

# Carbapenem stewardship tool: Impact on carbapenem usage and clinical outcome

Tan Wai Leong<sup>1</sup>, Izyana Munirah Idha<sup>1</sup>, Mariah Zakaria<sup>2</sup>, Ng Ruiyi<sup>2</sup>, Adam Jafer<sup>1</sup>, Syamhanin Adnan<sup>1</sup>, Hannah Mahir<sup>1</sup>, Fong Siew Li BPharm<sup>1</sup>, Benedict Sim Lim Heng<sup>1</sup>

<sup>1</sup>Antimicrobial Stewardship (AMS) Core Committee, Hospital Sungai Buloh, <sup>2</sup>Pharmacy Department, Hospital Sungai Buloh

## ABSTRACT

**Introduction:** Gram-negative bacteria are becoming increasingly resistant to carbapenems and are related to the use of carbapenem. Justification on the use of carbapenem may reduce the unnecessary carbapenem usage. The aim of this study is to evaluate the effectiveness of Carbapenem Initiation & 72H Review Form (CBP Form) in reducing the carbapenem usage in hospital and its impact on mortality. **Materials and Methods:** A single center, retrospective cross-sectional, pre- and post-enforcement of CBP Form was conducted. Data were obtained by reviewing the hospital's electronic medical database. All patients who were  $\geq 18$  years old and initiated on empirical therapy of carbapenems, from April to May 2022 (pre) and June 2022 (post) were included. The primary outcome was to compare the amount of carbapenem prescriptions continued more than 72 hours pre- and post-enforcement of CBP Form. The secondary outcome was to evaluate the impact of all-cause crude death after enforcement of CBP Form. **Results:** A total 83 (55 (Pre) vs 28 (Post)) carbapenem prescriptions were started as empirical therapy. The amount of carbapenem prescriptions ( $>72$  hours) was higher prior the enforcement of CBP Form (58.2% vs. 32.1%,  $\chi^2=5.033$ ,  $p=0.025$ ). In addition, the mortality rate of patients did not differ significantly between groups (40.0% vs. 39.3%,  $\chi^2=0.004$ ,  $p>0.05$ ). **Conclusion:** CBP Form is an effective stewardship tool to reduce the inappropriate use of carbapenem in hospital while not jeopardized patient's clinical outcome.

**Keywords:** Carbapenem, antimicrobial stewardship, carbapenem usage, mortality

# Aromatic spices harbour potential novel antibacterial compounds against ESKAPE pathogens

Tanessri Muni Peragas<sup>1</sup>, Muhammad Shahid<sup>2</sup>, Chandrajit Lahiri<sup>3</sup>, Jactty Chew<sup>3</sup>

<sup>1</sup>Department of Biological Sciences, Sunway University, <sup>2</sup>Department of Biological Sciences and Biotechnology, Universiti Kebangsaan Malaysia, <sup>3</sup>Department of Biological Sciences, Sunway University

## ABSTRACT

**Introduction:** Spices including cumin (*Cuminum cyminum*), fennel (*Foeniculum vulgare*) and Vietnamese coriander (*Persicaria odorata*) are widely used for their culinary and traditional medicinal purposes in South East Asia. However, their antibacterial potential has not been fully investigated. Herein, we determined the antibacterial activity of these species against ESKAPE pathogens and explored potential bioactive compounds that may be contributing to the observed antibacterial properties. **Materials and Methods:** Solvent-based crude extracts of spices were prepared and assessed for their preliminary antibacterial activity, followed by chemical profiling using GC-MS (Gas chromatography-mass spectrometry) analysis. The chemical constituents obtained from GC-MS analysis, were docked against selected target proteins of the six ESKAPE pathogens based on their functional relatedness to MDR. Pharmacological assessment and further molecular dynamics simulation was taken to reveal the top-ranked bioactive compound having the most potential as new antibacterial drugs against selected virulent proteins from the ESKAPE pathogens. The antibacterial activity of selected bioactive compounds was assessed using broth-dilution method and SEM (Scanning electron microscope) analysis. **Results:** Hexane, ethyl acetate, acetone and methanol extracts of all spices showed promising antibacterial effects against ESKAPE pathogens. GC-MS and bioinformatic analyses showed that Phenol, 2,4-bis(1,1-dimethylethyl)-, -(-)-carvone, carveol and estragole were found to be the top potential antibacterial molecules. Further analysis confirmed the antibacterial activity of these compounds on *E. faecium*, MRSA, *A. baumannii* and *P. aeruginosa*. **Conclusion:** Our data showed that spices harbour bioactive compounds that are effective in inhibiting MDR growth and support the notion that natural products are sources of valuable antibacterial compounds.

**Keywords:** aromatic, spices, cumin, fennel, coriander, ESKAPE, pathogen