Short Communication

**In vitro effect of Aegle marmelos on human sperm motility**

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Plants have served as a natural source of anti-fertility substances. The present study is aimed at investigating the anti-fertility potential of *Aegle marmelos* (Rutaceae) leaves. *A. marmelos* is a medicinal plant whose leaves are claimed to be useful in the treatment of spermatorrhoea. Various concentrations of the ethanol extracts of leaves of *A. marmelos* were investigated for their in vitro effect on sperm motility. It was found that the extracts had a considerable effect on the motility of sperm.

**Key words:** Sperm viability, *Aegle marmelos*, male contraception, bael.

**INTRODUCTION**

Sperm motility describes the ability of sperm to move properly towards an egg. This can also be thought of as the ‘quality’ of the sperm, which is a factor in successful pregnancies, as opposed to the ‘quantity’. Sperm which do not properly ‘swim’ will not reach the egg in order to fertilize it. Sperm motility is an important factor in semen quality. Insufficient sperm motility is a common cause of subfertility or infertility.

Several plant products inhibit male and female fertility and may be developed into contraceptives. Even though many indigenous plants have been shown to prevent birth, only few plants have so far been investigated for their anti-fertility activity (Kamboj, 1988). Since the last decade, efforts have been made to work on other areas such as spermicidal agents. Herbal preparations have been tested for spermicidal action in a number of countries (Singh et al., 1998).

*Aegle marmelos* Corr. (bael) is a popular medicinal plant and cosmopolitan in distribution. All parts of this plant, viz., root, leaf, trunk, fruit and seed, are used for curing one human ailment or another. Studies have reported that 50% ethanolic extract of the leaves of *A. marmelos* inhibited the elevation in serum cholesterol and triglycerides levels on hyperlipidaemic rats (Vijaya et al., 2009). Also the leaf extracts have been found to attenuate CCl4-mediated hepatic oxidative stress, toxicity, tumor promotion and subsequent cell proliferation response in Wistar rats (Khan et al., 2009). Aqueous extracts from fruits of *A. marmelos* exhibits protective effects on the pancreas (Kamalakannan et al., 2005) Leaves of this plant are claimed to be useful in spermatorrhoea (Sur et al., 1999).

Earlier studies have shown that ethanolic extracts of *A. marmelos* leaf possess anti-spermatogenic activity in rats (Sur et al., 2002). It has also been reported that aqueous extracts from the leaves of *A. marmelos* reduced the vitality of human sperms (Remya et al., 2009). Proper scientific research on the contraceptive effects of *A. marmelos* and its mode of action has not been carried out till now (Roychoudhury et al., 1995). The present investigation has been carried out to determine the activity of *A. marmelos* leaf on human sperm motility using ethanol extracts in vitro.

**MATERIALS AND METHODS**

**Plant material**

Fresh twigs of *A. marmelos* were collected from the forest of Karnala, Navi Mumbai, India. Identification of the plant material was done by Dr. Priti Vaidyanathan, Karnataka Agricultural University, Bangalore, India. A voucher specimen of the same has been deposited in the institutional herbarium. Fresh plant material was washed under running tap water, air dried, and then homogenized.
The results were presented as the average and standard error of triplicate experiments. The data in all the experiments were analyzed for statistical significance using analysis of variance (one-way ANOVA). The difference among average values was compared by high-range statistical domain (HSD) using Tukey’s Test (Mayers and Grossen, 1974). The statistical significance was checked at p < 0.05 and p < 0.01.

RESULTS

The effects of ethanolic extracts of *A. marmelos* leaves on the motility of sperm are presented in Table 1. The result is the proportion of motile spermatozoa, expressed as an integer percentage. It was observed that an increase in concentration of the extracts decreased the motility of sperms.

DISCUSSION

The results of the present study (Table 1) indicate that the leaf extracts of *A. marmelos* have a considerable effect on the motility of human sperms.

The use of chemical contraceptives by women is effective but has some limitations owing to some undesirable effects. Over the last decade, efforts are being made to work on other areas such as spermicidal agents (Bhattacharya, 1982; Mdhluli et al., 2002; Mdhluli, 2003). Herbal preparations have also been tested for spermicidal action in a number of countries. It has already been reported that aqueous extracts of *A. marmelos* decreases the motility of rat sperms *in vitro* (Sur et al., 1999, 2002). An earlier study on 50% ethanolic extracts of the leaves reported the potential of the same in suppressing the fertility of male albino rats (Chauhan et al., 2007). Studies have also indicated the potential of the aqueous extracts of *A. marmelos* in reducing the vitality of human sperms (Remya et al., 2009). It has already been reported that aqueous extracts of *A. marmelos* decreases the motility of rat sperms *in vitro* (Singh et al., 1998; Kamal et al., 2003). However studies using the ethanolic extracts for testing the motility of human sperms have not yet been...
reported to the best of our knowledge.
Phytochemical analysis of the leaf extracts by TLC had revealed the presence of coumarins in them (Sahare et al., 2008). Studies have also indicated the presence of phenols, alkaloids and flavanoids in the methanolic extracts of the leaves of \( A. \) marmelos (Rijamol et al., 2008). Aqueous extracts from the fruits have been reported to posses polyphenolic components (Prabhjit et al., 2009). In our earlier publication (Remya et al., 2009) we had reported the presence of alkaloids, tannins, terpenoids, volatile oil, glycosides and phenolic groups in the aqueous extracts of \( A. \) marmelos. This leads to the conclusion that the activity shown by the extracts could be because of the presence of the above mentioned secondary metabolites in them.

The findings of the present study clearly indicate that the ethanol extracts also have an effect on the motility of the human sperms and points to the prospectives of the use of \( A. \) marmelos as male contraceptive, which deserves further investigation.

REFERENCES


