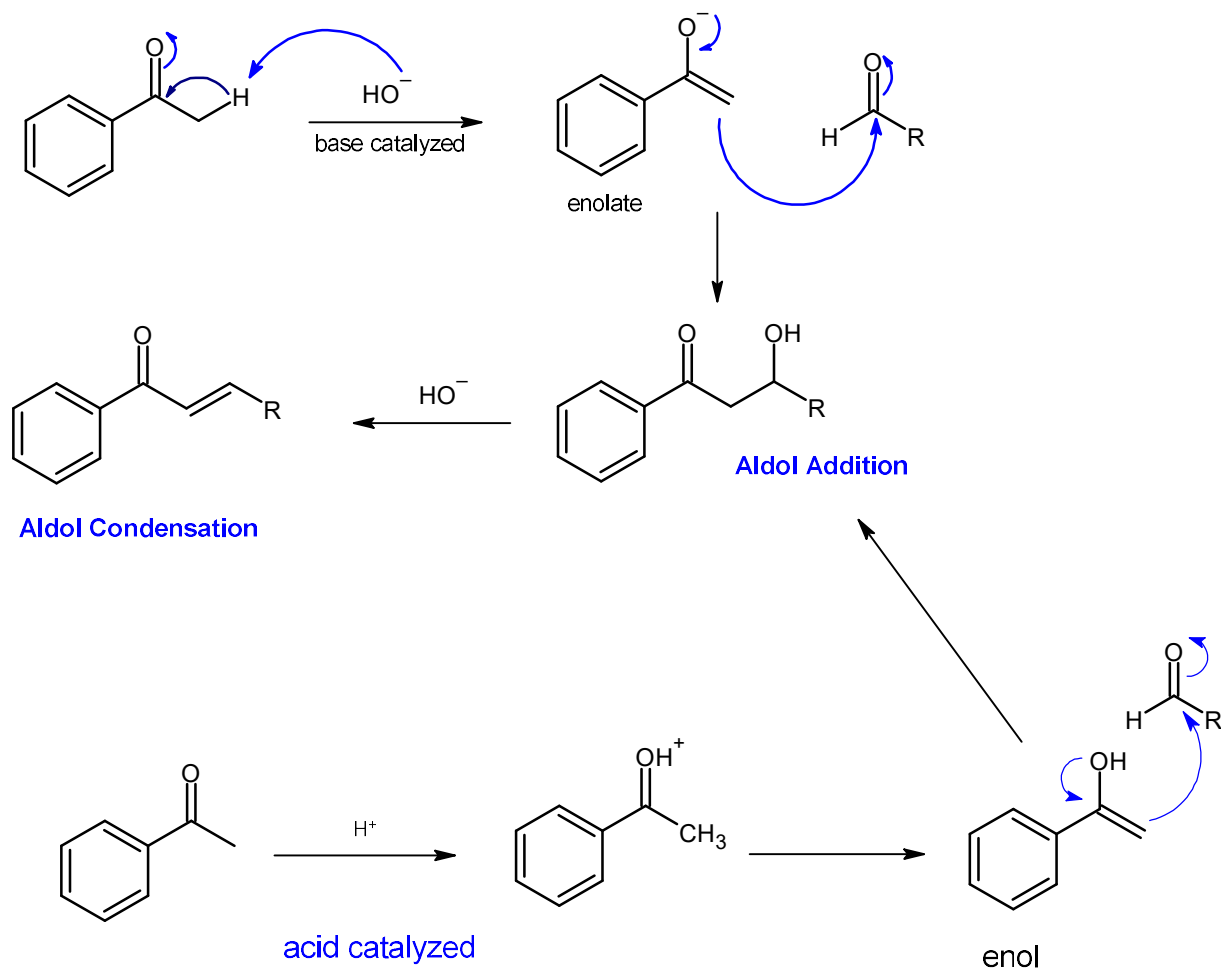
1. Opened ChemSketch software.
2. Selected the structure drawing tools.
3. Created the molecular structures of reactants.
4. Used arrows to depict electron movement and reaction progression.
5. Arranged the steps sequentially to show the full mechanism.
6. Saved and exported the diagram for documentation.

Mechanism:-

1.) Benzoin condensation Mechanism



2.) Aldol condensation Mechanism



Practical-2

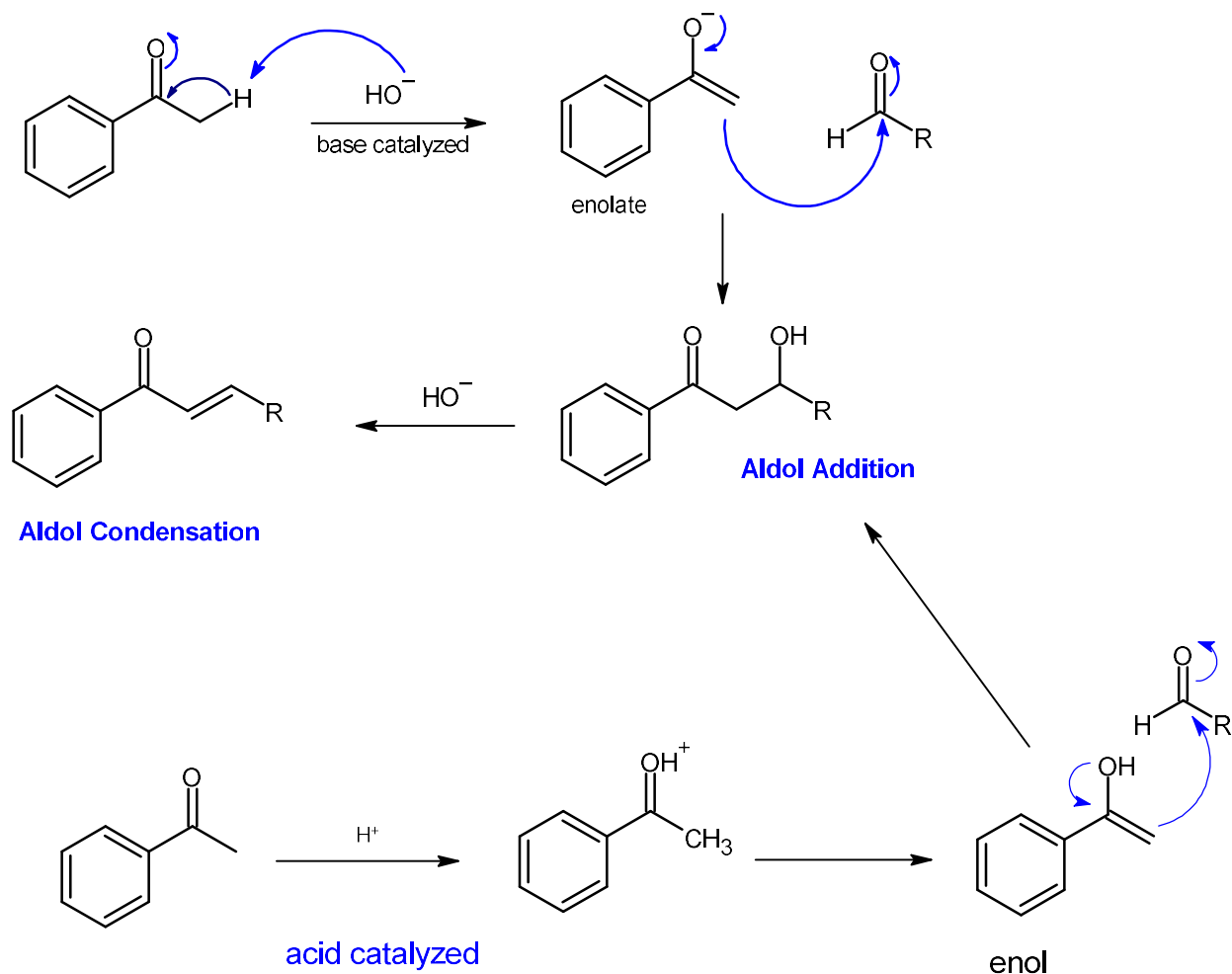
Aim:- To write two chemical equation on chemdraw.

Procedure:-

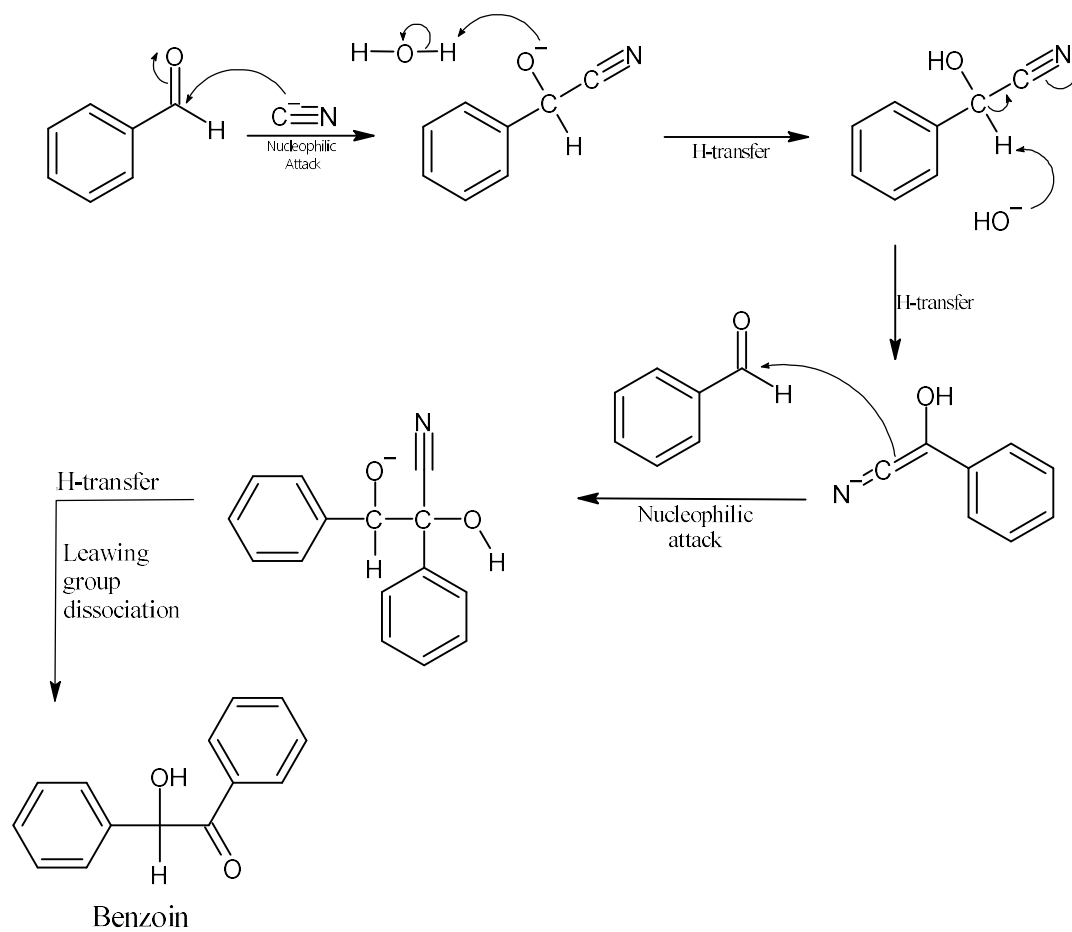
1. Open ChemDraw and create a new document.
2. Draw reactants using the Structure Drawing Tool.
3. Add bonds, charges, and lone pairs as needed.
4. Use arrows to show enolate formation, nucleophilic attack, proton transfer, and dehydration.
5. Label key components (reactants, products, conditions).
6. Optimize structure (Ctrl + Shift + K).
7. Save & export as PNG/JPEG/PDF for the practical file

Mechanism:-

1.) Aldol condensation Mechanism



2.) Benzoin condensation Mechanism



Practical-3

Aim:- To do referencing of a given topic in any style.

Topic:- Gold Nanoparticle and its applications (in ACS citation)

1. **Roy, A.; Pandit, C.; Gacem, A.; Alqahtani, M. S.; Bilal, M.; Islam, S.; Hossain, M. J.; Jameel, M.** Biologically Derived Gold Nanoparticles and Their Applications. *Bioinorg. Chem.* **2022**, 2022, 8184217. <https://doi.org/10.1155/2022/8184217>.
2. **Tirkey, A.; Babu, P. J.** Synthesis and Characterization of Citrate-Capped Gold Nanoparticles and Their Application in Selective Detection of Creatinine (A Kidney Biomarker). *Sens. Int.* **2024**, 5, 100252. <https://doi.org/10.1016/j.sintl.2023.100252>.
3. **Mikhailova, E. O.** Gold Nanoparticles: Biosynthesis and Potential of Biomedical Application. *J. Funct. Biomater.* **2021**, 12 (4), 70. <https://doi.org/10.3390/jfb12040070>.
4. **Firdhouse, M. J.; Lalitha, P.** Biogenic Green Synthesis of Gold Nanoparticles and Their Applications – A Review of Promising Properties. *Inorg. Chem. Commun.* **2022**, 143, 109800. <https://doi.org/10.1016/j.inoche.2022.109800>.
5. **Rizki, I. N.; Klaypradit, W.; Patmawati.** Utilization of Marine Organisms for the Green Synthesis of Silver and Gold Nanoparticles and Their Applications: A Review. *Sustain. Chem. Pharm.* **2023**, 31, 100888. <https://doi.org/10.1016/j.scp.2022.100888>.
6. **Liu, X.-Y.; Wang, J.-Q.; Ashby, C. R., Jr.; Zeng, L.; Fan, Y.-F.; Chen, Z.-S.** Gold Nanoparticles: Synthesis, Physiochemical Properties and Therapeutic Applications in Cancer. *Drug Discov. Today* **2021**, 26 (5), 1284–1292. <https://doi.org/10.1016/j.drudis.2021.01.030>.
7. **Heinemann, M. G.; Rosa, C. H.; Rosa, G. R.; Dias, D.** Biogenic Synthesis of Gold and Silver Nanoparticles Used in Environmental Applications: A Review. *Trends Environ. Anal. Chem.* **2021**, 30, e00129. <https://doi.org/10.1016/j.teac.2021.e00129>.
8. **Nadaf, S. J.; Jadhav, N. R.; Naikwadi, H. S.; Savekar, P. L.; Sapkal, I. D.; Kambli, M. M.; Desai, I. A.** Green Synthesis of Gold and Silver Nanoparticles: Updates on Research, Patents, and Future Prospects. *OpenNano* **2022**, 8, 100076. <https://doi.org/10.1016/j.onano.2022.100076>.
9. **Mostafazade, R.; Arabi, L.; Tazik, Z.; Akaberi, M.; Fazly Bazzaz, B. S.** Fungal Endophytes: Treasure Trove for Green Synthesis of Metallic Nanoparticles and Their Biological Applications. *Biocatal. Agric. Biotechnol.* **2024**, 60, 103307. <https://doi.org/10.1016/j.bcab.2024.103307>.
10. **Rad, A. G.; Abbasi, H.; Afzali, M. H.** Gold Nanoparticles: Synthesizing, Characterizing and Reviewing Novel Applications in Recent Years. *Phys. Procedia* **2011**, 22, 203–208. <https://doi.org/10.1016/j.phpro.2011.11.032>.

Practical-4

Aim:- To do referencing of a given topic in different styles.

Topic:- Gold Nanoparticle and its applications.

I.) In Harvard citation style:-

1. **Roy, A.; Pandit, C.; Gacem, A.; Alqahtani, M. S.; Bilal, M.; Islam, S.; Hossain, M. J.; Jameel, M.** Biologically Derived Gold Nanoparticles and Their Applications. *Bioinorg. Chem.* **2022**, 2022, 8184217. <https://doi.org/10.1155/2022/8184217>.
2. **Tirkey, A.; Babu, P. J.** Synthesis and Characterization of Citrate-Capped Gold Nanoparticles and Their Application in Selective Detection of Creatinine (A Kidney Biomarker). *Sens. Int.* **2024**, 5, 100252. <https://doi.org/10.1016/j.sintl.2023.100252>.
3. **Mikhailova, E. O.** Gold Nanoparticles: Biosynthesis and Potential of Biomedical Application. *J. Funct. Biomater.* **2021**, 12 (4), 70. <https://doi.org/10.3390/jfb12040070>.
4. **Firdhouse, M. J.; Lalitha, P.** Biogenic Green Synthesis of Gold Nanoparticles and Their Applications – A Review of Promising Properties. *Inorg. Chem. Commun.* **2022**, 143, 109800. <https://doi.org/10.1016/j.inoche.2022.109800>.
5. **Rizki, I. N.; Klaypradit, W.; Patmawati.** Utilization of Marine Organisms for the Green Synthesis of Silver and Gold Nanoparticles and Their Applications: A Review. *Sustain. Chem. Pharm.* **2023**, 31, 100888. <https://doi.org/10.1016/j.scp.2022.100888>.
6. **Liu, X.-Y.; Wang, J.-Q.; Ashby, C. R., Jr.; Zeng, L.; Fan, Y.-F.; Chen, Z.-S.** Gold Nanoparticles: Synthesis, Physiochemical Properties and Therapeutic Applications in Cancer. *Drug Discov. Today* **2021**, 26 (5), 1284–1292. <https://doi.org/10.1016/j.drudis.2021.01.030>.
7. **Heinemann, M. G.; Rosa, C. H.; Rosa, G. R.; Dias, D.** Biogenic Synthesis of Gold and Silver Nanoparticles Used in Environmental Applications: A Review. *Trends Environ. Anal. Chem.* **2021**, 30, e00129. <https://doi.org/10.1016/j.teac.2021.e00129>.
8. **Nadaf, S. J.; Jadhav, N. R.; Naikwadi, H. S.; Savekar, P. L.; Sapkal, I. D.; Kambli, M. M.; Desai, I. A.** Green Synthesis of Gold and Silver Nanoparticles: Updates on Research, Patents, and Future Prospects. *OpenNano* **2022**, 8, 100076. <https://doi.org/10.1016/j.onano.2022.100076>.
9. **Mostafazade, R.; Arabi, L.; Tazik, Z.; Akaberi, M.; Fazly Bazzaz, B. S.** Fungal Endophytes: Treasure Trove for Green Synthesis of Metallic Nanoparticles and Their Biological Applications. *Biocatal. Agric. Biotechnol.* **2024**, 60, 103307. <https://doi.org/10.1016/j.bcab.2024.103307>.

II.) In APA citation style

1. Roy, A., Pandit, C., Gacem, A., Alqahtani, M. S., Bilal, M., Islam, S., Hossain, M. J., & Jameel, M. (2022). Biologically derived gold nanoparticles and their applications. *Bioinorganic Chemistry*, 2022, 8184217. <https://doi.org/10.1155/2022/8184217>
2. Tirkey, A., & Babu, P. J. (2024). Synthesis and characterization of citrate-capped gold nanoparticles and their application in selective detection of creatinine (a kidney biomarker). *Sensors International*, 5, 100252. <https://doi.org/10.1016/j.sintl.2023.100252>
3. Mikhailova, E. O. (2021). Gold nanoparticles: Biosynthesis and potential of biomedical application. *Journal of Functional Biomaterials*, 12(4), 70. <https://doi.org/10.3390/jfb12040070>
4. Firdhouse, M. J., & Lalitha, P. (2022). Biogenic green synthesis of gold nanoparticles and their applications – A review of promising properties. *Inorganic Chemistry Communications*, 143, 109800. <https://doi.org/10.1016/j.inoche.2022.109800>
5. Rizki, I. N., Klaypradit, W., & Patmawati. (2023). Utilization of marine organisms for the green synthesis of silver and gold nanoparticles and their applications: A review. *Sustainable Chemistry and Pharmacy*, 31, 100888. <https://doi.org/10.1016/j.scp.2022.100888>
6. Liu, X.-Y., Wang, J.-Q., Ashby, C. R., Jr., Zeng, L., Fan, Y.-F., & Chen, Z.-S. (2021). Gold nanoparticles: Synthesis, physiochemical properties and therapeutic applications in cancer. *Drug Discovery Today*, 26(5), 1284–1292. <https://doi.org/10.1016/j.drudis.2021.01.030>
7. Heinemann, M. G., Rosa, C. H., Rosa, G. R., & Dias, D. (2021). Biogenic synthesis of gold and silver nanoparticles used in environmental applications: A review. *Trends in Environmental Analytical Chemistry*, 30, e00129. <https://doi.org/10.1016/j.teac.2021.e00129>
8. Nadaf, S. J., Jadhav, N. R., Naikwadi, H. S., Savekar, P. L., Sapkal, I. D., Kambli, M. M., & Desai, I. A. (2022). Green synthesis of gold and silver nanoparticles: Updates on research, patents, and future prospects. *OpenNano*, 8, 100076. <https://doi.org/10.1016/j.onano.2022.100076>
9. Mostafazade, R., Arabi, L., Tazik, Z., Akaberi, M., & Fazly Bazzaz, B. S. (2024). Fungal endophytes: Treasure trove for green synthesis of metallic nanoparticles and their biological applications. *Biocatalysis and Agricultural Biotechnology*, 60, 103307. <https://doi.org/10.1016/j.bcab.2024.103307>

III.) In Harvard citation style

1. **Roy, A., Pandit, C., Gacem, A., Alqahtani, M.S., Bilal, M., Islam, S., Hossain, M.J. and Jameel, M., 2022.** Biologically derived gold nanoparticles and their applications. *Bioinorganic Chemistry*, **2022**, p.8184217. Available at: <https://doi.org/10.1155/2022/8184217> [Accessed 21 February 2025].
2. **Tirkey, A. and Babu, P.J., 2024.** Synthesis and characterization of citrate-capped gold nanoparticles and their application in selective detection of creatinine (a kidney biomarker). *Sensors International*, **5**, p.100252. Available at: <https://doi.org/10.1016/j.sintl.2023.100252> [Accessed 21 February 2025].
3. **Mikhailova, E.O., 2021.** Gold nanoparticles: biosynthesis and potential of biomedical application. *Journal of Functional Biomaterials*, **12**(4), p.70. Available at: <https://doi.org/10.3390/jfb12040070> [Accessed 21 February 2025].
4. **Firdhouse, M.J. and Lalitha, P., 2022.** Biogenic green synthesis of gold nanoparticles and their applications – a review of promising properties. *Inorganic Chemistry Communications*, **143**, p.109800. Available at: <https://doi.org/10.1016/j.inoche.2022.109800> [Accessed 21 February 2025].
5. **Rizki, I.N., Klaypradit, W. and Patmawati, 2023.** Utilization of marine organisms for the green synthesis of silver and gold nanoparticles and their applications: a review. *Sustainable Chemistry and Pharmacy*, **31**, p.100888. Available at: <https://doi.org/10.1016/j.scp.2022.100888> [Accessed 21 February 2025].
6. **Liu, X.-Y., Wang, J.-Q., Ashby, C.R. Jr., Zeng, L., Fan, Y.-F. and Chen, Z.-S., 2021.** Gold nanoparticles: synthesis, physiochemical properties and therapeutic applications in cancer. *Drug Discovery Today*, **26**(5), pp.1284–1292. Available at: <https://doi.org/10.1016/j.drudis.2021.01.030> [Accessed 21 February 2025].
7. **Heinemann, M.G., Rosa, C.H., Rosa, G.R. and Dias, D., 2021.** Biogenic synthesis of gold and silver nanoparticles used in environmental applications: a review. *Trends in Environmental Analytical Chemistry*, **30**, p.e00129. Available at: <https://doi.org/10.1016/j.teac.2021.e00129> [Accessed 21 February 2025].
8. **Nadaf, S.J., Jadhav, N.R., Naikwadi, H.S., Savekar, P.L., Sapkal, I.D., Kambli, M.M. and Desai, I.A., 2022.** Green synthesis of gold and silver nanoparticles: updates on research, patents, and future prospects. *OpenNano*, **8**, p.100076. Available at: <https://doi.org/10.1016/j.onano.2022.100076> [Accessed 21 February 2025].
9. **Mostafazade, R., Arabi, L., Tazik, Z., Akaberi, M. and Fazly Bazzaz, B.S., 2024.** Fungal endophytes: treasure trove for green synthesis of metallic nanoparticles and their biological applications. *Biocatalysis and Agricultural Biotechnology*, **60**, p.103307. Available at: <https://doi.org/10.1016/j.bcab.2024.103307> [Accessed 21 February 2025].

IV.) In IEEE citation style

1. A. Roy, C. Pandit, A. Gacem, M. S. Alqahtani, M. Bilal, S. Islam, M. J. Hossain, and M. Jameel, "Biologically derived gold nanoparticles and their applications," *Bioinorganic Chemistry*, vol. 2022, p. 8184217, 2022. doi: [10.1155/2022/8184217](https://doi.org/10.1155/2022/8184217).
2. A. Tirkey and P. J. Babu, "Synthesis and characterization of citrate-capped gold nanoparticles and their application in selective detection of creatinine (a kidney biomarker)," *Sensors International*, vol. 5, p. 100252, 2024. doi: [10.1016/j.sintl.2023.100252](https://doi.org/10.1016/j.sintl.2023.100252).
3. E. O. Mikhailova, "Gold nanoparticles: Biosynthesis and potential of biomedical application," *Journal of Functional Biomaterials*, vol. 12, no. 4, p. 70, 2021. doi: [10.3390/jfb12040070](https://doi.org/10.3390/jfb12040070).
4. M. J. Firdhouse and P. Lalitha, "Biogenic green synthesis of gold nanoparticles and their applications – A review of promising properties," *Inorganic Chemistry Communications*, vol. 143, p. 109800, 2022. doi: [10.1016/j.inoche.2022.109800](https://doi.org/10.1016/j.inoche.2022.109800).
5. I. N. Rizki, W. Klaypradit, and Patmawati, "Utilization of marine organisms for the green synthesis of silver and gold nanoparticles and their applications: A review," *Sustainable Chemistry and Pharmacy*, vol. 31, p. 100888, 2023. doi: [10.1016/j.scp.2022.100888](https://doi.org/10.1016/j.scp.2022.100888).
6. X.-Y. Liu, J.-Q. Wang, C. R. Ashby Jr., L. Zeng, Y.-F. Fan, and Z.-S. Chen, "Gold nanoparticles: Synthesis, physiochemical properties and therapeutic applications in cancer," *Drug Discovery Today*, vol. 26, no. 5, pp. 1284–1292, 2021. doi: [10.1016/j.drudis.2021.01.030](https://doi.org/10.1016/j.drudis.2021.01.030).
7. M. G. Heinemann, C. H. Rosa, G. R. Rosa, and D. Dias, "Biogenic synthesis of gold and silver nanoparticles used in environmental applications: A review," *Trends in Environmental Analytical Chemistry*, vol. 30, p. e00129, 2021. doi: [10.1016/j.teac.2021.e00129](https://doi.org/10.1016/j.teac.2021.e00129).
8. S. J. Nadaf, N. R. Jadhav, H. S. Naikwadi, P. L. Savekar, I. D. Sapkal, M. M. Kambli, and I. A. Desai, "Green synthesis of gold and silver nanoparticles: Updates on research, patents, and future prospects," *OpenNano*, vol. 8, p. 100076, 2022. doi: [10.1016/j.onano.2022.100076](https://doi.org/10.1016/j.onano.2022.100076).
9. R. Mostafazade, L. Arabi, Z. Tazik, M. Akaberi, and B. S. Fazly Bazzaz, "Fungal endophytes: Treasure trove for green synthesis of metallic nanoparticles and their biological applications," *Biocatalysis and Agricultural Biotechnology*, vol. 60, p. 103307, 2024. doi: [10.1016/j.bcab.2024.103307](https://doi.org/10.1016/j.bcab.2024.103307).

V.) In Oxford citation style

1. **Roy, A., Pandit, C., Gacem, A., Alqahtani, M. S., Bilal, M., Islam, S., Hossain, M. J., and Jameel, M.** 'Biologically Derived Gold Nanoparticles and Their Applications', *Bioinorganic Chemistry*, vol. 2022, 2022, p. 8184217. Available at: <https://doi.org/10.1155/2022/8184217> [Accessed 21 Feb. 2025].
2. **Tirkey, A. and Babu, P. J.** 'Synthesis and Characterization of Citrate-Capped Gold Nanoparticles and Their Application in Selective Detection of Creatinine (A Kidney Biomarker)', *Sensors International*, vol. 5, 2024, p. 100252. Available at: <https://doi.org/10.1016/j.sintl.2023.100252> [Accessed 21 Feb. 2025].
3. **Mikhailova, E. O.** Gold Nanoparticles: Biosynthesis and Potential of Biomedical Application. *J. Funct. Biomater.* **2021**, 12 (4), 70. <https://doi.org/10.3390/jfb12040070>.
4. **Firdhouse, M. J. and Lalitha, P.** 'Biogenic Green Synthesis of Gold Nanoparticles and Their Applications – A Review of Promising Properties', *Inorganic Chemistry Communications*, vol. 143, 2022, p. 109800. Available at: <https://doi.org/10.1016/j.inoche.2022.109800> [Accessed 21 Feb. 2025].
5. **Rizki, I. N., Klaypradit, W., and Patmawati.** 'Utilization of Marine Organisms for the Green Synthesis of Silver and Gold Nanoparticles and Their Applications: A Review', *Sustainable Chemistry and Pharmacy*, vol. 31, 2023, p. 100888. Available at: <https://doi.org/10.1016/j.scp.2022.100888> [Accessed 21 Feb. 2025].
6. **Liu, X.-Y., Wang, J.-Q., Ashby, C. R., Jr., Zeng, L., Fan, Y.-F., and Chen, Z.-S.** 'Gold Nanoparticles: Synthesis, Physiochemical Properties and Therapeutic Applications in Cancer', *Drug Discovery Today*, vol. 26, no. 5, 2021, pp. 1284–1292. Available at: <https://doi.org/10.1016/j.drudis.2021.01.030> [Accessed 21 Feb. 2025].
7. **Heinemann, M. G., Rosa, C. H., Rosa, G. R., and Dias, D.** 'Biogenic Synthesis of Gold and Silver Nanoparticles Used in Environmental Applications: A Review', *Trends in Environmental Analytical Chemistry*, vol. 30, 2021, e00129. Available at: <https://doi.org/10.1016/j.teac.2021.e00129> [Accessed 21 Feb. 2025].
8. **Nadaf, S. J., Jadhav, N. R., Naikwadi, H. S., Savekar, P. L., Sapkal, I. D., Kambli, M. M., and Desai, I. A.** 'Green Synthesis of Gold and Silver Nanoparticles: Updates on Research, Patents, and Future Prospects', *OpenNano*, vol. 8, 2022, p. 100076. Available at: <https://doi.org/10.1016/j.onano.2022.100076> [Accessed 21 Feb. 2025].
9. **Mostafazade, R., Arabi, L., Tazik, Z., Akaberi, M., and Fazly Bazzaz, B. S.** 'Fungal Endophytes: Treasure Trove for Green Synthesis of Metallic Nanoparticles and Their Biological Applications', *Biocatalysis and Agricultural Biotechnology*, vol. 60, 2024, p. 103307. Available at: <https://doi.org/10.1016/j.bcab.2024.103307> [Accessed 21 Feb. 2025].