

**DETECTION OF TRIMETHOPRIM RESIDUES FROM RETAILED DRESSED  
CHICKEN (*Gallus gallus domesticus*) TISSUES  
IN ILOILO CITY**

A Thesis

Presented to

the College of Agriculture, Resources, and Environmental Sciences

Central Philippine University

Jaro, Iloilo City

In Partial Fulfillment

of the Requirements for the Degree

**BACHELOR OF SCIENCE IN AGRICULTURE**



By

**ARNEL DECRETALES**

2023

**DETECTION OF TRIMETHOPRIM RESIDUES FROM RETAILED CHICKEN  
(*Gallus gallus domesticus*) TISSUES  
IN ILOILO CITY**

Arnel Decretales

**ABSTRACT**

Poultry and livestock industries were prime contributors to agriculture outputs, which correlates with the growth of the human population. While poultry is an important protein source globally, concerns about antibiotic residues are also arising, affecting public health. This study focuses on detecting Trimethoprim (TMP) residues in chicken meat sold in Iloilo City using an Enzyme-Linked Immunosorbent Assay (ELISA) rapid test kit. TMP is an antibiotic used to treat various bacterial infections in chickens. The study aimed to detect Trimethoprim (TMP) residues from Chicken meat cuts sold in major Iloilo City retail locations. The study found positive TMP concentrations in some chicken samples; however, residues were not found confined to specific cuts of chicken tissue but were shown in two (2) instances to be pervasive throughout the chicken carcass, considering the samples were taken randomly on specific standard cuts. Therefore, no conclusions can be made correlating TMP residues to the retail location or cut of chicken meat bought. Thus, there is a need for further investigation at the farm and slaughterhouse levels to understand the factors contributing to antibiotic residues in chicken meat.

## REFERENCES

- Agyare, C., Boamah, V. E., Zumbi, C. N., & Osei, F. B. (2019). Antibiotic Use in Poultry Production and Its Effects on Bacterial Resistance. In Y. Kumar, & Y. Kumar (Ed.), *Antimicrobial Resistance - A Global Threat*. IntechOpen. doi:DOI: 10.5772/intechopen.79371
- Ahmadi, M., Bani-Asadi, F., Rokni, N., Golestan, L., & Shahidi, S. (2019, August 19). Assessment of The Distribution and Concentration of Residual Antibiotics in Chicken Meat and Liver Samples Collected in Tehran by Liquid Chromatography and Tandem Mass Spectrometry. *Egyptian Journal of Veterinary Sciences*. doi:<https://doi.org/10.2174/1573401315666190819122719>
- Alhajj, M., Zubair, M., & Farhana, A. (2023). Enzyme Linked Immunosorbent Assay. *Enzyme Linked Immunosorbent Assay*. (StatPearls, Compiler) Treasure Island (FL):: StatPearls Publishing. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK555922/>
- Amangelsin, Y., Semenova, Y., Dadar, M., Aljofan, M., & Bjørklund, G. (2023). The Impact of Tetracycline Pollution on the Aquatic Environment and Removal Strategies. *Antibiotics* , 12(3), 440. doi:<https://doi.org/10.3390/antibiotics12030440>
- Baldrias, L., Gatchalian-Yee, M., & Raymundo, A. (2008). Detection of antibiotic residues in dressed chicken from commercial and backyard producers using Four Plate Test. *Philippine Journal of Veterinary Medicine*, 45(1), 39-48. Retrieved from [https://www.researchgate.net/publication/289160152\\_Detection\\_of\\_antibiotic\\_residues\\_in\\_dressed\\_chicken\\_from\\_commercial\\_and\\_backyard\\_producers\\_using\\_Four\\_Plate\\_Test](https://www.researchgate.net/publication/289160152_Detection_of_antibiotic_residues_in_dressed_chicken_from_commercial_and_backyard_producers_using_Four_Plate_Test)

Barroga, T. M., Morales, R. G., Benigno, C. C., Castro, S. M., Caniban, M. M., Cabullo, M., . . . Dorado-Garcia, A. (2020). Antimicrobials Used in Backyard and Commercial Poultry and Swine Farms in the Philippines: A Qualitative Pilot Study. *Front. Vet. Sci.* doi:<https://doi.org/10.3389/fvets.2020.00329>

Beyene, T. (2015). Veterinary Drug Residues in Food-animal Products: Its Risk Factors and Potential Effects on Public Health. *Beyene, J Veterinar Sci Technol* 2, 7(1), 285. doi:10.4172/2157-7579.1000285

Bureau of Agriculture and Fisheries Service Technical Services Division. (2022, November 22). BAFS TSD-14. Antimicrobial Resistance (AMR) and Food Safety. (M. R. Mandigma, Ed.) Retrieved from [https://bafs.da.gov.ph/bafs\\_admin/admin\\_page/publications\\_pdf/Technical%20Bulletin%20for%20Antimicrobial%20Resistance%20and%20Food%20safety.pdf](https://bafs.da.gov.ph/bafs_admin/admin_page/publications_pdf/Technical%20Bulletin%20for%20Antimicrobial%20Resistance%20and%20Food%20safety.pdf)

Bureau of Agriculture and Fisheries Standards. (2022). BAFS DAPNS Veterinary Drug Residues in Food Product Standard Maximum Residue Limit (MRL) PNS/BAFS 48:2022 ICS 65.020.30. BAFS DA PNS Veterinary Drug Residues in Food Product Standard Maximum Residue Limit (MRL) PNS/BAFS 48:2022 ICS 65.020.30. Quezon City, M.M., Philippines. Retrieved from BAFS DA PNS Veterinary Drug Residues in Food Product Standard Maximum Residue Limit (MRL) PNS/BAFS 48:2022 ICS 65.020.30: [https://bafs.da.gov.ph/bafs\\_admin/admin\\_page/pns\\_file/2022-12-01-PNS.BAFS%2048.2022\\_PNS%20Veterinary%20Drug%20Residues%20in%20Food%20—%20Product%20Standard%20—%20Maximum%20Residue%20Limit%20\(MRL\).pdf](https://bafs.da.gov.ph/bafs_admin/admin_page/pns_file/2022-12-01-PNS.BAFS%2048.2022_PNS%20Veterinary%20Drug%20Residues%20in%20Food%20—%20Product%20Standard%20—%20Maximum%20Residue%20Limit%20(MRL).pdf)

- Calagui, R. (2016). Occurrence of Antibiotic Residue in Edible Tissues of Broiler Chicken Sold in Tuguegarao City, Philippines. *Interdisciplinary Research Journal*, 1(1). Retrieved from <https://ejournals.ph/article.php?id=10731>
- Cháfer-Pericás, C., Maquieira, Á., & Puchades, R. (2010). Fast screening methods to detect antibiotic residues in food samples. *TrAC Trends in Analytical Chemistry*, 29(9), 1038-1049. doi:<https://doi.org/10.1016/j.trac.2010.06.004>
- Charis, M., Neric, P., Gorgoncillo, C., Elca, J., & Curibot, J. (2019). Screening for Collusion in the Philippine Chicken Meat, Chicken Egg and Pork Markets. *J. ISSAAS*, 25, 135-147.
- Chen, W.-R. (2008, May 7). INTERACTIONS OF TETRACYCLINE ANTIBIOTICS WITH DISSOLVED METAL OXIDES. Atlanta, Georgia, USA. Retrieved from [https://smartech.gatech.edu/bitstream/handle/1853/24698/chen\\_wanru\\_200808\\_phd.pdf](https://smartech.gatech.edu/bitstream/handle/1853/24698/chen_wanru_200808_phd.pdf)
- Conde-Cid, M., Nuñez-Delgado, A., Fernandez-Sanjuro, J., Alvarez-Rodriguez, E., Fernandez-Calviño, D., & Arias-Estevez, M. (2020). Tetracycline and Sulfonamide Antibiotics in Soils: Presence, Fate and Environmental Risks. *Processes*, 8(1479), 1-40. doi:[doi:10.3390/pr8111479](https://doi.org/10.3390/pr8111479)
- Connolly, G., Clark, C., Campbell, R., Byers, A., Reed, J., & Campbell, W. (2022, November 9). Poultry Consumption and Human Health: How Much Is Really Known? A Systematically Searched Scoping Review and Research Perspective. *Adv Nutr*, 13(6), 2115–2124. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9776623/>
- DA Press Office. (2021, January 5). DA lines up key strategies to steer agri-fishery growth and transformation in 2021. Retrieved from Philippine Department of

Agriculture: <https://www.da.gov.ph/da-lines-up-key-strategies-to-steer-agri-fishery-growth-and-transformation-in-2021/>

Department of Health Antimicrobial Resistance Surveillance Laboratory. (2023).

Antimicrobial Resistance Surveillance Program Annual Report - 2022. Manila: DOH ARSL.

Destaw, T., & Ayehu, M. (2022). Austin J Vet Sci & Anim Husb., 9(4), 1104. Retrieved from <https://austinpublishinggroup.com/veterinary-science-research/fulltext/avsah-v9-id1104.php>

Dy, E. (1998). Inappropriate antibiotic use in the Philippines. Philippine Journal of Internal Medicine, 36(5), 179-188. Retrieved from <https://www.herdin.ph/index.php?view=research&cid=34875>

Espino, M., & Bellotindos, L. (2020, April). A System Dynamics Modeling and Computer-based Simulation in Forecasting Long-term Sufficiency: A Philippine Chicken Meat Sector Case Study. Eng. Technol. Appl. Sci. Res., 10(2), 5406-5411. doi:<https://doi.org/10.48084/etasr.3301>

European Agency for the Evaluation of Medicinal Products Veterinary Medicines Evaluation Unit. (1997, September). EMEA/MRL/255/97-Final : Trimethoprim Summary Report 2. Retrieved from [https://www.ema.europa.eu/en/documents/mrl-report/trimethoprim-summary-report-2-committee-veterinary-medicinal-products\\_en.pdf](https://www.ema.europa.eu/en/documents/mrl-report/trimethoprim-summary-report-2-committee-veterinary-medicinal-products_en.pdf)

European Union. (2023). Veterinary Medicines. Retrieved from EU Veterinary Medicines: Compare Medicines:

<https://medicines.health.europa.eu/veterinary/en/compare/products>

FAO. (2021). Maximum Residue Limits (MRLs). Retrieved from Maximum Residue Limits (MRLs) and Risk Management Recommendations (RMRs) for Residues of

Veterinary Drugs in Food: <https://www.fao.org/fao-who-codexalimentarius/codex-texts/maximum-residue-limits/en/>

Food and Agriculture Organization of the United Nations. (2009).

<https://www.fao.org/publications/card/en/c/1ba49045-e062-501c-a32f-6f6cb15cf631>. Rome, Italy: FAO/WHO.

Food and Agriculture Organization of the United Nations. (2023, November 14).

ORIGINS OF THE CODEX ALIMENTARIUS. ORIGINS OF THE CODEX ALIMENTARIUS. Retrieved from

<https://www.fao.org/3/y7867e/y7867e03.htm#:~:text=In%20the%20Austro%2DHungarian%20Empire,of%20identity%20for%20specific%20foods>.

Fuoco, D. (2012, June 12). Classification Framework and Chemical Biology of

Tetracycline-Structure-Based Drugs. *Antibiotics (Basel)*, 1(1), 1-3.

doi:<https://doi.org/10.3390%2Fantibiotics1010001>

Heads of Medicines Agencies . (2023). Heads of Medicines Agencies VMRI Product

Index. Retrieved from Heads of Medicines Agencies : <https://mri.cts-mrp.eu/portal/fulltext-search>

Heads of Medicines Agencies. (2016). Sulfamethoxazole and Trimethoprim

SE/W/0024/pdWS/001. 30: November. Retrieved from

[https://www.hma.eu/fileadmin/dateien/Human\\_Medicines/CMD\\_h\\_/Paediatric\\_Regulation/Assessment\\_Reports/Article\\_45\\_work-](https://www.hma.eu/fileadmin/dateien/Human_Medicines/CMD_h_/Paediatric_Regulation/Assessment_Reports/Article_45_work-sharing/Sulfamethoxazole_and_trimethoprim_2017_03_Art_45_Public_AR.pdf)

[sharing/Sulfamethoxazole\\_and\\_trimethoprim\\_2017\\_03\\_Art\\_45\\_Public\\_AR.pdf](https://www.hma.eu/fileadmin/dateien/Human_Medicines/CMD_h_/Paediatric_Regulation/Assessment_Reports/Article_45_work-sharing/Sulfamethoxazole_and_trimethoprim_2017_03_Art_45_Public_AR.pdf)

Inter-Agency Committee on Antimicrobial Resistance (ICAMR). (2023). Philippine

National Action Plan on Antimicrobial Resistance 2019-2023. Retrieved from

Department of Health Pharmaceutical Division: <https://pharma.doh.gov.ph/the-philippine-action-plan-to-combat-antimicrobial-resistance-2019-2023/>

Islam, S. (2022, March). Exploring the Structure and Activity of Metallo-Tetracyclines

Exploring the Structure and Activity of Metallo-Tetracyclines. Tampa, FL.

Retrieved October 2023, from <https://digitalcommons.usf.edu/etd/9380>

Kemnic, T., & Coleman, M. (2022). Trimethoprim Sulfamethoxazole. In T. Kemnic, & M.

Coleman, Trimethoprim Sulfamethoxazole (p. November). StatPearls Publishing

LLC. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK513232>

Lota, M., Chua, A., Azupardo, K., Lumangaya, C., Reyes, K., Villanueva, S., . . . Roxas,

E. (2022). A Qualitative Study on the Design and Implementation of the National

Action Plan on Antimicrobial Resistance in the Philippines. *Antibiotics*, 11(6), 820.

doi:<https://doi.org/10.3390/antibiotics11060820>

Mercer DVM, MS, DACVIM-LA, M. A. (2022, November). MSD Manual Veterinary

Manual. Retrieved from Tetracyclines Use in Animals:

[https://www.msdmanuals.com/professional/infectious-diseases/bacteria-and-](https://www.msdmanuals.com/professional/infectious-diseases/bacteria-and-antibacterial-drugs/trimethoprim-and-sulfamethoxazole)

[antibacterial-drugs/trimethoprim-and-sulfamethoxazole](https://www.msdmanuals.com/professional/infectious-diseases/bacteria-and-antibacterial-drugs/trimethoprim-and-sulfamethoxazole)

Mercer, M. A. (2022, November). Sulfonamides and Sulfonamide Combinations Use in

Animals. Retrieved from

[https://www.msdrvmanual.com/pharmacology/antibacterial-](https://www.msdrvmanual.com/pharmacology/antibacterial-agents/sulfonamides-and-sulfonamide-combinations-use-in-animals)

[agents/sulfonamides-and-sulfonamide-combinations-use-in-animals](https://www.msdrvmanual.com/pharmacology/antibacterial-agents/sulfonamides-and-sulfonamide-combinations-use-in-animals)

National Center for Biotechnology Information. (2023, November 13). PubChem

Compound Summary for CID 5578, Trimethoprim. Retrieved from PubChem:

<https://pubchem.ncbi.nlm.nih.gov/compound/Trimethoprim>

Philippine Department of Agriculture . (2023). The One DA Reform Agenda: Eighteen

(18) Key Strategies. Retrieved from Philippine Department of Agriculture :

<https://www.da.gov.ph/the-one-da-reform-agenda-eighteen-18-key-strategies/>

- Philippine Statistics Authority. (2021, April). Average Annual Per Capita Consumption of Selected Agricultural Commodities, 2018. Retrieved from Average Annual Per Capita Consumption of Selected Agricultural Commodities, 2018: <https://psa.gov.ph/content/average-annual-capita-consumption-selected-agricultural-commodities-2018>
- Philippine Statistics Authority. (2023). Selected Statistics on Agriculture and Fisheries 2018-2022. Quezon City: Philippine Statistics Authority. Retrieved from <https://psa.gov.ph/publication/selected-statistics-on-agriculture-and-fisheries>
- Physicians Committee for Responsible Medicine. (2023, November 28). Chicken Is Not a Healthy Choice. Retrieved from Physicians Committee for Responsible Medicine: <https://www.pcrm.org/good-nutrition/nutrition-information>
- Pinstrup-Andersen, P., & Hazel, P. (1985). The Impact of the Green Revolution and Prospects for the Future. *Food Reviews International*, 1(1), 1-25. Retrieved from [https://pdf.usaid.gov/pdf\\_docs/pnaaz044.pdf](https://pdf.usaid.gov/pdf_docs/pnaaz044.pdf)
- Pirali, T., Serafini, M., Cargnin, S., Masarotti, A., & Genazzani, A. A. (2020, April 20). Essential Medicinal Chemistry of Essential Medicines. *J. Med. Chem.*, 63(18), 10170–10187. doi:<https://doi.org/10.1021/acs.jmedchem.0c00415>
- Putecova, K., Nedbalcova, K., Bartejsova, I., Matiaskova, K., Jeklova, E., Viskova, M., . . . Stastny, K. (2021). Experimental determination of the pharmacokinetic properties of trimethoprim and sulfamethoxazole combination in the blood serum of broiler chickens. *Veterinary Research Institute, Brno, Czech Republic*, 66, 248–256. doi:<https://doi.org/10.17221/190/2020-VETMED>
- Roth, N., Käsbohrer, A., Mayrhofer, S., Zitz, U., Hofacre, C., & Domig, K. (2019, April). The application of antibiotics in broiler production and the resulting antibiotic

resistance in *Escherichia coli*: A global overview. *Poultry Science*, 98(4), 1791-1804. doi:<https://doi.org/10.3382/ps/pey539>

Sakamoto, S., Putalun, W., Vimolmangkang, S., Phoolcharoen, W., Shoyama, Y., Tanaka, H., & Morimoto, S. (2018). Enzyme-linked immunosorbent assay for the quantitative/qualitative analysis of plant secondary metabolites. *J Nat Med.*, 72(1), 32–42. doi:<https://doi.org/10.1007%2Fs11418-017-1144-z>

Saudi Food & Drug Authority. (2023). Maximum Residues Limits (Mrls) of Veterinary Drugs In Food. Retrieved 2023, from Saudi Food & Drug Authority: [https://www.sfda.gov.sa/sites/default/files/2019-06/VeterinaryDrugs\\_0.pdf](https://www.sfda.gov.sa/sites/default/files/2019-06/VeterinaryDrugs_0.pdf)

Shrestha , Y., & Shrestha, S. (2023, October 20). Fundamentals of Colorimetry. *Advances in Colorimetry*. (P. Samanta, Ed.) doi:10.5772/intechopen.112344

Straub, J. (2013). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4790302/>. *Antibiotics (Basel)*, 2(1), 115–162. doi:<https://doi.org/10.3390%2Fantibiotics2010115>

Tariq, S., Faheem, S., Rizvi, A., & Anwar, U. (2018, July 25). Tetracycline: Classification, Structure Activity Relationship and Mechanism of Action as a Theranostic Agent for Infectious Lesions-A Mini Review. *Biomedical Journal of Scientific and Technical Research*, 7(2), 5787-5796. doi:<http://dx.doi.org/10.26717/BJSTR.2018.07.001475>

United Nations. (1973). Report of the United Nations Conference on the Human Environment. New York: United Nations. Retrieved from <https://www.un.org/en/conferences/environment/stockholm1972>

United Nations. (1993). Report of the United Nations Conference on Environment and Development . New York: United Nations . Retrieved from United Nations Conference on the Human Environment, 5-16 June 1972, Stockholm: <https://www.un.org/en/conferences/environment/stockholm1972>

United Nations. (2023). About Codex Alimentarius. Retrieved from Codex Alimentarius International Food Standards: <https://www.fao.org/fao-who-codexalimentarius/about-codex/en/#c453333>

United Nations. (2023). UN Division for Sustainable Development Goals (DSDG) Department of Economic and Social Affairs (UNDESA) . Retrieved from THE 17 GOALS: <https://sdgs.un.org/goals#history>

Vashisht, P., Goyal, A., & Hearth Holmes, M. (2022, September 12). Sweet Syndrome. Retrieved from Sweet Syndrome: <https://www.ncbi.nlm.nih.gov/books/NBK431050/>

World Health Organization. (2023). Model List of Essential Medicines. Retrieved from WHO Model List of Essential Medicines: <https://list.essentialmeds.org/>

World Health Organization. (2023). WHO Electronic Essential Medicines List (eEML) : Sulfamethoxazole + trimethoprim. Retrieved from Sulfamethoxazole + trimethoprim: <https://list.essentialmeds.org/medicines/334>

Wróbel, A., Arciszewska, K., Maliszewski, D., & Drozdowska, D. (2019). Trimethoprim and other nonclassical antifolates an excellent template for searching modifications of dihydrofolate reductase enzyme inhibitors. *The Journal of Antibiotics*, 73, 5-27. doi:<https://doi.org/10.1038/s41429-019-0240-6>

Wróbel, A., Arciszewska, K., Maliszewski, D., & Drozdowska, D. (2019, October 2). Trimethoprim and other nonclassical antifolates an excellent template for searching modifications of dihydrofolate reductase enzyme inhibitors. *The Journal of Antibiotics*, 73, 5-27. doi:<https://doi.org/10.1038/s41429-019-0240-6>

Zhongyu, C. (2021). Hazards and Detection Techniques of Veterinary Drug Residues. 2021 2nd International Academic Conference on Energy Conservation,

Environmental Protection and Energy Science (ICEPE 2021). 271, p. 9. Perth: .  
doi:<https://doi.org/10.1051/e3sconf/202127104033>