

Campus Universitário – Viçosa, MG – 36570-900 – Telefone (31)3612-6705/6760 – E-mail: tc.a@ufv.br

ANTIBIOTIC RESISTANCE: INTERACTION WITH HOST AND ENVIRONMENTAL CHANGES AND EMERGING  
BIO-POLYMERS, BIO TRAP AND TARGET TAL 797 – Seminário  
COSTA, C.R.; KLEVENSKRM, A.; RODRIGUES JR, RICHARDSON, J.; SANTOS, M.; VIEIRA, R.P., ET AL.  
INFLUENCING HEALTH CARE ASSOCIATED INFECTIONS IN HOSPITALS AND COMMUNITIES IN BRAZIL, PUBLIC  
HEALTH REP 2009; 122(1): 1-10. NODAL, M.; VIEIRA, R.P.; COSTA, C.R.; SANTOS, M.; VIEIRA, R.P., ET AL.  
PSEUDOMONAS AERUGINOSA URINARY TRACT INFECTION AND BACTERIOPHAGE TAIL PROTEIN, RUANG L, ZHAO C, CHEN  
**Data**  
**TÍTULO DO RESUMO**  
**Pós-graduando:** Izabela Vieira Botelho  
**Orientador:** Monique Renon Eller ( DTA )  
**Nível:** ( ) MS ( x ) DS

"Detection of Pathogenic Bacteria through Novel Protein-Based Assays: A Promising Approach for Improved Diagnostics"

This abstract presents a novel approach for the rapid and cost-effective detection of pathogenic bacteria, with a focus on the highly virulent and multidrug-resistant *Pseudomonas aeruginosa*. This bacterium is notorious for its ability to form biofilms and its prevalence in healthcare-associated infections. Such infections, affecting individuals with compromised immune systems and conditions like cystic fibrosis, often lead to severe complications. Conventional detection methods are expensive, time-consuming, and challenging to implement, particularly in resource-limited and remote settings. To address this gap, the research group in Biotechnological Products and Processes in the Food Industry at UFV (Universidade Federal de Viçosa) has developed innovative microagglutination and colorimetric tests capable of identifying *Pseudomonas* sp. within 3 to 10 minutes of contact, respectively. These tests exploit the specificity of the tail protein of the UFV-P2 bacteriophage as a sensing molecule for *Pseudomonas aeruginosa* identification. The current study aims to utilize this technology for the rapid detection of *P. aeruginosa* in urine samples from infected patients. Additionally, using a similar methodology, predictive models for rapid detection of *Escherichia coli* and *Staphylococcus aureus* will be developed and tested. The primary objective of this research is to enable accurate, swift, and easily applicable diagnostics at a low cost, thereby facilitating prompt and precise treatments. This approach is anticipated to alleviate the financial burden on healthcare systems and reduce the duration of medical interventions. Moreover, these models hold the potential for broader applications across various domains, including the food industry and water analysis in treatment facilities. This innovative approach not only addresses an urgent need in medical diagnostics but also lays the foundation for versatile applications with far-reaching implications.

## Referências bibliográficas:

- (1) [HTTPS://WWW.WHO.INT/NEWS-ROOM/FACT-SHEETS/DETAIL/ANTIMICROBIAL-RESISTANCE](https://www.who.int/news-room/detail/antimicrobial-resistance)(2) QIN, S., XIAO, W., ZHOU, C. ET AL. PSEUDOMONAS AERUGINOSA: PATHOGENESIS, VIRULENCE FACTORS, ANTIBIOTIC RESISTANCE, INTERACTION WITH HOST, TECHNOLOGY ADVANCES AND EMERGING THERAPEUTICS. SIG TRANSDUCT TARGET THER 7, 199 (2022).[HTTPS://DOI.ORG/10.1038/S41392-022-01056-1](https://doi.org/10.1038/S41392-022-01056-1)(3) KLEVENS RM, EDWARDS JR, RICHARDS CL JR, HORAN TC, GAYNES RP, ET AL. ESTIMATING HEALTH CARE-ASSOCIATED INFECTIONS AND DEATHS IN U.S. HOSPITALS, 2002. PUBLIC HEALTH REP 2007;122:160–166.(4) NEWMAN JN, FLOYD RV, FOTHERGILL JL. INVASION AND DIVERSITY IN PSEUDOMONAS AERUGINOSA URINARY TRACT INFECTIONS. J MED MICROBIOL. 2022 MAR;71(3):001458. DOI:10.1099/JMM.0.001458. PMID: 35275806; PMCID: PMC9176269.(5) HAO X, HUANG L, ZHAO C, CHEN S, LIN W, LIN Y, ZHANG L, SUN A, MIAO C, LIN X, CHEN M, WENG S. ANTIBACTERIAL ACTIVITY OF POSITIVELY CHARGED CARBON QUANTUM DOTS WITHOUT DETECTABLE RESISTANCE FOR WOUND HEALING WITH MIXED BACTERIA INFECTION. MATER SCI ENG C MATER BIOL APPL. 2021 APR;123:111971. DOI: 10.1016/J.MSEC.2021.111971. EPUB 2021 FEB 18. PMID: 33812599.(6) RÜGER M, ACKERMANN M, REICHL U. SPECIES-SPECIFIC VIABILITY ANALYSIS OF PSEUDOMONAS AERUGINOSA, BURKHOLDERIA CEPACIA AND STAPHYLOCOCCUS AUREUS IN MIXED CULTURE BY FLOW CYTOMETRY. BMC MICROBIOL. 2014 MAR 7;14:56. DOI:10.1186/1471-2180-14-56. PMID: 24606608; PMCID: PMC3995885.(7) RAO AR, SPLAINGARD MS, GERSHAN WM, HAVENS PL, THILL A, BARBIERI JT. DETECTION OF PSEUDOMONAS AERUGINOSA TYPE III ANTIBODIES IN CHILDREN WITH TRACHEOSTOMIES. PEDIATR PULMONOL. 2005 MAY;39(5):402-7. DOI: 10.1002/PPUL.20194. PMID: 15666370.(8) CHOI HJ, KIM MH, CHO MS, KIM BK, KIM JY, KIM C, PARK DS. IMPROVED PCR FOR IDENTIFICATION OF PSEUDOMONAS AERUGINOSA. APPL MICROBIOL BIOTECHNOL. 2013 APR;97(8):3643-51. DOI: 10.1007/S00253-013-4709-0. EPUB 2013 MAR 17. PMID: 23504075.(9) JOYANES P, DEL CARMEN CONEJO M, MARTÍNEZ MARTÍNEZ L, PEREA EJ. EVALUATION OF THE VITEK 2 SYSTEM FOR THE IDENTIFICATION AND SUSCEPTIBILITY TESTING OF THREE SPECIES OF NONFERMENTING GRAM-NEGATIVE RODS FREQUENTLY ISOLATED FROM CLINICAL SAMPLES. J CLIN MICROBIOL. 2001 SEP;39(9):3247-53. DOI: 10.1128/JCM.39.9.3247-3253.2001. PMID: 11526158; PMCID: PMC88326.(10) QUESADA MD, GIMÉNEZ M, MOLINOS S, FERNÁNDEZ G, SÁNCHEZ MD, RIVELLO R, RAMÍREZ A, BANQUÉ C, AUSINA V. PERFORMANCE OF VITEK 2 COMPACT AND OVERNIGHT MICROSCAN PANELS FOR DIRECT IDENTIFICATION AND SUSCEPTIBILITY TESTING OF GRAM-NEGATIVE BACILLI FROM POSITIVE FAN BACT/ALERT BLOOD CULTURE BOTTLES. CLIN MICROBIOL INFECT. 2010 FEB;16(2):137-40. DOI: 10.1111/J.1469-0691.2009.02907.X. EPUB 2009 SEP 23. PMID: 19778301.(11) BEDNARČUK N, GOLIĆ JELIĆ A, STOJASAVLJEVIĆ ŠATAR A, STOJAKOVIĆ N, MARKOVIĆ PEKOVIĆ V, STOJILJKOVIĆ MP, POPOVIĆ N, ŠKRĐIĆ R. ANTIBIOTIC UTILIZATION DURING COVID-19: ARE WE OVER-PRESCRIBING? ANTIBIOTICS (BASEL). 2023 FEB 2;12(2):308. DOI:10.3390/ANTIBIOTICS12020308. PMID: 36830218; PMCID: PMC9952319.

**Orientador(a)**

**Orientado(a)**

SECRETARIA DE CIÊNCIAS DA UFSCAR - SECRETARIA DE CIÊNCIAS DA UFSCAR

SECRETARIA DE CIÊNCIAS DA UFSCAR - SECRETARIA DE CIÊNCIAS DA UFSCAR

UFSCAR - UNIVERSIDADE FEDERAL DE SANTA CATARINA - UFSCAR - UNIVERSIDADE FEDERAL DE SANTA CATARINA - UFSCAR

TEL: 737-3000/3001

Data:

### RESUMO DO PROJETO

Professor(a) orientador(a): Viviane Bottelho  
Instituição: Universidade Federal de Santa Catarina (UFSC)  
E-mail: viviane.bottelho@ufsc.br

### "Detection of Pathogenic Bacteria through Novel Polymer-Based Assays: A Proactive Approach for Food Hygiene and Safety"

This abstract presents a novel approach for the detection and effective delivery of pathogenic bacteria, particularly in our highly violent and uncontrollable food chain. This bacterium is known to cause food-borne illnesses and its presence in foodstuffs are concerned between food safety issues, offering solutions with comprehensive measurements and methods via cyste-glycine, which lead to severe damages. Thus, conventional approaches have been developed, time-consuming and challenging to implement, necessarily to ensure safety and hygiene quality. To address the gaps, one research group at Research Center Products and Technology in Food Industry at UFG (Universidade Federal do Paraná) has been investigating enzymes, such as amylase and lipase, to detect specific of *Candida parapsilosis* and *Candida krusei* up to 5 to 10 minutes of time of analysis. These tests applied the specificity of the two groups of yeast-like microorganisms to sensing techniques for the pathogen species identification. This new study aims to improve the technique for the rapid detection of *Pseudomonas aeruginosa* in food, suggesting it to food and patients. Additionally, using a similar methodology, predictive models for other致病菌如 *Escherichia coli* and *Staphylococcus aureus* will be developed and tested. The ultimate goal of this research is to ensure accurate, rapid, and easily applicable diagnostics of a new class, thereby facilitating early diagnosis and prevent treatments. This approach is anticipated to alleviate the food safety burden on institutions, reduce and reduce the duration of medical interventions. Moreover, these methods can also have broader applications across various domains, reducing the food industry and human health risk and prevent potential risks. This proactive approach notably minimizes an urgent need for medical supplies, but ensuring the food safety for mankind against food-borne diseases.