CHAPTER 2

AIMS & OBJECTIVES

2.1 RATIONALE OF THE STUDY

Polycystic ovarian syndrome (PCOS) is a heterogeneous collection of signs and symptoms which together form a spectrum of the disorder with mild/severe disturbance in reproduction, endocrine and metabolic functions. The pathophysiology of PCOS appears to be multifactorial and polygenic, which is contributed by intra and extra ovarian factors. Women with PCOS demonstrate decreased sensitivity to the feedback effects of gonadal steroids on GnRH secretion (Marshall and Eagleson, 1999). This causes an accelerated frequency of LH secretion from anterior pituitary (Barontini et al., 2001) resulting into abnormal steroid synthesis contributed majorly by ovarian theca cells (Huaton et al., 2014). Intrinsic anomaly of steroidogenesis reflects itself in causing follicular arrest which is evident by the presence of peripheral cysts in ovary. Biochemical alterations of ovarian function render its effect on metabolically active organs by causing insulin resistance, leading to metabolic syndrome.

With emphasis to above, current available mode of treatment for PCOS is by use of insulin sensitizers like metformin and ovulatory agent like clomiphene citrate (Leanza et al., 2014). But, these drugs have been reported for their side effects upon prolonged usage (Salpeter et al., 2003). Thereby, in current decade, research is directed towards alternative therapy to manage mainly hypoglycemia (Jain et al., 2004; Kamat, 2002; Musabayane et al., 2006; Tanaka et al., 2006)**.** In current era, researchers are exploiting the semi-arid xerophyte namely *Aloe vera.* It is enriched with phytocomponents like steroids (Cholesterol, lupeol, β sitosterol, stigmasterol) (Tanaka et al., 2006), alkaloids, polyphenols (Misawa et al., 2012)**,** vitamins, minerals, etc (Rajasekaran et al., 2004) which are responsible for its anti-tumor, anti-inflammatory, anti-oxidant, and laxative effects (Prabjone et al., 2006; Tamura et al., 2009). Several clinical and experimental studies have been demonstrated the hypoglycemic effects of *Aloe vera* (Botes et al., 2008; Rajasekaran et al., 2004; Yongchaiyudha et al., 1996). Additionally, there are some reports indicating role of *Aloe vera* derived extracts as a preventive agent against insulin resistance (Pérez et al., 2007) and dyslipidemia (Rajasekaran et al., 2006). In quest of active components that may be involved in hypoglycemic efficacy, it is shown that isolated phytosterols from *Aloe vera* gel have modulatory action that can prevent visceral

fat deposition by altering hyperglycemic, hyper-insulinimeic and insulin resistant state (Misawa et al., 2012; Misawa et al., 2008)**.**

As stated in Ayurveda, *Aloe vera* (popularly called as kumari-asava) helps to improve menstrual irregularities in reproductive age. Moreover, in Saurashtra region of Gujarat, many communities consume *Aloe vera* gel for the reproductive anomalies. However, scientific evaluation of *Aloe vera* gel for treatment of female infertility has not been attempted till date. In this regard, it would be interesting to examine the **role of *Aloe vera* gel in management of Polycystic Ovarian Syndrome (PCOS) and its associated complications.** Thereby, aim of current study was to *"Bio-prospect Aloe vera gel for female infertility"*.

2.2 OBJECTIVES

2.2.1. Objective 1: Effect of *Aloe vera gel* in letrozole induced PCOS rat model.

a) Development of PCOS rat model with the help of Letrozole (non-steroidal aromatase inhibitor).
b) Standardization of Dose and Time dependent effect of *Aloe vera* gel (fresh and formulated) in PCOS rat model.

2.2.2 Objective 2

Effect of *Aloe vera* gel on Reproductive parameters in PCOS rat model

2.2.3 Objective 3

Phytochemical analysis of *Aloe vera* gel.

2.2.4 Objective 4

Effect of Petroleum ether (P1-Non Polar) fraction of *Aloe vera* gel in PCOS rat model.

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