



RESEARCH ARTICLE

PHARMACEUTICS

**EVALUATION OF ANTI IMPLANTATION AND ABORTIFICIENT PROPERTIES OF  
*PORTULACA OLERACEA* L. IN ALBINO RATS****RAMESH LONDONKAR\*<sup>1</sup> AND HANUMANTAPPA. B. NAYAKA<sup>1</sup>,**<sup>1</sup> Department of Biotechnology, Gulbarga University, Gulbarga Karnataka, India**RAMESH LONDONKAR**

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**ABSTRACT**

The present study was aimed to evaluate the effect of *Portulaca oleracea* L on fertility of female albino rats. Albino rats were orally administered with Petroleum Ether, chloroform and Ethanol crude extracts of aerial part of *Portulaca oleracea* L in both high and low dose (500mg and 250 mg / kg of body weight / day, for 7 days), and effect of crude extract on Anti implantation and Abortifacient activity was investigated. The treatment of petroleum ether crude extract has shown 20% and 30% reduction in implantation activity at low (250) and (500) high doses respectively. In case of chloroform and Ethanol crude extracts, the chloroform extract has shown 50% and 60% reduction in implantation activity at low and high doses respectively, whereas Ethanolic crude extracts have shown 40% and 50% reduction in implantation sites with respect to low and high dose of extract treatment. Ethanolic crude extract treatment has shown abortifacient activity but the petroleum ether and chloroform extract treatment to pregnant rats did not show any abortifacient activity.



## KEY WORDS

*Portulaca Oleracea L*, Anti implantation, Abortifacient

## INTRODUCTION

The control of population growth is very important in populated countries like India and China and hence control is an issue of global and national public health concern. Current methods of contraception result in an unacceptable rate of unwanted pregnancies and having side effects also. Thus there is a need to replace these agents by safe and effective agents such as plant based contraceptive agents. Many plants / plant extracts have been used as antifertility agents in folklore and traditional medicines without producing apparent toxic effects<sup>1</sup>. The rapid rise in population has caused serious problems in the economic growth and all-round human development in developing countries. The family planning has been promoted through several methods of contraception, but due to serious adverse effects produced by synthetic steroidal contraceptives (3) attention has now been focused on medicinal plants for possible contraceptive effect. In this present research work, we screened *Portulaca Oleracea L* for anti implantation and Abortifacient effects in female albino rats. *Portulaca Oleracea L* is an annual, prostrate or spreading, succulent, branched herb of the *Portulaca* family, quite glabrous, 10-50cm long. The stems are often purplish. The leaves are fleshy and flat, obtuse, oblong – obovate, base conata, 1 to 2.5 cm long flowers are sessile, axillary and terminal, few – flowered heads, the heads solitary or cymose, the buds compressed. Petals, five, yellow, about as long as the sepals stamens are 8-12 number. The entire plant of *Portulaca Oleracea L* have been reported to have medicinal properties via., Anti-diabetic, anti ulcer, anticancer, antiviral, antimicrobial etc.(Medicinal plants of world Ivan

A Ross) Keeping all these above reports in view, we have screened this plant for anti implantation and Abortifacient activities in female albino rats.

## MATERIAL AND METHODS

### *Plant material*

The fresh healthy aerial parts of *Portulaca Oleracea L* were collected from the plants grown in Gulbarga University camps. These were shade dried and powdered. About 500g of powder was successively hot extracted with petroleum ether, chloroform and ethanol. The solvents were removed by distillation under reduced pressure and then crude extract so obtained were dissolved in 1% Tween 80 for administration to Rats.

### *Preparation of extract*

The plant material was dried in shade, ground and extracted with petroleum ether or chloroform or ethanol by soxhlet extraction. The extracts were taken and solvent was evaporated at room temperature.

### *Animals*

Adult Swiss albino female rats weighing 120-150g were used in these investigations. The rats were maintained under hygienic conditions in well ventilated room with temperature maintained  $25^{\circ} \pm 2^{\circ}C$ . All the animals were fed twice a day with animal pellet feed (Hindustan Lever Limited, Mumbai) and also supplemented either with bread, spinach leaves, soaked black grams or dahlia. The tap water was provided ad libitum. Animals in each group were housed in polypropylene cages. General body weight of



the animals was monitored regularly during the entire tenure of the experiment. Animals were maintained according to the guideline of institutional animal ethics committee.

### **Acute toxicity**

Dose fixation was carried out by staircase method on Swiss albino fend keys (120-150g). All the 3 different solvent extracts of *Portulaca Oleracea L* were homogenized in Tween 80(%) and dissolved in distilled water; they were administered to rats orally by means of intragastric catheter. It was observed that none of the extracts were found to be lethal even at the dose of 20,000 mg / kg body weight. Hence 250mg / kg and 500mg / kg body weight of the crude extracts was fixed as the low and high doses respectively.

### **Anti implantation and abortifacient studies:**

Anti implantation and Abortifacient activity were determined following the method of Khanna and Chowdhury. Female rats of estrus phase were kept with male rats of proven fertility in the ratio of 2:1. The females were examined for vaginal sperms the animals which showed thick clumps of spermatozoa in vaginal smears were segregated from the male partner and divided into 7 groups each group containing 6 animals. The day when spermatozoa were detected in the vaginal smear was considered as day 1 of pregnancy.

### **To evaluate the Anti implantation activity**

An effective doses of 250mg / kg body weight and 500mg / kg of body weight of petroleum ether, chloroform and ethanol extracts dissolved in 1% Tween 80, were orally administrated daily to members of the 7 groups through catheter tube as shown in table -1 for 7 days starting on day 1 of pregnancy to seventh day .On day 10 of pregnancy, all the animal were laprotomised under light ether anesthesia and sterile

conditions. Both uterine horns were examined for number of implants which were recorded.

### **To evaluate the Abortifacient activity**

Where in case of to Evaluation of Abortifacient activity, an effective doses of 250mg / kg body weight and 500mg / kg of body weight of petroleum ether, chloroform and ethanol extracts dissolved in 1% Tween 80, were orally administrated daily to members of the 7 groups through catheter tube as shown in table -2 for 7 days starting on day 7 of pregnancy to 14 day .On day 15 of pregnancy, all the animal were laprotomised under light ether anesthesia and sterile conditions. Both uterine horns were examined for number of abortifacient sites which were recorded.

### **Statistical analysis**

The results are expressed as mean  $\pm$  S.D. Data were statistically analyzed by one-way analysis of variance. Sequential differences among means were calculated at the level of  $p < 0.05$ .

## **RESULTS**

Various extracts of *Portulaca Oleracea L* was evaluated for anti implantation activity. The petroleum ether extract at the dose 250mg / kg and ethanol extract at the dose 250mg / kg body weight has not prevented the implantation significantly. But 50% of implantation sites are reduced significantly with administration of chloroform extract at both 250mg / kg and 500mg / kg body weight and also ethanol extract at 500mg / kg body weight as shown in table 1. The study on abortifacient activity indicates that the ethanol extract at both 250mg / kg and 500mg / kg body weight have shown Abortifacient activity. But both low and high doses of petroleum ether and chloroform extracts are non – effective in Abortifacient activity when compared with control group. The Abortifacient



activity induced by ethanol extract in the rats was represented by the presence of placental scars and placentomas in all the cases.(Table1,2) and (Graph.1)

**Table 1**  
**Effect of Petroleum ether, Chloroform and Ethanol crude extracts of *Portulaca Oleracea L* for anti implantation activity due to oral administration for 7 days in female albino rats**

Group No.,	1	2	3	4	5	6	7
Treatment	Control (% Tween 80)	Petroleum Extract	Petroleum Extract	Chloroform extract	Chloroform extract	Ethanol extract	Ethanol extract
Dose, mg/kg body weight	0.5ml	250mg	500mg	250mg	500mg	250mg	500mg
No.of implantation sites	12.33±0.88	10.67±0.32	7.67 ±0.05	6.00±0.00*	5.66±0.01*	8.33±0.02	6.66±0.04*

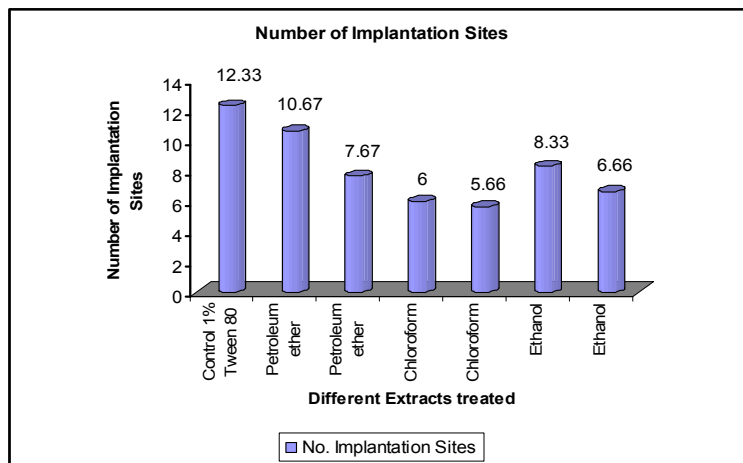
*The values are expressed as Mean ± SD six animals (n=6) per group*  
*\* indicates statically significant at p < 0.05.*

**Table 2**  
**Effect of Petroleum ether, Chloroform and Ethanol crude extracts of *Portulaca Oleracea L* for Abortifecient activity due to oral administration for 7 days in female albino rats**

Group No.,	1	2	3	4	5	6	7
Treatment	Control (1% Tween 80)	Petroleum Extract	Petroleum Extract	Chloroform extract	Chloroform extract	Ethanol extract	Ethanol extract
Dose mg/kg body weight	0.5ml	250mg	500mg	250mg	500mg	250mg	500mg
No.of implantation sites	-	-	-	-	-	12.33±0.88	12.33±0.99*

*The values are expressed as Mean ± SD six animals (n=6) per group*  
*\* indicates statically significant at p < 0.05.*

**Graph. 1.**  
**Showing anti implantation activity of Petroleum ether, Chloroform and Ethanol crude extracts of *Portulaca Oleracea L.***



## DISCUSSION

Many crude extracts and active principles derived from medicinal plants were evaluated for their antifertility effects in animal models. The floral extract of a plant, *Thespesia populnea* was studied by Kavimani et al and was reported to have antisteroidogenic activity in female albino mice<sup>6</sup>. The chemical examination of flowers revealed the presence of flavones and its glycoside viz., kaempferol, gossypetin and kavempferol 3-o-glucoside. Further more, the seeds of this plant contained thespesin<sup>(7)</sup>. Gossypol was reported to be present in the bark and fruit and this has already been found to have anti implantation activity in female rats<sup>(10)</sup>. In the present study the reports of the preliminary anti implantation activity of 3 different solvent extracts of *Portulaca Oleracea L* autopsy on day 10 revealed that all the control rats (treated with a vehicle of 1% Tween 80) were pregnant and had a normal number of implantations and normal

duration of diestrus. On treatment with chloroform extract at both 250mg / kg and 500mg / kg body weight and ethanol extract at 500mg / kg body weight was found that the number of implantation uteri horns decreased 50% significantly. The petroleum extract at 250mg and 500mg / kg body weight and ethanol at 250mg kg body weight was found to have no such effects. This loss of implantation caused by the crud extract may be due to anti zygotic, blastocyt toxic or anti implantation activity as described by Hafez<sup>(14)</sup>. The phenomenon of implantation and maintenance of early pregnancy is critical and complex in mammals. Many methods and agents have been developed to inhibit the process by impairment of the phenomenon, either at the tissue level either naturally or through the agents involved.

Among the three extracts of *Portulaca oleracea L* studied for their anti implantation



activity, the petroleum ether extract at two level i.e., 200 and 400mg / kg body weight was found to be the most potent in reducing the mean no. of implantation sites to  $7.5 \pm 0.96$  and  $1.5 \pm 0.64$  respectively with respective percent inhibition of implantation to 34.78 and 87.24. However, the Chloroform extract at both the dose level of 200mg 400mg / kg body weight was found to be effective in reducing the respective mean no of implants to  $10.25 \pm 0.75$  and  $5.4 \pm 2.20$  with respective percent inhibition of implantation to 12.77 and 54.04.

In the present investigation among all the three solvent extracts of *Portulaca Oleracea L* only ethanol extract of both 250mg / kg and 500mg / kg body weight have shown Abortifacient

activity. The petroleum ether and chloroform extracts was not found to have no such effects on the Abortifacient sites. The Abortifacient activity of ethanol extract of *Portulaca oleracea L* is mainly due to its estrogenic activity which imbalances the required progesterone and estrogen ratio. High dose of estrogen disproportionate to progesterone leads to resorption of features (Sindgi-1975).

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