INTRODUCTION

Most of the traditional system of medicine use Herbal medicine. Since the early human existence, plants have been used for human welfare either by intuition or by trial and error. However, the scientific evidence to ensure the safety and quality and to establish the mechanism of these herbal drugs is lacking. Only research can discard the fanciful and emotional claims of herbal drugs and can reaffirm the usefulness of tradition herbal remedies.\textsuperscript{1-3}

There is tremendous advance in the modern medicine. But they are associated with certain limitations. Safety and cost have been a major concern while using modern medicines. So, herbal medicines are more acceptable especially in developing countries. In India, herbal medicines are very popular even though many of them are without scientific justification. There are a number of plants used by human beings from ancient times for treatment of diseases. However, scientific research is needed to provide more evidence on their efficacy and safety.\textsuperscript{1-3}

The population in the developed countries like UK, Germany, France, and Sweden is stabilized as the birth rate and death rate are almost equal. In developing countries like India, Pakistan, Bangladesh etc. the birth rate is three times more than the death rate.\textsuperscript{4} In India, the population was growing at the rate of 1.5\% in the last decade. About 18 million people are added every year to the population of India.\textsuperscript{5} The population explosion creates a number of problems in food, shelter, water, education, employment, and health care etc. So, not only India but whole world needs necessary steps to control the growth of human population.\textsuperscript{6}

Population control is important for individual and national welfare. The search for oral contraceptive agents which control human fertility is an old history record. Many countries have already banned the use of hormonal contraceptives because of its carcinogenic effects. The cost of many synthetic and semi synthetic oral contraceptive
agents available in the market for fertility is increasing day by day and in many cases it cannot fulfill the health care needs of people in developing countries.\textsuperscript{7}

Since last few decades, most of the research efforts were concentrated on the discovery of oral contraceptives from the synthetic source and no attention was paid to the herbal drugs, although plants are the rich source of bioactive phytoconstituents.\textsuperscript{8} The synthetic drugs or steroidal contraceptive pills for fertility control show serious adverse effects like gastrointestinal disturbance, depression, hypertension, painful uterine contraction, increased risk of cancer, weight gain and hormonal imbalance.\textsuperscript{9} So, there is need of herbal contraceptives which is not only efficacious but also safe and economic.

A number of plants from Indian origin have been experimentally tested for their antifertility activity, and out of 318 different plants used worldwide, 227 plants are of Indian origin. Approximately, 74 plants have been screened scientifically for their antifertility activity and 48 of them have been found to be effective.\textsuperscript{10}

The people of Rarrh region of West Bengal are rich in ethnomedicinal knowledge. This Rarrh region is the extended part of Chhotonagpur plateau and consists of seven districts namely Bankura, Birbhum, Burdwan, East Midnapur, Murshidabad, Purulia and West Midnapur. There are 46 plant species documented to be possessing ethnomedicinal value.\textsuperscript{11} There are still more number of plants with ethnomedicinal value which have not been documented yet. We have selected one such plant \textit{Avicennia alba} Blume (Family- Avicenniaceae/Acanthaceae) in the present study.

The mangrove plant, \textit{Avicennia alba} Blume is available in mangrove forest of saline water in southeast Asia.\textsuperscript{12} Traditionally this plant has been used as contraceptive agent.\textsuperscript{13,14} This plant is used in asthma, ulcer, snake-bites and skin diseases in traditional system of herbal medicine of India.\textsuperscript{15,16} There are folklore claims regarding antifertility activity of aerial parts of this plant in the Rarrh region of West Bengal. However, there is no previous scientific report of its antifertility effect. Again there are some other folklore claims on antimicrobial and analgesic activity of this plant in the Rarrh region of West Bengal.
The present study was thus undertaken with following objectives:

1. To evaluate the antifertility effect of *Avicennia alba* Blume in female rats.

2. To characterize the chemical constituents.

3. To explore the possible mechanism of antifertility activity.

4. To evaluate the safety.

5. To evaluate other biological activities (if any)

The plant extracts were compared with Ethinyl estradiol to evaluate their antifertility effect. Chromatography and spectral techniques were used to characterize phytoconstituents. In vivo female rat models and Bioinformatics tools were used to explore the possible mechanism. Acute toxicity study was done to evaluate safety. Suitable models were used to assess other biological activities.