

UNIVERSITI TEKNOLOGI MARA

**CYTOTOXIC AND ANTIMICROBIAL ACTIVITIES OF *TRIGONELLA*
FOENUM-GRAECUM (FENUGREEK) SEED AQUEOUS EXTRACT AGAINST
HUMAN COLORECTAL CANCER CELLS AND URINARY TRACT
INFECTION (UTI) CAUSING BACTERIA**

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TABLE OF CONTENTS

TITLE PAGE	
APPROVAL SHEET	
ACKNOWLEDGEMENTS.....	i
TABLE OF CONTENTS	ii
LIST OF TABLE	v
LIST OF FIGURES.....	vi
LIST OF ABBREVIATION.....	viii
ABSTRACT.....	xi
CHAPTER 1	1
INTRODUCTION.....	1
1.1 Background of study.....	1
1.2 Hypothesis.....	4
1.3 Objectives.....	4
CHAPTER 2	5
LITERATURE REVIEW	5
2.1 Overview of cancer.....	5
2.2 Colorectal Cancer (CRC).....	6
2.2.1 Anatomical locations of CRC.....	6
2.2.2 Epidemiology.....	7
2.2.3 TNM Staging	7
2.2.4 Risk factors	9
2.2.5 Symptoms and Signs	11
2.2.6 Treatments	11
2.2.6.1 Surgery.....	11
2.2.6.2 Chemotherapeutic agents.....	12
2.3 Urinary Tract Infection (UTI)	14
2.3.1 Overview	14
2.3.2 Classifications of UTI	14

ABSTRACT

The issues of chemotherapy-induced side effects and increased bacterial resistance have given rise to needs for safer alternatives from natural sources. The present study assessed the both antimicrobial and cytotoxicity potential of *Trigonella Foenum-Graecum* (TFG) seeds aqueous extract. The extract was prepared by soaking it in distilled water for 24 h and before subjected to either direct freeze drying process or boiling and freeze drying process. The resultant extract was tested against Gram positive and negative bacteria by using Disc Diffusion Method. Blank discs impregnated with 10 μ l of extract (0.1 mg/ml-100 mg/ml) were placed on the surface of bacteria cultures and incubated for 48 h. Gentamicin, ampicillin and penicillin were included as positive controls. The anticancer effect of TFG seeds aqueous extract against HCT 116, a CRC cell line, was assessed using SRB assay. The cells were treated with 20 μ l of extract (1×10^{-5} mg/ml- 1×10^{-1} mg/ml) and incubated for 72 h. Results obtained were used to plot the dose-response curve from which IC_{50} was determined. 5-FU was included as positive control. The present study found that the aqueous extract was more selective towards Gram positive bacteria. The extract also inhibited HCT 116 in a dose dependent manner ($IC_{50} = 0.0027$ mg/ml). The positive controls, however, exhibited greater antimicrobial and cytotoxic activities. In conclusion, further study can be carried out by using another solvent to harness the full antimicrobial and anticancer potentials of TFG seeds extract.

CHAPTER 1

INTRODUCTION

1.1 Background of study

Chemotherapy plays important roles in treatment of bacterial infections and cancers. Its optimal use, however, is often limited by resistance (Isturiz, 2008). The development of resistant strains, for example, *Escherichia coli* (*E.coli*), has become an emerging problem to antimicrobial chemotherapy (Prakash & Saxena, 2013). Drug-resistant bacteria not only prevent the intended effect of antimicrobial agents, but may also lead to uncontrolled, widespread of bacteria transmission. The limited choice of antimicrobial agents has made the efforts of overcoming bacterial resistance even more daunting (Saga & Yamaguchi, 2009). On the other hand, cancer treated by chemotherapy may also develop multiple and complex mechanisms to evade the effects of anticancer drugs (Rebucci & Michiels, 2013). Apart from carcinogenic and teratogenic effects, existing cancer therapies affect both cancer and normal cells, giving rise to many unwanted side effects (Al-Oqail et al., 2013). As such, there is a dire need in identifying new chemotherapeutic drugs which can be used against resistant bacterial infection and cancers. Natural products can be seen as a promising alternative source for drug development (Dash, Sultana & Sultana, 2011). Indeed, medicinal plants have significant roles in providing new leads with therapeutic properties against these diseases (Gurib-Fakim, 2006).