TABLE OF FIGURES

CHAPTER 1

1.1 SYSTEMATIC DIAGRAM OF FEMALE REPRODUCTIVE SYSTEM……...2

1.2 PROCESS OF OOGENESIS…….....4

1.3 FOLLICULOGENESIS…….……....5

1.4 REGULATION OF OVARIAN FUNCTION BY HYPOTHALAMUS-PITUITARY-OVARIAN (HPO) AXIS…….....7

1.5 COMPARISION BETWEEN HUMAN MENSTRUAL CYCLE AND RAT ESTRUS CYCLE……..8

1.6 STEROIDOGENESIS PROCESS IN OVARY……..10

1.7 TWO CELL THEORY OF ESTROGEN PRODUCTION……21

1.8 BLASTOCYST FORMATION AND IMPLANTATION DURING GESTATION PERIOD……21

1.9 VARIOUS CAUSES OF FEMALE INFERTILITY…….....23

1.10 PATHOPHYSIOLOGY OF POLYCYSTIC OVARIAN SYNDROME…….28

1.11PROPOSED CELLULAR MECHANISMS INVOLVED IN INSULIN-STIMULATED ANDROGEN BIOSYNTHESIS IN PCOS……..……31

1.12 INTRA-AND EXTRA-OVARIAN FACTORS ASSOCIATED WITH THE PCOS PATHOLOGY……...34

CHAPTER 4

4.3.1.A.EFFECT ON BODY WEIGHT IN LETROZOLE INDUCED PCOS RAT MODEL…….……..107

4.3.1.B. EFFECT ON ORAL GLUCOSE TOLERANCE TEST (OGTT) IN LETROZOLE INDUCED PCOS RAT MODEL……..…….107

4.3.1.C. EFFECT ON OVARIAN STRUCTURE IN LETROZOLE INDUCED PCOS RAT MODEL……...108

4.3.1.D. EFFECT ON OVARIAN STEROIDAL ENZYMES ACTIVITIES IN LETROZOLE INDUCED PCOS RAT MODEL…… ……...108

4.3.2 DOSE AND TIME DEPENDENT EFFECT OF ALOE VERA GEL (FRESH & FORMULATION) ON BODY WEIGHT…….……111

4.3.3 DOSE AND TIME DEPENDENT EFFECT OF ALOE VERA GEL (FRESH & FORMULATION) ON ORAL GLUCOSE TOLERANCE TEST (OGTT)…….……...113

4.3.4 DOSE AND TIME DEPENDENT EFFECT OF ALOE VERA GEL (FRESH AND FORMULATION) ON SERUM TOXICITY MARKERS…….…….....115

4.3.5.DOSE AND TIME DEPENDENT EFFECT OF ALOE VERA GEL (FRESH & FORMULATION) ON STEROIDOGENIC ENZYME ACTIVITY FOR 30 DAYS OF TREATMENT…….……120

4.3.6 DOSE AND TIME DEPENDENT EFFECT OF ALOE VERA GEL (FRESH & FORMULATION) ON STEROIDAL ENZYME ACTIVITY FOR 60 DAYS OF TREATMENT……...……121

4.3.7 Dose and time dependent effect of Aloe vera gel (Fresh & Formulation) on steroidal enzyme activity for 90 days of treatment……..……..122

4.3.8 Dose dependent effect of Aloe vera gel (Fresh) on Ovarian structure……...125

CHAPTER 5

5.1 Process of fertilization……134

5.2 Implantation of the blastocyst during implantation window…….....135

5.3 Steroidogenesis in feto-placental unit during pregnancy…….....137

5.3.1 Effect of Aloe vera gel on Uterine implantation enzymes activity in letrozole induced PCOS rat model……..……...145

5.3.2 Effect of Aloe vera gel on implantation in letrozole induced PCOS rat at early gestation……..……146

5.3.3 Effect of Aloe vera gel on ovarian steroidogenic enzymes activity in letrozole induced PCOS rat at early gestation…….....147

5.3.4 Effect of Aloe vera gel on Liver steroid metabolizing enzymes in letrozole induced PCOS rat at early gestation…….....148

5.3.5 Effect of Aloe vera gel on fetal development in letrozole induced PCOS rats at late gestation period……150

5.3.6 Effect of Aloe vera gel on steroidogenic enzymes activity in letrozole induced PCOS rats at late gestation……...……...152

5.3.7 Effect of Aloe vera gel on ovarian structure at late gestation period in letrozole induced PCOS rats……...……..154

5.3.8Effect of Aloe vera gel on Placental structure at late gestation period in letrozole induced PCOS rats…….154

5.3.9 Effect of Aloe vera gel on Liver steroid metabolizing enzymes in letrozole induced PCOS rat at late gestation…….....156

5.3.10Effect of Aloe vera gel on important steroidogenesis regulating genes in letrozole induced PCOS rats……...……..159

5.3.11Effect of Aloe vera gel on the expression of Steroid regulating protein in letrozole induced PCOS rats…….……161

5.3.12 Effect of Aloe vera gel on Serum Toxicity markers in letrozole induced PCOS rats…….……..162

CHAPTER 6

6.2.1 Photographic records of *Aloe barbadensis* Mill. and authentification certificate…….……176

6.3.1(a) Estimation of total sterols……..…….....179

6.3.1(b) Estimation of Total Flavonoids…….……..179

6.3.1(c) Estimation of Total Phenolics……..179

6.3.2 Fingerprint of Lupeol and Aloe vera gel……...181

6.3.3 HPTLC densitogram of Lupeol as an active chemical marker……181

6.3.4 Linearity of the method for estimation of lupeol…….....181

6.3.5 HPLC chromatograms of Aloe vera gel……..183

6.3.6 "Ex vivo" effect of Aloe vera gel on steroid enzyme activity in letrozole induced PCOS Rat model……185

6.3.7 Thin Layer Chromatography analysis of P1 fraction of Aloe vera gel….....186

6.3.8 HPTLC analysis of P1 fraction of Aloe vera gel……...186

6.3.9 HPTLC chromatogram of P1 Fraction of Aloe vera gel……..187

6.3.10 HPLC chromatogram of P1 fraction of Aloe vera gel……...188

6.3.11 GC chromatogram of the P1 fraction of Aloe vera gel……...……..190

6.3.12 Mass spectra of b Sitosterol separated in GC chromatogram at RT 35.16 min in the P1 fraction……..……191

CHAPTER 7

7.1 Structures of main plant sterols…….....197

7.3.1 Stability of P1 fraction of Aloe vera gel……...204

7.3.2 Effect of P1 fraction of AVG on Body weight in letrozole induced PCOS rats…….....205

7.3.3 Effect of P1 fraction of AVG on Oral Glucose Tolerance Test (OGTT) in letrozole induced PCOS rats……...……..206

7.3.4 Effect of P1 fraction of on Steroidogenic enzyme activity in letrozole induced PCOS rats……...……210

7.3.5 Effect of P1 fraction of AVG on Liver steroid metabolizing enzymes activities in letrozole induced PCOS rats…….212

7.3.6 Effect of P1 fraction of AVG on Ovarian histological changes in letrozole induced PCOS rats……213

7.3.7 Effect of P1 fraction on Transcript of key protein involved in regulation of Steroidogenesis in letrozole induced PCOS rats……...215

7.3.8 Effect of P1 fraction on protein expression involved in regulation of Steroidogenesis in letrozole induced PCOS rats……..……...216

TABLE OF TABLES

CHAPTER 1

1.1 TISSUE SPECIFIC EXPRESSION OF ESTROGEN RECEPTORS…….21

1.2 CURRENT THERAPIES AVAILABLE FOR MANAGEMENT OF PCOS…….40

CHAPTER 4

4.3.1 EFFECT ON ESTRUS CYCLICITY IN LETROZOLE INDUCED PCOS RAT MODEL….....107

4.3.2 QUALITATIVE ANALYSIS FOR STABILITY OF ALOE VERA GEL FORMULATION IN BATCH WISE MANNER……109

4.3.3 DOSE AND TIME DEPENDENT EFFECT OF ALOE VERA GEL (FRESH) ON INSULIN STATUS……114

4.3.4 DOSE AND TIME DEPENDENT EFFECT OF ALOE VERA GEL (FRESH & FORMULATION) ON ESTRUS CYCLICITY……...116

4.3.5 DOSE AND TIME DEPENDENT EFFECT OF ALOE VERA GEL (FRESH) ON STEROID HORMONAL PROFILE……..124

CHAPTER 5

5.3.1 EFFECT OF ALOE VERA GEL ON REPRODUCTIVE PERFORMANCE IN LETROZOLE INDUCED PCOS RAT AT EARLY GESTATION…….145

5.3.2 EFFECT OF ALOE VERA GEL ON FERTILITY PARAMETERS IN LETROZOLE INDUCED PCOS RATS AT LATE GESTATION PERIOD…….149

5.3.3 EFFECT OF ALOE VERA GEL ON HORMONAL PROFILE LATE GESTATION PERIOD IN LETROZOLE INDUCED PCOS RATS……..155

CHAPTER 6

6.3.1 QUALITATIVE ANALYSIS OF ALOE VERA GEL……177

6.3.2 CONCENTRATION OF PHYTO-COMPONENTS IN FRESH AND FORMULATED ALOE VERA GEL……...179

6.3.3 CALIBRATION CURVES, LIMIT OF DETECTION AND LIMIT OF QUANTITATION OF LUPEOL…….....181

6.3.4 PRECISION AND ACCURACY OF THE METHOD FOR ESTIMATION OF LUPEOL.....182

6.3.5 QUANTITATIVE ANALYSIS OF PHYTOSTEROL CONTENT IN ALOE VERA GEL BY HIGH PRESSURE LIQUID CHROMATOGRAPHY…….……183

6.3.6 QUALITATIVE TESTS FOR PARTIALLY PURIFIED COMPONENTS……...184

6.3.7 QUANTITATIVE ANALYSIS OF PARTIALLY PURIFIED ISOLATED FRACTIONS……...184

6.3.8 QUANTIFICATION OF THE PHYTOSTEROLS IN P1 FRACTION OF THE ALOE VERA GEL……...188

6.3.9 THE DETAILED INFORMATION ON THE PROBABLE PHYTOCHEMICAL CONSTITUENTS DETECTED IN THE P1 FRACTION OF ALOE VERA GEL……..192

CHAPTER 7

7.3.1 EFFECT OF P1 FRACTION OF AVG ON INSULIN STATUS IN LETROZOLE INDUCED PCOS RATS…….207

7.3.2 EFFECT OF P1 FRACTION ON LIPID PROFILE IN LETROZOLE INDUCED PCOS RATS……208

7.3.3 EFFECT OF P1 FRACTION OF ON HORMONAL PROFILE IN LETROZOLE INDUCED PCOS RATS……211