



Evaluation Of Ovulation Activity And Emmenagogue Activity Of Kandankathiri Legiyam In Letrozole-Induced Polycystic Ovarian Disease In Female Wistar Rats

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Abstract

Background

Polycystic ovarian disease (PCOD) is a common endocrine disorder characterized by chronic anovulation, hormonal imbalance, ovarian dysfunction, and menstrual irregularities. Traditional Siddha formulations have long been used in the management of reproductive disorders. Kandankathiri Legiyam is a Siddha polyherbal formulation traditionally indicated for gynecological conditions and menstrual disturbances.

Aim

The present study aimed to evaluate the ovulation activity, hormonal modulation, and emmenagogue activity of Kandankathiri Legiyam in letrozole-induced PCOD female Wistar rats.

Materials and Methods

Healthy adult female Wistar rats were selected and divided into four groups consisting of model control, standard control, low-dose treatment (200 mg/kg), and high-dose treatment (400 mg/kg). PCOD was induced by oral administration of letrozole (1 mg/kg) for 14 consecutive days. Following confirmation of PCOD by vaginal smear cytology and ovarian morphology, treatment was initiated. The standard group received clomiphene citrate (1 mg/kg), while treatment groups received Kandankathiri Legiyam orally for the remaining study duration. Vaginal smear

examination and serum hormonal estimation were performed on days 1, 15, and 28. Hormonal parameters including LH, FSH, progesterone, and estrogen were analyzed using ELISA and CLIA methods.

Results

Persistent diestrus phase and bilaterally enlarged ovaries confirmed successful induction of PCOD. Treatment with Kandankathiri Legiyam restored estrous cyclicity and improved reproductive hormone levels compared with the disease control group. The high-dose group demonstrated better normalization of LH and increased FSH, progesterone, and estrogen levels toward physiological values. Vaginal cytology findings revealed restoration of proestrus and estrus phases in treated groups by day 28.

Conclusion

Kandankathiri Legiyam demonstrated significant ovulation-inducing, endocrine modulatory, and emmenagogue activities in letrozole-induced PCOD female Wistar rats. The high-dose treatment showed superior therapeutic efficacy compared to the low dose.

Keywords: Kandankathiri Legiyam, Ovulation Activity, Emmenagogue Activity, Vaginal Cytology, Hormonal Assay, Wistar Rats

1. Introduction

Polycystic Ovary Syndrome (PCOS), also referred to as polycystic ovarian disease (PCOD), is one of the most common endocrine and metabolic disorders affecting women of reproductive age, with a global prevalence of approximately 8–13%, depending on the diagnostic criteria employed. It is characterized by chronic anovulation, hyperandrogenism, polycystic ovarian morphology, menstrual irregularities, infertility, obesity, insulin resistance, and metabolic abnormalities that significantly impair reproductive and overall health⁽¹⁻⁴⁾. The syndrome has emerged as a major public health concern because of its long-term reproductive, metabolic, and psychological consequences.

The pathophysiology of PCOS is multifactorial and involves complex interactions between genetic susceptibility, endocrine dysfunction, metabolic disturbances, and environmental factors. A characteristic endocrine abnormality is an increased secretion of luteinizing hormone (LH) relative to follicle-stimulating hormone (FSH), resulting in excessive ovarian androgen production, impaired follicular development, chronic anovulation, and menstrual dysfunction. Inadequate progesterone secretion secondary to anovulation and altered estrogen metabolism further disrupt the hypothalamic–pituitary–

ovarian axis, ultimately leading to cystic ovarian changes and infertility⁽²⁻⁵⁾.

Experimental animal models play a vital role in understanding the pathogenesis of PCOS and evaluating novel therapeutic agents. Among these, the letrozole-induced PCOS model in female Wistar rat is widely accepted because it closely mimics the endocrine, reproductive, and histopathological characteristics of human PCOS. Letrozole, a potent aromatase inhibitor, blocks the conversion of androgens into estrogens, thereby inducing hyperandrogenism, persistent diestrus phase, multiple ovarian cysts, elevated LH levels, reduced FSH concentrations, and disrupted estrous cyclicity^(6,7).

Current treatment strategies for PCOS include lifestyle modification, insulin sensitizers, ovulation-inducing agents, and hormonal therapy. Although these interventions improve symptoms, long-term treatment may be associated with adverse effects, recurrence, and limited restoration of normal ovarian physiology. Consequently, there is increasing interest in traditional herbal medicines as safer and effective alternatives for the management of reproductive disorders^(2,8).

Siddha medicine has been practiced for centuries in South India for the management of various gynecological disorders, including menstrual abnormalities and infertility. Kandankathiri

Legiyam is a classical Siddha polyherbal formulation traditionally prescribed to improve female reproductive health. The constituent herbs possess antioxidant, anti-inflammatory, endocrine-modulatory, and fertility-enhancing properties⁽⁹⁻¹²⁾. However, scientific evidence supporting its ovulation-inducing and hormonal modulatory effects in experimental PCOS remains limited.

Therefore, the present study was undertaken to evaluate the **ovulation activity** and **emmenagogue activity** of Kandankathiri Legiyam in letrozole-induced PCOS female Wistar rats.

IEC Approval

The Institutional Ethical Committee, Government Siddha Medical College, Chennai Reviewed And Approved The Study.

IEC No : GSMC-CH-1243/ME-II/092/2024

CTRI No: This trial was registered in Clinical Trial Registry India

CTRI No: CTRI/2025/05/087836

Acute oral toxicity:

The Organization for Economic Co-operation and Development (OECD) guidelines for testing of chemicals, No 425

IAEC Approval : MB/IAEC/25/02/09/A

2. Aim and Objectives

2.1 Aim

To evaluate the ovulation activity, hormonal modulation, and emmenagogue activity of Kandankathiri Legiyam in letrozole-induced PCOD female Wistar rats.

2.2 Objectives

- To induce PCOD in female Wistar rats using letrozole.

- To evaluate ovulation activity using vaginal smear cytology.
- To assess the emmenagogue activity of Kandankathiri Legiyam.
- To compare the efficacy of low-dose and high-dose treatment.

3. Materials and Methods

3.1 Test Substance

Details of the test substance provided by the sponsor are:

Test Substance Name : Kandankathiri legiyam

Purity : NA

Manufacturer : Sponsor

Batch No : Nil

Date of Manufacture : NA

Physical Appearance : herbal paste

Storage Conditions : 24±30 °C

3.2 Test System

Species : Rat (*Rattus norvegicus*)

Strain : Wistar

Body weight Range : 120±30g

Age : 4-8 weeks

Sex : Female

Animal Source : Mass Biotech.

Number of Animals : 12

Method of Identification : Colour code on body tail and cage in number

3.3 Experimental Animals

Healthy adult female Wistar rats with regular estrous cycles were selected for the study. Animals were maintained under standard laboratory conditions with controlled temperature, humidity, and light-dark cycle. Standard pellet diet and water were provided ad libitum.

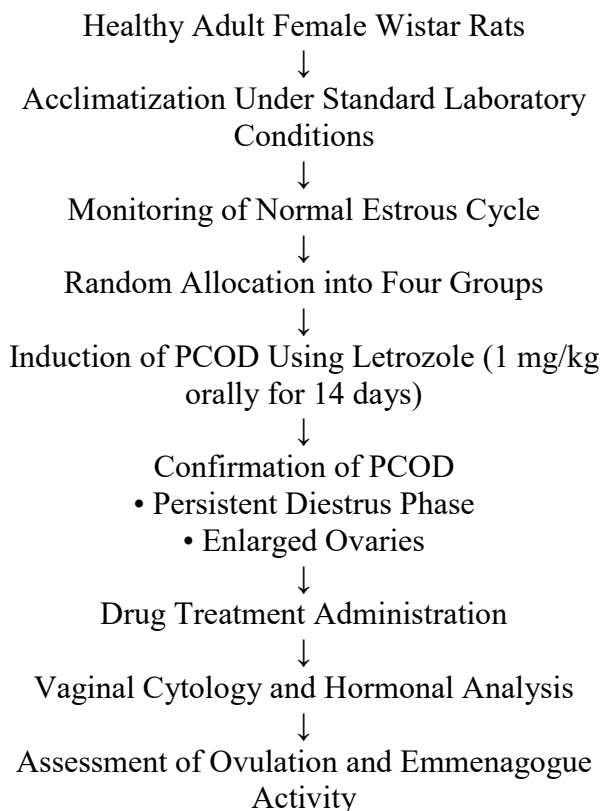
3.4 Experimental Design

Healthy adult Wistar rats were used in this study, with (n = 3) animals per group.

Animals were randomly divided into four groups:

- Group I – Model Control
- Group II – Standard Control (Clomiphene citrate 1 mg/kg)
- Group III – Kandankathiri Legiyam Low Dose (200 mg/kg)
- Group IV – Kandankathiri Legiyam High Dose (400 mg/kg)

Flow Chart of Experimental Design



Induction of PCOD

PCOD was induced by oral administration of letrozole (1 mg/kg) once daily for 14 consecutive days. Vaginal smear examination confirmed persistent diestrus phase. Gross pathological examination demonstrated bilaterally enlarged ovaries⁽¹⁸⁾.

Serum Collection Methodology

The animals were administered mild anesthesia using isoflurane prior to blood collection and the animals have been 4 hours fasting before blood collection. Blood samples were collected from the retro-orbital sinus using a heparinized

capillary tube under aseptic conditions. The collected blood was transferred into microcentrifuge tubes and centrifuged at 3,000 rpm for 5 minutes. Following centrifugation, the clear supernatant serum was carefully separated and stored for further biochemical analysis.

Estimation of Ovulation Activity

Ovulation activity was assessed through daily vaginal smear cytology. The estrous cycle phases were identified based on predominant cell types:

Proestrus – Nucleated epithelial cells
Estrus – Cornified epithelial cells
Metestrus – Mixed cornified cells and leukocytes
Diestrus – Predominantly leukocytes
Restoration of normal estrous cyclicity indicated recovery of ovulatory function.

Emmenagogue Activity

Emmenagogue activity was assessed by monitoring the duration and transition of estrous cycle phases. Reduction in prolonged diestrus phase and restoration of normal estrous cyclicity were considered indicators of emmenagogue activity.

Vaginal Cytology Method

Vaginal smears were collected using saline-moistened sterile cotton swabs. The swab was gently inserted into the vaginal canal and the collected sample was smeared onto a clean glass slide. Smears were fixed with methanol and stained using Swift Rapid Staining Kit. Slides were examined microscopically to determine estrous cycle phases⁽¹⁹⁾.

PCOD induction phase (1-14 days)

Group	Rat No	Dose (mg/kg b.wt.)	Route	Volume (ml/kg)	Concentration (mg/ml)	Treatment Day	N° of doses	Day of Sacrifice
1	3	1	Oral	10	1	14	1	15
2	3	1	Oral	10	1	14	1	-
3	3	1	Oral	10	1	14	1	-
4	3	1	Oral	10	1	14	1	-

Note : To check the induction of disease ,1 animal is terminal sacrifice is done in group 1

Treatment period (day 15 - 28)

Group. No	Rat No	Dose (mg/kg b.wt.)	Route	Volume (ml/kg)	Concentration (mg/ml)	Treatment Day	N° of doses	Day of Sacrifice
1	2	-	-	-	-	-	-	28
2	3	10	Oral	10	1	28	1	28
3	3	200	Oral	10	1	28	1	28
4	3	400	Oral	10	1	28	1	28

4. Results**Effect on Vaginal Cytology and Estrous Cycle**

Vaginal smear cytology was performed on days 1, 15, and 28 to evaluate estrous cycle alterations and ovulation activity.

On day 1, vaginal smears from all experimental groups predominantly showed nucleated epithelial cells and cornified epithelial cells, indicating normal estrous cyclicity prior to disease induction.

Following administration of letrozole for 14 consecutive days, all groups exhibited persistent diestrus phase characterized by predominance of leukocytes in vaginal smear cytology. This finding confirmed successful induction of PCOD and suppression of normal ovulatory activity.

At the end of the treatment period (day 28), the model control group continued to exhibit persistent diestrus phase, indicating continued reproductive dysfunction.

The standard control group treated with clomiphene citrate demonstrated restoration of

normal estrous cyclicity with reappearance of proestrus and estrus phases.

The low-dose treatment group showed partial restoration of estrous cyclicity with transitional cellular changes.

The high-dose treatment group demonstrated marked restoration of normal estrous cyclicity with predominant nucleated epithelial cells indicating re-establishment of proestrus phase and recovery of ovulatory activity.

Ovulation Activity

The restoration of estrous cyclicity in treatment groups indicated improvement in ovulation activity following administration of Kandankathiri Legiyam.

Persistent diestrus observed in the model control group suggested anovulation and endocrine dysfunction induced by letrozole. Treatment with Kandankathiri Legiyam shortened the prolonged diestrus phase and promoted restoration of normal estrous cycle progression.

The high-dose treatment group exhibited superior ovulation-inducing activity compared with the low-dose group, as evidenced by restoration of proestrus and estrus phases in vaginal cytology.

Emmenagogue Activity

The present study demonstrated significant emmenagogue activity of Kandankathiri Legiyam in letrozole-induced PCOD rats.

Administration of the test formulation promoted normalization of estrous cyclicity and reduced prolonged diestrus phase associated with PCOD pathology.

The high-dose treatment group showed greater efficacy in restoring reproductive cyclicity and promoting onset of proestrus phase compared with the low-dose group.

These findings suggest that Kandankathiri Legiyam possesses reproductive regulatory activity capable of improving menstrual and ovulatory dysfunction associated with PCOD.

Mortality

Animals were observed at least twice per day for mortality and morbidity.

Clinical Observations

Clinical observations were performed pre - treatment and at 30 minutes, 1, 2, 3 and 6 hour

Summary of Clinical Observations and Moralities

Observation	Group 1
Clinical signs	
Normal	3/3
Lethargy	0/3
Abdominal breathing	0/3
Piloerection	0/3
Mortality	0/3

after oral intubation on the day of dosing. Subsequently, the animals were observed once daily for 28 days after dosing.

Body Weight

All animals were weighed prior to dose administration (day 1) and on Day 7,14,21 and on Day 28 after dosing.

Feed Measurement

Feed for the animals were weighed and given on day 1 ,4,8,12,16,20,24 and on Day 28 after dosing.

Temperature

All animals were temperature value is measured by infrared thermometer of point of care company which measures up to range of (89°F-109°F) noted on Day 1,7,14,21 and on Day 28 after dosing.

Gross Pathology

On day 14, one animal from the disease model group was sacrificed for gross pathological examination, which revealed bilaterally enlarged ovaries with multiple cystic follicles, confirming successful induction of PCOD. At the end of the treatment phase, on day 28, animals from all groups were sacrificed, and gross examination of ovaries was performed.

Observation	Group 2
Clinical signs	
Normal	3/3
Lethargy	0/3
Abdominal breathing	0/3
Piloerection	0/3
Mortality	0/3

Observation	Group 3
Clinical signs	
Normal	3/3
Lethargy	0/3
Abdominal breathing	0/3
Piloerection	0/3
Mortality	0/3

Observation	Group 4
Clinical signs	
Normal	3/3
Lethargy	0/3
Abdominal breathing	0/3
Piloerection	0/3
Mortality	0/3

Appendix 1

Clinical Observations of Individual Animals

	Group 1			Group 2			Group 3			Group 4		
Rat No	1	2	3	1	2	3	1	2	3	1	2	3
Observation after initial hrs	0	0	0	0	0	0	0	0	0	0	0	0
i	0	0	0	0	0	0	0	0	0	0	0	0
ii	0	0	0	0	0	0	0	0	0	0	0	0
iii	0	0	0	0	0	0	0	0	0	0	0	0
*	0	0	0	0	0	0	0	0	0	0	0	0
Clinical observation days												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0

Key : i = observation made at 1 hr after oral dose, ii = observation made at 1 hr after oral dose, iii = observation made at 1 hr after oral dose, *=Observation made at 6h after oral dose, 0 =Normal body symptom in external sign

Appendix 2

Body weight and Body weight gain of Individual Animals

Group	Rat N ^o	#	Body weight (g) on day			
			7	14	21	28
Group 1	1	142	160	181	D	D
	2	123	137	158	174	196
	3	124	130	152	164	171
Group 2	1	122	139	159	166	184
	2	138	158	182	195	206
	3	133	160	194	206	214
Group 3	1	141	162	182	200	218
	2	131	152	173	183	193
	3	119	136	160	183	194
Group 4	1	159	197	230	250	268
	2	164	174	194	216	224
	3	138	150	165	170	176

Key :#=Before dosing(Day-0),

Appendix 3

Feed Measurement of Individual Animals

Group	Days	Feed input (g)	Feed remaining (g)	Feed consumed (g)	Feed consumed/ (animal/day) (g)
Group 1	1	400	400	0	0
	4	400	287	113	9.4
	8	400	250	150	12.5
	12	400	287	113	9.4
	16	400	223	177	14.7
	20	400	363	37	3
	24	400	206	194	16.1
	28	400	288	112	9.3

Group	Days	Feed input (g)	Feed remaining (g)	Feed consumed (g)	Feed consumed/ (animal/day) (g)
Group 2	1	400	400	0	0
	4	400	254	146	12.1
	8	400	210	190	15.8
	12	400	255	145	12
	16	400	294	106	8.8
	20	400	188	212	17.6
	24	400	218	182	15.1
	28	400	170	230	19.1

Group	Days	Feed input (g)	Feed remaining (g)	Feed consumed (g)	Feed consumed/ (animal/day) (g)
Group 3	1	400	400	0	0
	4	400	270	130	10.8
	8	400	230	170	14.1
	12	400	266	134	11.1
	16	400	215	185	15.4
	20	400	172	228	19
	24	400	219	181	15
	28	400	206	194	16.1

Group	Days	Feed input (g)	Feed remaining (g)	Feed consumed (g)	Feed consumed/ (animal/day) (g)
Group 4	1	400	400	0	0
	4	400	249	151	12.5
	8	400	204	196	16.3
	12	400	256	144	12
	16	400	100	300	25
	20	400	153	247	20.5
	24	400	199	201	16.7
	28	400	196	204	17

Appendix 4

Temperature of each rats in every group Fahrenheit (°F)

Group	Rats N°	Temperature on day (°F)				
		#	7	14	21	28
Group 1	1	96.2	97.7	96.4	D	D
	2	95.2	97.7	97.9	97.5	94.1
	3	96.4	94.9	95.4	97.5	96.1
Group 2	1	93.4	97.7	97.7	96.8	93.2
	2	93.2	97.0	96.2	97.2	91.7
	3	94.2	94.3	97.5	97.5	97.7
Group 3	1	96.4	97.3	97.7	96.3	95.2
	2	91.8	98.1	97.7	97.7	95.0
	3	94.8	98.3	97.2	97.7	97.7
Group 4	1	97.5	97.9	97.7	97.7	96.5
	2	97.4	97.9	93.2	97.7	95.4
	3	97.1	97.7	97.5	97.7	94.5

Vaginal smear cytology

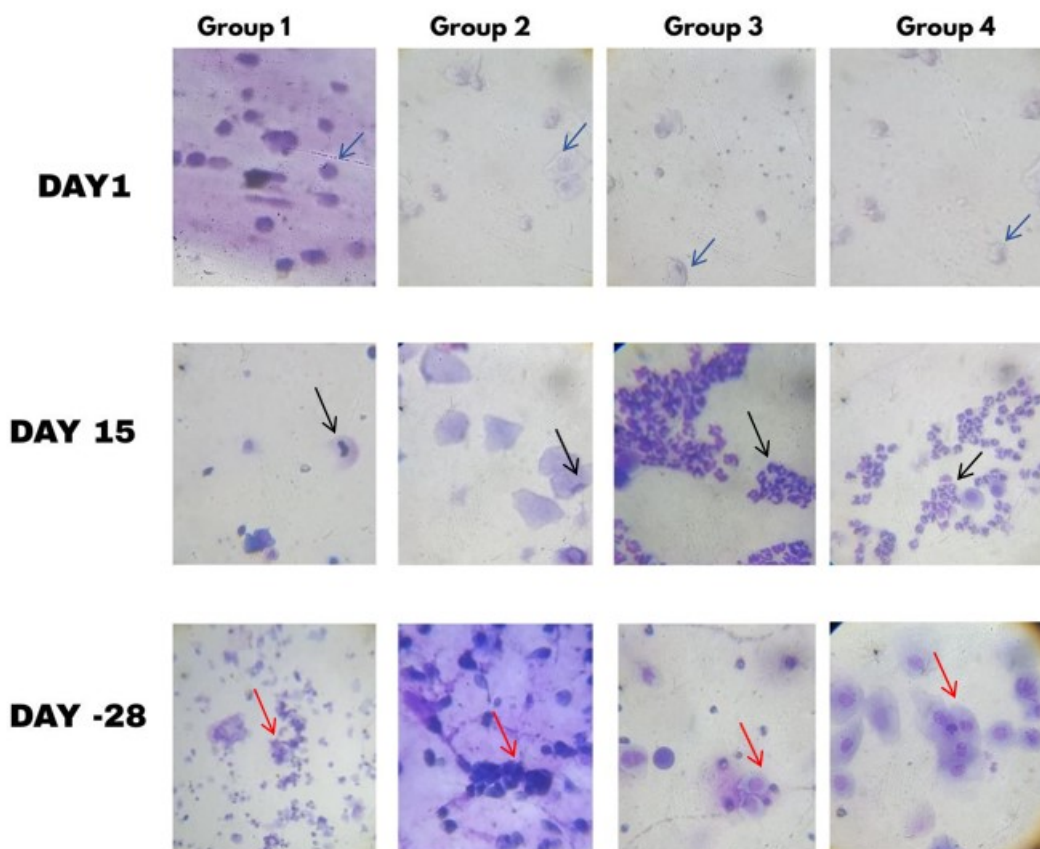


Figure A : the vaginal smear cytology of day 1,15,28 in group 1,2,3,4

Figure : Day 1 -Vaginal Smear Cytology

→ The blue arrow indicates the cornified cells (estrus cell cycle)

Day 1, vaginal smears from all four groups predominantly display nucleated epithelial cells, which are large, round to polygonal, and contain visible nuclei.

Group 1 shows a relatively high cellular density with well-stained nuclei, indicating an active phase of cell proliferation typical of proestrus.

Groups 2, 3, and 4 also show nucleated epithelial cells but with fewer numbers and slightly less dense staining, suggesting these animals may be in early proestrus or a transitional phase approaching estrus.

Figure : Day 15 Vaginal Smear Cytology –

→ The arrow represent - diestrus cells

Group (1,2,3,4)- the vaginal smears showing diestrus are characterized primarily by a predominance of leukocytes (white blood cells). These cells are small, round, and densely stained, often appearing scattered or in small clusters throughout the smear.

Figure : Day 28 vaginal smear cytology -

→ The arrow indicates the below representative cells

Group 1 shows many leukocytes, consistent with the diestrus phase, marking a period of quiescence in the reproductive cycle.

Groups 2 and 4 exhibit predominantly nucleated epithelial cells with distinct, large nuclei, indicating a proestrus phase where epithelial proliferation resumes.

Group 3 displays fewer cells overall but maintains a mixed population, possibly representing a transitional phase.

Appendix 5

Gross Pathological Findings of Individual Animals

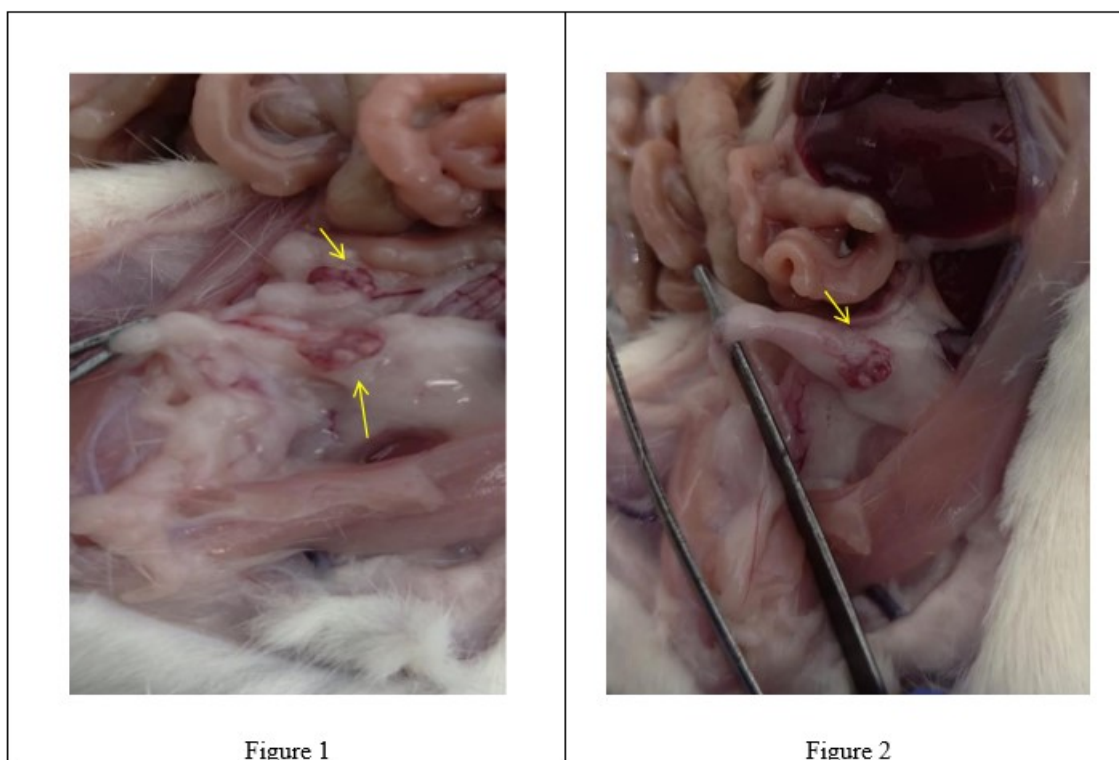
Group	Rat No	Mode of death	Gross Pathological Findings		
			External	Day	Internal
Group 1	1	TS	NAD	15	Enlarged ovaries , excesses fat deposit on ovaries site
	2	TS	NAD	28	Enlarged ovaries
Group 2	1	TS	NAD	28	NAD
	2	TS	NAD	28	NAD
Group 3	1	TS	NAD	28	Spleen Abnormal ,normal ovaries size
	2	TS	NAD	28	Normal ovaries size
Group 4	1	TS	NAD	28	Uterus is swollen ,ovaries white bumps
	2	TS	NAD	28	Uterus is swollen ,enlarged ovaries and white bumps

Key: F=Female, NAD=No abnormal , TS= terminal sacrifice

Gross Pathology of group 1



Gross pathology of rat group -1 rat 1- day 15

Gross pathology of rat 2-day 28



- The yellow arrow indicates the ovaries which is affected in rat 1 and rat 2 day 28.
- Figure 1 :** The surface of the ovary appears bumpy or nodular in structure which confirmed the PCOD is induced in all rats by day 15 gross pathology showing follicular cyst
- Figure 2 :** The surface of ovaries with white bumps describes the PCOD in rats on day28

Gross Pathology of group 2 at day 28

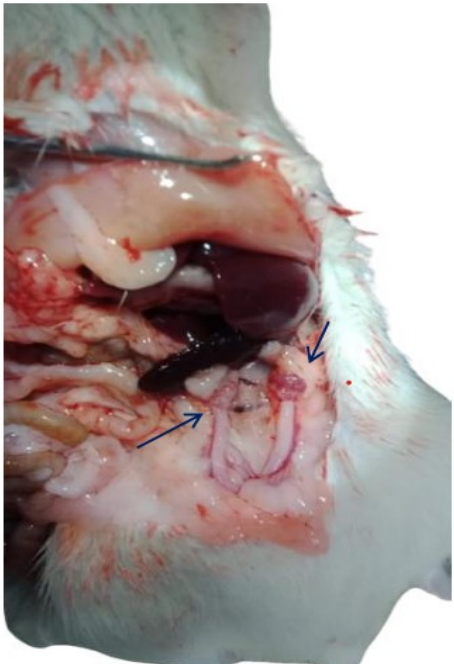
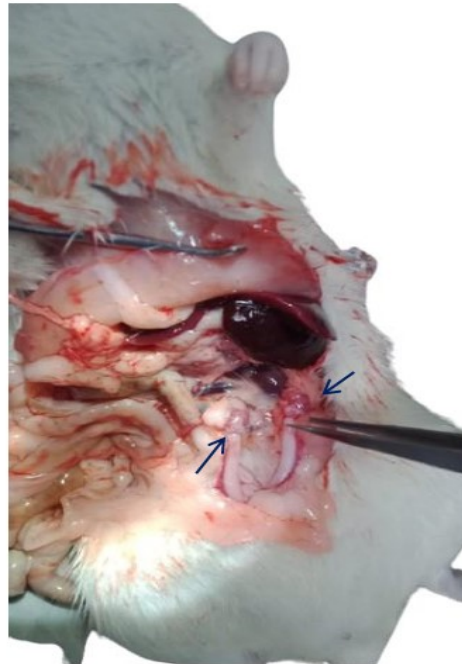
Gross pathology of rat 1	Gross pathology of rat 2
 <p data-bbox="108 757 215 795">Figure 3</p>	 <p data-bbox="821 734 933 772">Figure 4</p>

→ The arrow indicates the ovaries which is affected in rat 1 and rat 2 day 28.

Figure 3: Indicates the size of ovaries is reduced and doesn't have any white bumpy or nodular

Figure 4 : Indicates the size of ovaries is reduced and doesn't have any white bumpy or nodular

Gross Pathology of group 3 at day -28

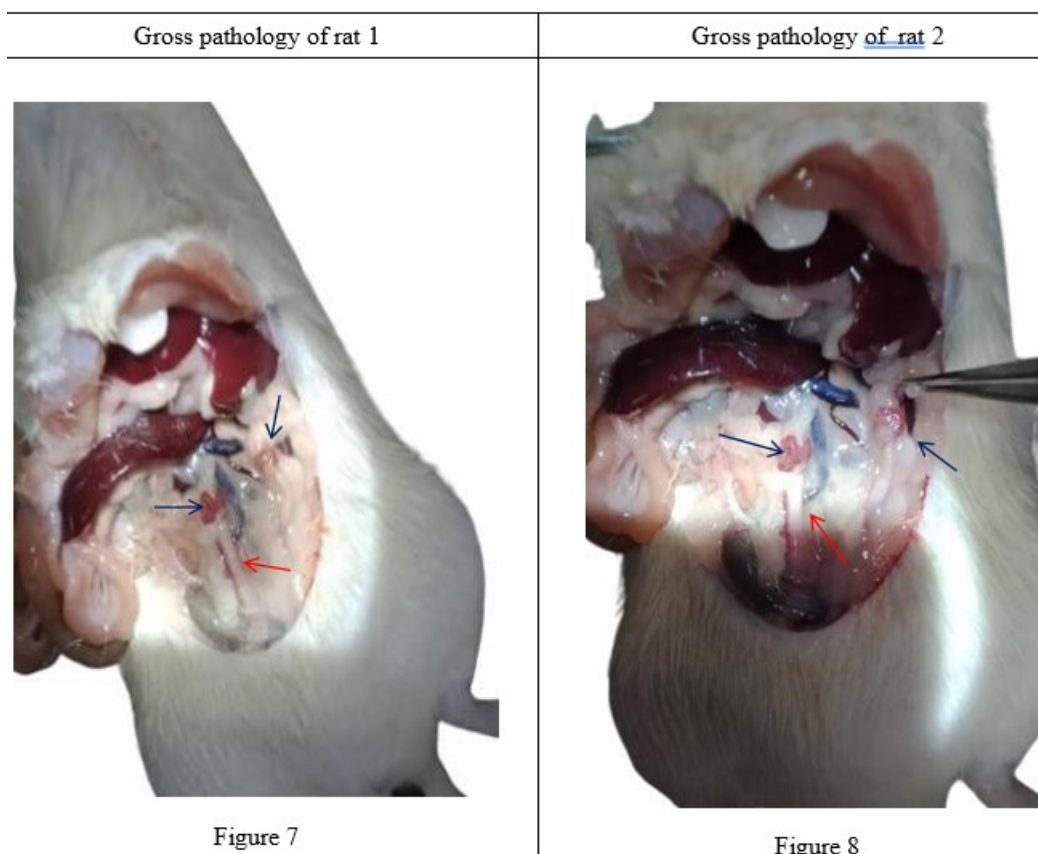
Gross pathology of rat 1	Gross pathology of rat 2
 <p data-bbox="446 1769 550 1803">Figure 5</p>	 <p data-bbox="877 1769 981 1803">Figure 6</p>

→ The arrow indicates the ovaries which is affected in rat 1 and rat 2 on day 28.

Figure 5 : Indicates the size of ovaries is reduced and have less white bumpy or nodular **Figure 6 :**

Indicates the size of ovaries is reduced and have less white bumpy or nodular

Gross Pathology of group 4 at day -28



→ The arrow indicates the ovaries

→ The arrow indicates the uterus

Figure 7 : the enlarged ovaries white bumps and the uterus also swollen

Figure 8 : the enlarged ovaries with multiple white bumps and uterus also swollen

Discussion

Polycystic ovarian disease (PCOD) is characterized by chronic anovulation, disrupted estrous cyclicity, follicular arrest, and endocrine dysfunction resulting from hyperandrogenism and altered hypothalamic–pituitary–ovarian (HPO) axis activity^(1,2). In the present study, letrozole administration successfully induced PCOD, as evidenced by persistent diestrus, irregular estrous cycles, reduced ovulation, and cystic ovarian changes. These findings are in agreement with previous reports demonstrating that aromatase inhibition by letrozole suppresses estrogen synthesis, elevates androgen levels, and interferes with normal follicular maturation and ovulation. Treatment with Kandankathiri Legiyam significantly restored normal estrous cyclicity in

PCOD-induced rats. The reduction in the prolonged diestrus phase and re-establishment of regular estrous stages indicate recovery of normal ovarian function. Restoration of the estrous cycle is considered a reliable marker of reproductive recovery because cyclic vaginal cytology reflects coordinated ovarian steroidogenesis and gonadotropin secretion^(4,5). These findings suggest that Kandankathiri Legiyam may normalize HPO axis function and promote physiological follicular development.

The ovulation-promoting activity observed in the treated animals further supports the therapeutic efficacy of Kandankathiri Legiyam. Compared with the disease control group, treated rats exhibited improved ovulatory function as evidenced by increased mature follicles and corpus luteum formation. The presence of corpus

lutea confirms successful follicular rupture and restoration of ovulation. Since chronic anovulation is the hallmark reproductive abnormality in PCOD, recovery of ovulatory activity represents an important therapeutic outcome.

The emmenagogue activity of Kandankathiri Legiyam may be explained by its ability to restore normal ovarian steroidogenesis and endocrine balance. In PCOD, arrested follicles fail to produce adequate estrogen, preventing ovulation and subsequent progesterone secretion. By facilitating follicular maturation and ovulation, Kandankathiri Legiyam appears to re-establish the physiological hormonal sequence necessary for regular reproductive cycles.

The beneficial effects may also be attributed to the phytochemical constituents of *Solanum xanthocarpum*, the major ingredient of Kandankathiri Legiyam. The plant is rich in steroidal alkaloids, flavonoids, saponins, and phenolic compounds possessing antioxidant and anti-inflammatory activities. Oxidative stress contributes significantly to follicular arrest and impaired oocyte maturation in PCOD; therefore, reduction of oxidative stress may improve ovarian function and enhance ovulation^(1,3).

Overall, the present findings demonstrate that Kandankathiri Legiyam effectively restored estrous cyclicity and ovulatory activity in letrozole-induced PCOD rats. These results provide experimental evidence supporting the traditional Siddha use of Kandankathiri Legiyam as an emmenagogue and ovulation-promoting formulation, warranting further mechanistic and clinical investigations.

Conclusion

The present study demonstrated that Kandankathiri Legiyam possesses significant ovulation-inducing, hormonal modulatory, and emmenagogue activities in letrozole-induced PCOD female Wistar rats. Treatment restored estrous cyclicity and improved reproductive hormone levels. The high-dose treatment exhibited better therapeutic efficacy compared to the low dose.

These findings scientifically support the traditional use of Kandankathiri Legiyam in female reproductive disorders and suggest its potential role in the management of PCOD.

Future Scope

Further studies including histopathological evaluation, molecular studies, toxicity profiling, and clinical trials are recommended to establish the therapeutic efficacy and safety of Kandankathiri Legiyam in PCOD management.

Acknowledgement

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Conflict of Interest

The authors declare no conflict of interest.

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