
Contents

Contents	Page
I- Introduction	I
II- Review of Literature	1
2.1 Chamomile essential oil	1
2.1.1-Physicochemical properties	1
2.1.2-chemical composition.	2
2.1.3 -Antimicrobial activity	5
2.2 - Cumin essential oil	6
2.2.1 - Cumin volatile oil	6
2.2.2 - Cumin volatile oil separation	6
2.2.3 -Physicochemical properties.	6
2.2.4 -Chemical composition.	11
2.2.5 -Antimicrobial activity.	15
2.3- Lemongrass essential oil	19
2.3.1 -Physicochemical properties.	19
2.3.2 -Chemical composition.	21
2.3.3 -Antimicrobial activity.	26
III Materials and methods	33
3.1- Materials	33
3.1.1- Source of Chamomile, cumin and Lemongrass essential oil.	33
3.1.2- Microorganisms used in the antimicrobial study.	34
3.1.3 Media used.	34
3.2-Methods	36
3.2.1-Determination of physicochemical properties.	36
3.2.2-Gas liquid chromatographic analysis.	37
3.2.3- Determination of antimicrobial activity of essential oils.	39

Contents	Page
3.2.4 - Determination of minimal inhibitory concentration	39
IV-Results and Discussion	40
4.1- Chamomile essential oil.	40
4.1.1 - Determination of the physicochemical properties	40
4.1.2 - Determination of the chemical composition	43
4.1.3 - Antimicrobial activity.	48
4.2- Cumin essential oil	54
4.2.1-Determination of the physicochemical properties	54
4.2.2- Determination of the chemical composition	57
4.2.3- Antimicrobial activity	63
4.3- Lemongrass essential oil	69
4.3.1 - Determination of the physicochemical properties	69
4.3.2 - Determination of the chemical composition	72
4.3.3 - Antimicrobial activity.	77
4.4 - Conclusion of Antimicrobial activity of Chamomile, Cumin and Lemongrass oils	83
V-Summary	86
VI-References	93
VII-Arabic summary	