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ANTIFERTILITY EFFECTS OF HERBAL PLANTS CONTRAINDICATED DURING THE FIRST TRIMESTER OF PREGNANCY IN SIDDHA MEDICINE – A REVIEW

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ABSTRACT

Siddha medicine advises against the use of a number of medicinal plants during the first trimester of pregnancy. Many of these plants have also been examined in laboratory studies for effects on fertility, the oestrous cycle, implantation, ovarian function and uterine contractility. These effects offer a plausible pharmacological basis for the traditional caution, because the first trimester is the period in which fertilisation products implant, the corpus luteum and progesterone support are critical, and organogenesis takes place. This narrative review aimed to summarise the antifertility and related reproductive effects reported for 24 herbal plants contraindicated during the first trimester in Siddha medicine, to identify the pharmacological patterns that recur across them, and to discuss the implications for traditional practice and for herbal safety in early pregnancy. A compiled evidence table of 24 plants, with plant parts, phytochemistry, pharmacological activity and a source reference for each entry, was read in full. Reproductive and antifertility information was extracted, grouped by type of effect and graded by the kind of evidence available, and summarised qualitatively. This is a narrative review; no systematic search, pooling of data or formal quality appraisal was undertaken. Experimental antifertility or pregnancy-interrupting data were reported for eight plants (*Plumbago indica*, *Aloe barbadensis*, *Aristolochia bracteolata*, *Nigella sativa*, *Gossypium herbaceum*, *Ferula asafoetida*, *Gloriosa superba* and *Coriandrum sativum*). Hormonal, oestrous-cycle or uterine-function data were reported for three further plants (*Sesamum indicum*, *Anethum graveolens* and *Cissus quadrangularis*). Four plants had only statement-level or indirect reproductive information, and nine plants had no reproductive data in the source material. The reported effects were anti-implantation activity, reduced conception, ovulation inhibition, depletion of antral follicles and corpora lutea, uterine atrophy, altered oestrogen and progesterone concentrations, increased uterine contractility and abortifacient action. Experimental evidence supports a pharmacological basis for the Siddha first-trimester contraindication of several of these plants, mainly through effects on implantation, ovarian function, hormone balance and uterine contractility. Almost all of the evidence comes from animal studies using crude extracts at doses that cannot be translated directly to human use. Concentrated preparations of these plants should be avoided in early pregnancy until their reproductive safety has been properly evaluated.

KEYWORDS: Abortifacient; Antifertility activity; Anti-implantation; First trimester; Siddha medicine.

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INTRODUCTION

Traditional systems of medicine have long used plants to regulate fertility, to bring on menstruation and to terminate pregnancy. Fertility regulation with plants or plant preparations is described in the ancient literature of indigenous systems of medicine, and the search for plant-based contraceptives has continued because synthetic steroidal contraceptives produce adverse effects (Chinchilla *et al.*, 2013). Plants that alter the levels of oestrogen and other reproductive hormones may either enhance fertility or act as antifertility agents, and some commonly eaten plant foods contain phytoestrogens (Umar *et al.*, 2022). Medicinal plants that are safe in non-pregnant adults can therefore pose a risk when taken during pregnancy.

Siddha medicine, Its literature lists plants that should be avoided, or used only with great caution, in the first trimester of pregnancy. The first trimester is the most vulnerable stage of gestation: implantation and early placentation depend on a precise hormonal environment, early pregnancy is maintained by progesterone, and the embryo is most susceptible to toxic injury during organogenesis (Norwitz et al., 2001; Moore et al., 2020). A herbal preparation that disturbs ovarian function, alters oestrogen or progesterone balance, stimulates uterine contraction or interferes with implantation could therefore threaten the pregnancy at this time.

Pharmacological studies of many of the plants on the Siddha first-trimester list have reported antifertility, anti-implantation, ovulation-inhibiting, uterotonic or abortifacient effects (Daniyal and Akram, 2015; Paarakh, 2010; Thirumal *et al.*, 2012; Khatun, 2023), but this evidence is scattered across separate plant-specific papers and reviews. It has not been brought together in relation to the Siddha contraindication. This review therefore collates the reproductive findings reported for 24 first-trimester contraindicated plants, examines the pharmacological patterns across them, and discusses how far these findings help to explain the traditional caution. It is a narrative review and does not follow a systematic-review protocol.

METHODOLOGY

This is a narrative review. It describes and interprets previously published findings and does not attempt to identify every relevant study, to estimate effect sizes or to grade the certainty of the evidence and is based on a compiled evidence table of 24 herbal plants regarded in Siddha medicine as contraindicated during the first trimester of pregnancy. For each plant the table gives the Siddha name, the plant part used, a classification code, the chemical constituents, the reported pharmacological activities, pathological or toxicological information, the risk to pregnant women where recorded, and an author–year reference to the published source of the information. The plant parts and codes are reported here as they appear in the source table; the meaning of the codes is not defined in it and they are not interpreted in this review.

Each entry was read in full. Information on fertility, the oestrous cycle, ovulation, folliculogenesis, implantation, pregnancy loss, uterine contractility, sperm or sexual function and reproductive hormones was extracted, together with the extract, dose, animal model and outcome where these were stated. Entries were then assigned to one of four evidence tiers: Tier 1, experimental antifertility or pregnancy-interrupting data; Tier 2, hormonal, oestrous-cycle or uterine-function data; Tier 3, statement-level or indirect reproductive information without experimental detail; and Tier 4, no reproductive data in the source entry.

Every statement is attributed to the publication cited for that plant in the source table, using the Harvard (author, year) system. Where a cited publication itself reports the work of other investigators, this is indicated.

RESULTS AND DISCUSSION

The source table contained 24 plants. Eight plants had experimental antifertility or pregnancy-interrupting data (Tier 1), three had hormonal, oestrous-cycle or uterine-function data (Tier 2), four had only statement-level or indirect reproductive information (Tier 3), and nine had no reproductive data in the source (Tier 4).

Table 1: Plants contraindicated in the first trimester in Siddha medicine, evidence tier and source of reproductive information.

Plant	Siddha name	Evidence tier	Principal reproductive information	Source
Plumbago indica	Kodiveli	Tier 1	Anti-implantation; anti-ovulatory; estrogenic/anti-estrogenic	Khatun, 2023
Calotropis gigantea	Erukku	Tier 4	No evidence (cytotoxicity only)	Negi and Bisht, 2021
Carica papaya	Pappasi	Tier 3	Antifertility effect stated, no detail	Yogiraj *et al.*, 2014
Lepidium sativum	Azhi	Tier 4	No evidence (chemoprotection only)	Manohar *et al.*, 2012
Aloe barbadensis	Katrazhai / Kariyapolam	Tier 1	Persistent proestrus; no conception in treated rats	Chinchilla *et al.*, 2013
Ananas comosus	Annasi	Tier 3	Abortifacient steroids in mice	Pakrashi and Basak, 1976; Sharma *et al.*, 2024
Bambusa arundinacea	Moongil	Tier 4	No evidence (nanoparticle cytotoxicity)	Nazreen, 2022

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Plant	Siddha name	Evidence tier	Principal reproductive information	Source
Brassica juncea	Kadugu	Tier 4	No evidence	Ogidi, 2020
Aristolochia bracteolata	Aaduthinnap paalai	Tier 1	Anti-implantation and abortifacient	Thirumal *et al.*, 2012
Sesamum indicum	Ellu	Tier 2	Anti- and pro-estrogenic; oestrogen/progesterone altered	Umar *et al.*, 2022; Wei *et al.*, 2022
Nigella sativa	Karunseeragam	Tier 1	Post-coital contraceptive; anti-implantation; abortifacient	Keshri *et al.*, 1995; Paarakh, 2010
Gossypium herbaceum	Paruththi	Tier 1	Follicle and corpus luteum depletion; uterine atrophy	Chikkulla *et al.*, 2018
Ferula asafoetida	Perunkayam	Tier 1	Post-coital antifertility	Upadhyay, 2017
Anethum graveolens	Sathakuppai	Tier 2	Longer oestrous cycle; uterine contraction	Monsefi *et al.*, 2006; Chahal *et al.*, 2017
Crocus sativus	Kunguma poo	Tier 3	Aphrodisiac/fertility-enhancing; no antifertility data	Rahmani *et al.*, 2017
Picrorhiza scrophulariiflora	Kaduku rogini	Tier 4	No evidence (antitumour only)	Smit, 2000
Cedrus deodara	Devatharu	Tier 4	No evidence (general toxicity only)	Pathak *et al.*, 2023
Gloriosa superba	Karthigai poo	Tier 1	Uterotonic; reduced implants; abortion	Malpani *et al.*, 2011; Sharma and Mishra, 2022
Cannabis sativa	Kanja	Tier 4	No evidence	Odieka *et al.*, 2022
Carissa carandas	Kala	Tier 4	No evidence	Kadam *et al.*, 2022
Coriandrum sativum	Malli	Tier 1	Dose-dependent anti-implantation	Al-Said *et al.*, 1987; Momin *et al.*, 2012
Moringa oleifera	Murungu	Tier 3	Antifertility and abortifacient listed, no detail	Nama *et al.*, 2015
Cissus quadrangularis	Pirandai	Tier 2	Oestrogenic and androgenic activity	Camil *et al.*, 2020
Morinda tinctoria	Nuna	Tier 4	No evidence	Sahoo *et al.*, 2009

Tier 1, experimental antifertility or pregnancy-interrupting data; Tier 2, hormonal, oestrous-cycle or uterine-function data; Tier 3, statement-level or indirect information; Tier 4, no reproductive data in the source entry. Siddha names, plant parts and codes are given as in the source table.

Table 2: Reproductive findings reported for plants in evidence Tiers 1 and 2.

Plant	Extract / preparation	Model and dose	Principal finding	Type of effect	Source
Plumbago indica	Ethanolic root extract; acetone extract of stem	Female rats; 200 and 400 mg/kg	40% and 50% pre-implantation loss; reversible anti-ovulatory effect; estrogenic and anti-estrogenic activity; loss of sperm motility at 10% concentration	Anti-implantation; anti-ovulatory; hormonal	Khatun, 2023
Aloe barbadensis	*Aloe* extract (preparation not specified in the source)	Rats; 1.5 and 2 g/rat for 21 days	Persistent proestrus; no conception in the 1.5 and 2 g groups (control mean litter 9)	Reduced conception; cycle disruption	Chinchilla *et al.*, 2013
Aristolochia bracteolata	Ethyl acetate fraction of ethanolic root extract	Female albino rats; 20–40 mg/kg	Dose-related anti-implantation and abortifacient activity, pre- and post-coital; 40 mg/kg comparable to ethinyl oestradiol	Anti-implantation; abortifacient	Thirumal *et al.*, 2012

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Plant	Extract / preparation	Model and dose	Principal finding	Type of effect	Source
Nigella sativa	Hexane, ethanol and hot-water extracts; seed powder	Rats, rabbits; women (reported)	2 g/kg hexane extract prevented pregnancy (in the original study, in the one rat reported at this dose; ethanolic extract not significantly active up to 2 g/kg); 500 mg/kg powder anti-implantation; 200 mg/kg ethanolic extract inhibited ovulation in rabbits; large oral doses reported to cause abortion in women	Contraceptive; anti-implantation; abortifacient	Keshri *et al.*, 1995; Paarakh, 2010
Gossypium herbaceum	Methanolic root extract	Cyclic female albino rats; 2.2, 2.5 and 3.0 g/kg/day	Fewer healthy antral and Graafian follicles and corpora lutea, more atretic follicles; reduced ovarian and uterine weights; atrophic uterus	Folliculogenesis disruption; uterine atrophy	Chikkulla *et al.*, 2018
Ferula asafoetida	Methanolic resin extract	Sprague-Dawley rats; 400 mg/kg daily, days 1–10 post-coitum	Pregnancy prevented in 80% of rats; 100% when given with polyvinylpyrrolidone (study cited in the review)	Post-coital antifertility	Upadhyay, 2017
Gloriosa superba	Aqueous root extract	Female rats; *in vivo* and *in vitro*	Dose-dependent uterine contractions (slightly below oxytocin per the review); early abortifacient activity; fewer implants; traditional use to induce abortion	Uterotonic; anti-implantation; abortifacient	Malpani *et al.*, 2011; Sharma and Mishra, 2022
Coriandrum sativum	Aqueous extract of fresh seeds	Rats; 250 and 500 mg/kg orally	Dose-dependent anti-implantation without complete infertility; no significant abortifacient effect; lower progesterone on day 5	Anti-implantation; hormonal	Al-Said *et al.*, 1987; Momin *et al.*, 2012
Sesamum indicum	Hydroethanolic seed extract	Female Wistar rats; 100, 300 and 500 mg/kg for 30 days	Serum oestrogen significantly lower at 300 mg/kg than at other doses and control; progesterone lower; anti- and pro-estrogenic, dose-dependent	Hormonal modulation	Umar *et al.*, 2022

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Plant	Extract / preparation	Model and dose	Principal finding	Type of effect	Source
Anethum graveolens	Aqueous and ethanolic seed extracts; seed infusion	54 Wistar rats; 40 women in labour (cited studies)	High dose lengthened oestrous cycle and diestrus and raised progesterone; myometrial contraction; infusion increased contractions and shortened first stage of labour	Hormonal; uterotonic	Monsefi *et al.*, 2006; Chahal *et al.*, 2017
Cissus quadrangularis	70% ethanolic extract (friedelin 2.5%)	Ovariectomised rats; 75 and 100 mg/kg	Serum oestrogen raised by 94% and 232% over ovariectomised control (17β-estradiol, 568%); androgenic activity estimated	Oestrogenic; androgenic	Camil *et al.*, 2020

Major pharmacological patterns

1. Anti-implantation and prevention of pregnancy

Anti-implantation activity was the most consistent reproductive finding. *Plumbago indica* reduced implantation, with pre-implantation loss of 40% and 50% at 200 and 400 mg/kg of ethanolic root extract (Khatun, 2023). *Aristolochia bracteolata* showed dose-related anti-implantation and abortifacient activity both when given before and after coitus, and its total antifertility effect at 40 mg/kg was comparable with that of ethinyl oestradiol (Thirumal *et al.*, 2012). *Nigella sativa* prevented pregnancy in rats when hexane extract was given on days 1–10 after coitus, and seed powder showed anti-implantation activity (Keshri *et al.*, 1995; Paarakh, 2010). The methanolic extract of *Ferula asafoetida* resin prevented pregnancy in 80% of rats in a study cited by Upadhyay (2017). Aqueous extract of *Coriandrum sativum* seeds produced a dose-dependent anti-implantation effect but did not cause complete infertility (Al-Said *et al.*, 1987; Momin *et al.*, 2012), and *Gloriosa superba* extracts reduced the number of implants in albino rats (Sharma and Mishra, 2022).

These findings are relevant to the first-trimester contraindication because implantation and early placental establishment determine whether a pregnancy continues. Several of the studies were post-coital, with dosing in the first ten days after mating, which corresponds to the pre- and peri-implantation period in rodents. It is also notable that the effect of C. sativum was partial rather than complete, and that no abortifacient effect or fetal abnormality was found when this extract was given later in pregnancy (Al-Said *et al.*, 1987; Momin *et al.*, 2012). This suggests that the timing of exposure is important, with the peri-implantation period more sensitive than later gestation in this model.

2. Ovarian function, oestrous cycle and hormonal modulation

A second group of effects concerns the ovary and the reproductive hormones. In rats, the methanolic root extract of *Gossypium herbaceum* reduced the numbers of healthy small antral and Graafian follicles and of corpora lutea, increased atretic follicles, and reduced ovarian and uterine weights, epithelial height and myometrial and stromal thickness, in a dose-dependent manner. The authors concluded that the extract caused atrophic uterine changes and disrupted folliculogenesis by inhibiting further development of recruited follicles (Chikkulla *et al.*, 2018). Because the corpus luteum is the source of progesterone in early pregnancy, loss of corpora lutea is a plausible mechanism for pregnancy failure.

Plumbago indica acetone extract showed a reversible anti-ovulatory effect with strong estrogenic and anti-estrogenic activity in female rats (Khatun, 2023), and ethanolic extract of *Nigella sativa* inhibited ovulation in rabbits (Paarakh, 2010). In rats given an aloe preparation, the oestrous cycle was disturbed with persistent proestrus and no conception occurred in the 1.5 g and 2 g groups, compared with a mean litter of nine in controls; the authors suggested an imbalance of oestradiol and progesterone or an action on the hypothalamo–pituitary axis, and cited reports of increased ovarian steroidogenesis and oestrogen with reduced progesterone (Chinchilla *et al.*, 2013).

Hormone concentrations were altered by several other plants. Hydroethanolic extract of *Sesamum indicum* lowered serum oestrogen at 300 mg/kg, with a non-monotonic dose response that the authors described as both anti- and pro-estrogenic (Umar *et al.*, 2022). A high dose of *Anethum graveolens* extract lengthened the oestrous cycle and the diestrus phase and raised progesterone concentration (Monsefi *et al.*, 2006). *Cissus quadrangularis* extract raised serum oestrogen in ovariectomised rats and was estimated to have androgenic activity (Camil *et al.*, 2020), and the aqueous extract of C. sativum lowered progesterone on day 5 of pregnancy, which may explain its anti-implantation effect (Al-Said *et al.*, 1987; Momin *et al.*, 2012). In early pregnancy, both oestrogen and progesterone must be maintained within a narrow range, so any of these hormonal shifts could be disruptive.

3. Uterotonic and abortifacient activity

Several plants affect uterine contractility directly. The root extract of *Gloriosa superba* had uterotonic activity *in vivo* and *in vitro* in female rats, although the height of contraction was slightly lower than that produced by oxytocin (Malpani *et al.*, 2011; Sharma and Mishra, 2022). Dill seed contracted the myometrium and enhanced oxytocin release, with limonene and anethole showing contractile effects on uterine muscle, and in a clinical study cited in the same review, dill seed infusion increased the number of contractions and shortened the first stage of labour in 40 treated women compared with 60 controls (Zagami *et al.*, 2012, cited in Chahal *et al.*, 2017). Uterotonic activity is desirable at term, but in the first trimester it could provoke contractions and bleeding.

Abortifacient activity was reported for *Aristolochia bracteolata* in rats (Thirumal *et al.*, 2012). For *Nigella sativa*, hot-water extract and whole seeds in large oral doses were reported to cause abortion in pregnant women (Paarakh, 2010), which is the most direct human report in the source material, although it is cited as a report and its original detail is not available here. For G. superba, aqueous root extract showed early abortifacient activity in rats (Malpani *et al.*, 2011), and a traditional preparation of root paste with black pepper and goat milk is recorded as inducing abortion (Sharma and Mishra, 2022). The steroids isolated from *Ananas comosus* were reported to have an abortifacient effect in mice (Pakrashi and Basak, 1976), and *Moringa oleifera* is listed, with flowers and gum named, as abortifacient (Nama *et al.*, 2015), although no experimental detail was given.

4. Male reproductive and sexual effects

Although the Siddha contraindication concerns pregnancy, some of the evidence concerns male fertility and shows that the antifertility properties of these plants are not confined to females. *Plumbago indica* extract abolished sperm motility in rats at 10% concentration (Khatun, 2023), and ethanolic seed extract of *Nigella sativa* had an antifertility effect in male rats, probably due to inherent oestrogenic activity (Paarakh, 2010). In contrast, saffron (*Crocus sativus*) is described as improving fertility and libido, with crocin and its aqueous extract at 160–320 mg/kg increasing mounting and erection frequency in rats (Rahmani *et al.*, 2017). The source material therefore does not show antifertility activity for all plants on the list, and the saffron findings are a reminder that a first-trimester caution does not necessarily rest on antifertility pharmacology.

5. Cytotoxic and genotoxic considerations

Although this review is concerned with antifertility effects, the source table also records cytotoxic and genotoxic findings that are relevant to embryonic safety. Plumbagin from *Plumbago indica* was a strong generator of reactive oxygen species, depleted cellular glutathione and caused DNA double-strand breaks through oxidative damage, and the ethanolic root extract was cytotoxic at higher concentrations (Khatun, 2023). Cytotoxicity and genotoxicity are desirable in a cancer drug, but the rapidly dividing cells of an early embryo are also vulnerable to such actions. The source data are cell-culture and animal findings and do not show embryotoxicity in themselves, so they are best read as a reason for caution rather than as evidence of harm.

Plant-specific interpretation

Tier 1 plants. *Plumbago indica* has the broadest set of reproductive findings, covering anti-implantation, anti-ovulatory, hormonal and sperm-motility effects, together with oxidative and genotoxic actions of plumbagin (Khatun, 2023). *Aristolochia bracteolata* combines anti-implantation and abortifacient effects at low experimental doses (Thirumal *et al.*, 2012). *Nigella sativa* has post-coital contraceptive, anti-implantation, anti-ovulatory and abortifacient reports (Paarakh, 2010), which is notable because the seed is also widely used as a food and spice. *Gossypium herbaceum* affects the follicle population and uterine structure at high doses (Chikkulla *et al.*, 2018). *Ferula asafoetida* resin prevented pregnancy in most treated rats (Upadhyay, 2017). *Gloriosa superba* combines uterotonic, anti-implantation and abortifacient reports (Sharma and Mishra, 2022). *Coriandrum sativum* produced a partial anti-implantation effect with a progesterone decrease and no abortifacient or teratogenic effect in the study reported (Al-Said *et al.*, 1987; Momin *et al.*, 2012). *Aloe barbadensis* extract was associated with no conception in treated rats (Chinchilla *et al.*, 2013), but the extract was not defined and the report was tagged to a phytochemistry review, so the result should be confirmed against the primary study.

Tier 2 plants. *Sesamum indicum*, *Anethum graveolens* and *Cissus quadrangularis* alter hormone concentrations or uterine activity but have not been shown to prevent pregnancy in the source material. Their significance for the first trimester is therefore inferential: oestrogen and progesterone changes (Umar *et al.*, 2022; Camil *et al.*, 2020), prolonged diestrus (Chahal *et al.*, 2017) and uterine contraction (Chahal *et al.*, 2017) are all of potential concern, but they should not be taken as proof of harm at dietary intakes. Sesame seed contains lignans such as sesamin and sesamolin that have various pharmacological effects (Wei *et al.*, 2022). The seeds of S. indicum and the leaves and seeds of A. graveolens are used as foods, and the effects described were seen with concentrated extracts.

Tier 3 plants. *Carica papaya* has an antifertility effect stated for leaf extract, and its latex contains the proteolytic enzymes papain and chymopapain (Yogiraj *et al.*, 2014), but no experimental detail was given. *Ananas comosus* contains the steroids ergosterol peroxide and β-sitosterol derivatives and was reported to have steroid-mediated abortifacient activity in mice (Pakrashi and Basak, 1976; Sharma *et al.*, 2024). *Moringa oleifera* is listed as antifertility and abortifacient (Nama *et al.*,

2015). *Crocus sativus* is reported to be fertility-enhancing rather than antifertility (Rahmani *et al.*, 2017).

Tier 4 plants. For nine plants the source contained no reproductive data: *Calotropis gigantea* (Negi and Bisht, 2021), *Lepidium sativum* (Manohar *et al.*, 2012), *Bambusa arundinacea* (Nazreen, 2022), *Brassica juncea* (Ogidi, 2020), *Picrorhiza scrophulariiflora* (Smit, 2000), *Cedrus deodara* (Pathak *et al.*, 2023), *Cannabis sativa* (Odieka *et al.*, 2022), *Carissa carandas* (Kadam *et al.*, 2022) and *Morinda tinctoria* (Sahoo *et al.*, 2009). Their entries describe constituents, anticancer or cytotoxic activity and, for *Cedrus deodara*, general toxicity (Pathak *et al.*, 2023). The lack of data does not mean that these plants are free of reproductive effects, and their Siddha contraindication may rest on traditional observations, other pharmacological actions or on grounds not captured by the source. These plants represent a clear gap for future reproductive toxicity research.

Clinical and Siddha medicine implications

The reproductive findings offer a plausible pharmacological explanation for the Siddha caution in the first trimester for at least eleven of the 24 plants, through effects on implantation, ovarian function, hormone balance and uterine contractility. The correspondence between traditional prohibition and later experimental findings supports the continued use of the contraindication list as a precautionary tool.

The evidence does not, however, allow a firm statement about human risk or a safe dose. The doses used in animal studies were large and the extracts were crude, so exposure from culinary use is likely to be much lower than the experimental exposure. A reasonable distinction can be drawn between food use, such as seeds and herbs used as flavouring, and the use of concentrated extracts, resins, latex, roots or traditional medicinal formulations. The evidence is most worrying for the latter group, in particular for plants with abortifacient or uterotonic reports such as *Gloriosa superba*, *Aristolochia bracteolata* and *Nigella sativa*.

For practitioners, the review supports avoiding concentrated preparations of the Tier 1 plants and, as a precaution, of the Tier 2 plants during the first trimester, asking women who may be pregnant about herbal use before prescribing, and recording any adverse pregnancy outcomes. For research, priorities include standardised reproductive toxicity studies with defined extracts and dose ranges, studies in the peri-implantation window, assessment of fetal outcome, investigation of the plants in Tier 4, and, where ethically possible, pharmacovigilance in human populations.

Limitations

This review has several limitations. First, it is a narrative review based on a single compiled source table; no systematic search was performed, so relevant studies may have been missed, and no formal risk-of-bias or quality assessment was made. Second, most of the information is secondary: findings are attributed to the review or article tagged to each plant, and in several cases that article describes the work of other investigators. Third, the reproductive evidence is uneven: nine of 24 plants have no reproductive data in the source and four have only statement-level information.

CONCLUSION

Experimental findings reported for the herbal plants contraindicated in the first trimester in Siddha medicine, including anti-implantation, anti-ovulatory, folliculogenesis-disrupting, hormone-modulating, uterotonic and abortifacient effects, are consistent with the traditional caution. The strongest and most consistent evidence concerns *Plumbago indica*, *Aristolochia bracteolata*, *Nigella sativa*, *Gossypium herbaceum*, *Ferula asafoetida*, *Gloriosa superba* and *Coriandrum sativum*, with supportive findings for *Aloe barbadensis*, *Sesamum indicum*, *Anethum graveolens* and *Cissus quadrangularis*. However, the evidence is largely preclinical, secondary and dose-dependent, and nine plants remain without reproductive data.

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