بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قال تعالى:

{ بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ (**١**) الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ (**٢**) الرَّحْمَنِ الرَّحِيمِ (**٣**) مَالِكِ يَوْمِ الدِّينِ (**٤**) إِيَّاكَ نَعْبُدُ وَإِيَّاكَ نَسْتَعِينُ (**٥**) اهْدِنَا الصِّرَاطَ الْمُسْتَقِيمَ (٦) صِرَاطَ الَّذِينَ أَنْعَمْتَ عَلَيْهِمْ غَيْرِ الْمَغْضُوبِ عَلَيْهِمْ وَلَا الضَّالِّينَ (٧) }

صدق الله العظيم

سورة الفاتحة

Dedication

I dedicate this work:

- *To my mother and father for their unlimited love and for all their commitment to being there for me throughout my life.*
- *To the person whom I exceptionally love Hafeez, A. Mahomed.*
- *To Munzir, my dear lovely sweet brother.*
- *To my teachers, relatives, friends, and colleagues.*

Acknowledgement

I would like to thank my supervisor Dr. Humodi Ahmed Saeed for his input and patience throughout this project. Honestly, would not be done without his nonstop guidance. I am very grateful to the staff of the Department of Microbiology in Sudan University of Science and Technology. Thanks and appreciation were also done to Dr. Mogahid Mohammed Elhassan for his effort in the performance of molecular analysis.

I would like especially to thank and acknowledge the group of work Miss. Suheir Ramadan and Miss. Igbal A. Ahmed for their technical assistance.

ABSTRACT

Extended-spectrum beta-lactamases (ESBLs) are one of the problems that facing the world now in the treatment of bacterial infections. This study was conducted in the Research Laboratory in Sudan University of Science and Technology. The study was carried out during the period from December 2009 to May 2010, to detect TEM, SHV and CTX-M genes in ESBLs- producing *Serratia marcescens*. The *Serratia marcescens* strains were obtained from the Research Laboratory. All strains were checked for purity by sub-culturing on nutrient agar and examined microscopically. Bacterial DNA was extracted from each isolate using boiling method. Multiplex PCR was used to detect these genes. The obtained result showed the presence of *TEM* gene only in five of the isolates; SHV and CTX-M were not detected in all the isolates examined. It is concluded that, TEM gene is the commonest gene in *Serratia marcescens* isolates. Further studies with a large number of bacterial strains are required to validate this result.

المستخلص

تعتبر الإنزيمات الممتدة الطيف واحده من المشاكل التي تواجه العالم الان في علاج الاصابات البكتيرية. هذه الدراسةِ نُفِّذتْ في مختبرِ البحوثِ في جامعةِ السودان للعلُوم والتكنولوجيا في الفترةِ مِنْ ديسمبر/ 2009 إلى مايو/ 2010، للكتِشف عن الجيناتِ (*TEM* و *SHV* و *CTX-M*) في السراتية الذابلة المنتجة لإنزيماتَ بيتا لاكتام الممتدة الطيفِ. تم الحصول على سلالات السراتية الذابلة من مختبر البحوث بالجامعة والتأكد من نقاوتها بإعادة تزريعها على الأجار المغذي ومن ثم فحصها مجهريا. تم استخلاص الحمض النووى منقوص الاكسجين للسلالات باستعمال طريقة الغليان. استخدمت طريقة تفاعل البلمرة المتسلسل المتعدد الإرسال للكِشف عن هذه الجيناتِ. اظهرتْ النتيجةُ وجود الجين *TEM* في خمسة من السلالات. وعدم وجود SHV و CTX-M في جميع السلالات موضوع البحث. وخلصت الدراسة إلى أن الجين *TEM* هو الاكثر شيوعا فى سلالات السراتية الذابلة. وان دراسات اضافية بعدد كبير من السلالات مطلوبة لاثبات هذه النتيجة.

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List of Abbreviations

BP	Base pair
CTX-M	Cefotaxime
DW	Deionized water
DNA	Deoxynucleic acid
dNTPs	Deoxynucleotide pyrimidines
DDD	Double Disc Diffusion
ESBLs	Extended Spectrum Beta Lactamases

$MgCL_2$	Magnesium chloride
NA	Nutrient Agar
PCR	Polymerase Chain Reaction
SHV	Sulfhydryl variable
TBE	Tris base Boric acid EDTA
TEM	Temoniera
TSI	Tri Sugar Iron
UTI	Urinary Tract Infection
UV	Ultraviolet Light
PBPs	Penicillin-binding proteins
OXA	Oxacillin