INTRODUCTION
Polycystic ovary syndrome (PCOS) is a very common endocrine disorder among women in their reproductive age (Carmina E et al.1999, Teede H et al, 2010). Polycystic ovary syndrome is associated with reproductive and metabolic disorders which includes infertility, hyperandrogenism, luteinizing hormone (LH) hypersecretion, low levels of Estradiol and Progesterone, polycystic ovaries, insulin resistance and dyslipidemia, with an increased risk of cardiovascular disease and diabetes mellitus. (Strowitzki T et al., 2010; Rajasekaran S. et.al2005). Women with PCOS may have underactive thyroid gland, causing hypothyroidism (Archana Shirsath, et.al, 2015). Often the treatment of PCOS is brought to nearly normal levels by Omega-3 fatty acid present in the sardine oil and krill oil thus showing its potential effect and an alternative to metformin in treating PCOS.

MATERIALS AND METHOD
Sixty Wistar albino female rats weighing 150g-200g were procured from Haffkine Biopharmaceuticals limited, Parel, Mumbai. All the animals were weighed and their health was verified. They were divided into 5 groups, each comprising of 6 rats. Animals were acclimatized for 7 days under laboratory conditions prior to initiation of study. They were housed in well-ventilated cages under standard environmental conditions (25 ± 2°C, 45 - 55% relative humidity, and 12 h dark/light cycle and ventilated cages under standard environmental conditions (25 ± 2°C, 45 - 55% relative humidity, and 12 h dark/light cycle).

EXPERIMENTAL PROTOCOL
Oral dose of Letrozole was given for inducing PCOS in experimental animals, the dose was made at the concentration of 1.0 mg/kg body weight dissolved in 1% Carboxymethyl Cellulose (CMC), 2.0 ml/kg of dose was administered once daily for a period of 21 days (Kafal, et al., 2004) and during the experimental period the vaginal smear was collected daily to study the estrous cycle. After inducing PCOS in rats for 21 days the animals were treated with Sardine oil and Krill oil, 240 mg /kg/orally/daily (Ouladsahebmadarek E. et al.,2014) for 30 days and 60 days respectively and one group was treated with Metformin drug for comparative studies.

RESULT
In letrozole induced PCO rats, levels of FSH, LH and Testosterone showed an increase but after the treatment with fish oil and shell fish oil, their levels decreased. Whereas Estrogen Progesterone and TSH levels were observed to be low, which was elevated after the treatment with fish oil. Similar results were observed in rats treated with Metformin. The animals treated for prolonged period of 60 days showed better results as compared to 30 days. Figure 1, 2, 3, 4, 5 and 6 shows the hormone levels after the treatment for 30 days and 60 days. The present study was undertaken to determine the effect of sardine oil and krill oil in the treatment of letrozole induced PCOS in Wistar albino female rats on Follicle Stimulating Hormone, Luteinizing Hormone, Thyroid Stimulating Hormone. Estradiol, Progesterone and Testosterone. The rats were induced PCOS with letrozole for 21 days and treated with fish oil, shell fish oil and Metformin for 30 days and 60 days. The results showed that the hormone levels altered after the treatment. Hence, it may be concluded that the hormonal fluctuation caused in PCOS was brought to nearly normal levels by Omega-3 fatty acid present in the sardine oil and krill oil thus showing its potential effect and an alternative to metformin in treating PCOS.

Figure1: Effect of fish and shell fish oil on Estradiol (ES), Progesterone (Pg) and Testosterone (T) along with group –V treated with Metformin treated for 30 days.
the present study fish (Sardine oil) and shell fish oil (Krill oil) was used for the treatment of PCOS. Earlier studies (Desai et al., 2012; Jadhav et al., 2013) reported that in nearly 80% of PCOS patients, the testosterone levels increase. Similar results were observed in the present study where both testosterone and LH levels increased causing Hyperandrogenism, key feature of PCOS. Estrogen levels were found to be reduced in PCO induced group which results in increasing levels of LH by weakening the negative feedback mechanism on the LH production in the pituitary gland, which in turn further stimulates theca cells to secrete testosterone (Kafali et al., 2004). The elevated levels of testosterone and LH decreased when treated with metformin, and it lowered the levels of androgens. Treatment with fish oil and shell fish oil showed similar result and marked improvement was observed in the animals treated for 60 days. Levels of testosterone and LH reduced to nearly normal levels. Higher levels of FSH was observed which is caused due to impairment of ovarian folliculogenesis, after the treatment with fish oil and shell fish oil the hormone levels decreased. Group-III which was treated with Sardine oil exhibited better results as compared to Krill oil. It could be said that the Omega-3 brought about the anti-androgenic effect and helped in normalizing the alteration of hormones in induced rats. The present study may provide a baseline data for further investigation on therapeutic benefits of fish oil and shell fish oil in management of PCOS.

CONCLUSION
Owing to the ever-increasing incidences of PCOS in the population during their reproductive age is one of the most common endocrine disorder. There is a need to find out an alternative therapeutic agent instead of the drug which are prescribed for the treatment of PCOS which after prolonged use results in various side effects. It may be concluded that fish oil and shell fish oil may be used as an alternative to drugs for treating PCOS.

REFERENCES
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