

TABLE OF CONTENTS

ABSTRACT (English)	p.1
ABSTRACT (Italian)	p.4
1. INTRODUCTION	p.7
1.1. Vancomycin-Resistant <i>Staphylococcus aureus</i> (VRSA), Vancomycin-Intermediate <i>Staphylococcus aureus</i> (VISA) and heterogeneous Vancomycin-Intermediate <i>Staphylococcus aureus</i> (hVISA)	p.9
1.2. Staphylococcal cell wall and mechanism of action of vancomycin and daptomycin	p.13
1.3. Phenotypic feature of VISA and hVISA strains	p.18
1.4. Molecular feature of VISA and hVISA strains	p.20
1.4.1. The role of accessory gene regulator locus in vancomycin resistance	p.21
1.4.2. The role of <i>graRS</i> in vancomycin resistance	p.26
1.4.3. The role of <i>walRK</i> (<i>vicRK</i> or <i>yycFG</i>) in vancomycin resistance	p.28
1.4.4. The role of <i>mprF</i> in vancomycin resistance.	p.30
1.4.5 The role of <i>dltABCD</i> operon in vancomycin resistance	p.33
1.4.6. The role of <i>atIA</i> , <i>lytM</i> and <i>sceD</i> in vancomycin resistance	p.34
2. AIM OF THE STUDY	p.38

3. MATERIALS AND METHODS	
3.1. Bacterial strains	p.39
3.2. MICs and Macro Etest	p.39
3.3. Population analysis profile/area under the curve analysis (PAP/AUC)	p.40
3.4. Molecular characterization	p.40
3.5. Autolysis ratio by Triton X-100 assay	p.41
3.6. Screening of δ -haemolysin activity on 5% sheep blood agar plates	p.41
3.7. RNA extraction, retro-transcription and quantitative real time RT-PCR	p.42
3.8. Sequencing and sequence analysis	p.46
4. RESULTS	
4.1. Phenotype and molecular characteristics of the strains	p.47
4.2. Total autolysis ratio and δ -haemolysin production	p.48
4.3. <i>graR</i> and <i>walK</i> mutations	p.48
4.4. Relative quantitative expression of autolytic, cell-wall charge and virulence regulator genes in drug-free conditions	p.48
4.5. Relative quantitative expression of autolytic, cell-wall charge and virulence regulator genes in presence of VAN or DAP	p.50
5. DISCUSSION	p.52
6. REFERENCES	p.60
7. TABLES	p.82
8. FIGURES	p.87