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CHARACTERIZATION OF OPPORTUNISTIC GRAM-NEGATIVE BACTERIA STRAINS ISOLATED FROM INTENSIVE CARE UNIT PATIENTS IN RIYADH, SAUDI ARABIA

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The prevalence of opportunistic bacterial infections is a notable concern in healthcare facilities, including Saudi Arabia. Therefore, this study aimed to characterize opportunistic bacterial strains prevalent in healthcare settings within Saudi Arabia. The descriptive cross-sectional study included 36 samples, collected from ICU patients of six hospitals in Saudi Arabia. The isolates were processed for the identification of bacterial strains by the VITEK 2 system. Phylogenetic analyses were performed to explore relationships among various bacterial species based on their 16S rRNA gene sequences. Ten methanolic extracts from natural crude were tested *in vitro* for antibacterial activity. All isolated bacteria were Gram-negative and according to VITEK 2 analyzer the most prevalent bacteria was *Klebsiella pneumonia* representing (30.6%,) followed by *Pseudomonas aeruginosa* (25%), *Proteus mirabilis* (19.4%), *Escherichia coli* (13.9%), *Serratia marcescens* (8.3%) and *Citrobacter koseri* (2.8%). Results showed that all samples examined had DNA that was pure, with a purity ratio of 1.8 to 2.0. Phylogenetic tree analysis revealed various similarities in the nucleotide base of different bacterial strains. Only four extracts (*Melaleuca cajuputi, Acanthaster planci, Stylissa carteri, and Sonneratia*

lanceolata) showed antibacterial activity, which displayed various degrees of inhibition against all isolated bacteria using the disc diffusion method. The current study demonstrated that all isolated bacteria were Gram-negative, and the most frequent bacteria found was *Klebsiella pneumonia*. Also, different similarities were observed in the nucleotide base composition among different microorganisms specially *Escherichia* sp. strain and the *Citrobacter koseri* strain that displayed the most similarity among isolated samples. Furthermore, the potential efficacy of four extracts from natural resources could be the best potential as future antibiotics.

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PENCIRIAN STRAIN BAKTERIA GRAM-NEGATIF OPORTUNISTIK YANG DIPENCILKAN DARIPADA PESAKIT UNIT PENJAGAAN INTENSIF DI RIYADH, ARAB SAUDI

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Kelaziman jangkitan bakteria oportunistik adalah kebimbangan yang ketara dalam kemudahan penjagaan kesihatan, termasuk Arab Saudi. Oleh itu, kajian ini bertujuan untuk mencirikan strain bakteria oportunistik yang lazim dalam tetapan penjagaan kesihatan di Arab Saudi. Kajian keratan rentas deskriptif termasuk 36 sampel, dikumpulkan daripada pesakit ICU di enam hospital di Arab Saudi. Pemencilan isolat telah dilakukan untuk mengenalpasti strain bakteria oleh sistem VITEK 2. Analisis filogenetik dilakukan untuk meneroka hubungan antara pelbagai spesies bakteria berdasarkan urutan gen 16S rRNA mereka. Sepuluh ekstrak methanol daripada minyak mentah semulajadi telah diuji secara *in vitro* untuk aktiviti antibakteria. Semua bakteria terpencil adalah Gram-negatif dan menurut penganalisis VITEK 2 bakteria yang paling lazim adalah *Klebsiella pneumonia* mewakili (30.6%,) diikuti oleh *Pseudomonas aeruginosa* (25%), *Proteus mirabilis* (19.4%), *Escherichia coli* (13.9%), *Serratia marcescens* (8.3%) dan *Citrobacter koseri* (2.8%). Keputusan menunjukkan bahawa semua sampel yang diperiksa mempunyai DNA yang tulen, dengan nisbah ketulenan 1.8 hingga 2.0. Analisis pokok filogenetik mendedahkan

pelbagai persamaan dalam asas nukleotida bagi strain bakteria yang berbeza. Empat ekstrak (*Melaleuca cajuputi, Acanthaster planci, Stylissa carteri, dan Sonneratia lanceolata*) menunjukkan aktiviti antibakteria, yang memaparkan pelbagai darjah perencatan terhadap semua bakteria terpencil menggunakan kaedah penyebaran cakera. Kajian semasa menunjukkan bahawa semua bakteria terpencil adalah dari Gram-negatif, dan bakteria yang paling kerap ditemui ialah *K. pneumonia*. Perbezaan diperhatikan dalam komposisi asas nukleotida antara mikroorganisma yang berbeza khususnya strain *Escherichia* sp. dan strain *C.koseri* yang menunjukkan persamaan yang paling banyak di antara sampel terpencil. Potensi keberkesanan empat sebatian dari sumber semula jadi mempunyai potensi terbaik sebagai sumber antibiotik pada masa hadapan.