



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

HERBAL MEDICINES CAUSING TERATOGENIC EFFECTS

*PRAJAKTA SANJAY PAIKRAO, AZAM KHAN, SWATI KAMBLE

Student, Professor, Student

JAGADAMBHA INSTITUTE OF PHARMACY AND RESEARCH, KALAMB, MAHARASHTRA, INDIA

ABSTRACT

The fashionability of natural drug is growing worldwide. Unlike conventional certified drugs, herbal drug practices are generally not supported by effectiveness, efficacy, or safety studies, which raise enterprises about implicit pitfalls involved in their operation, particularly in high- threat cases similar as pregnant women where teratogenicity is a concern. Despite a lack of wisdom- grounded substantiation, the use of herbal products for the operation of gestation- associated challenges is common, due to the common notion that they're free of poisonous goods and adverse responses because they're “ natural. ” The lack of concern about exercising herbal remedies during gestation is strengthened by the lack of regulation in utmost countries for their marketing. still, factory- grounded remedies aren't free of adverse responses. Medicinal shops and herbal remedies contain substances that can be poisonous to the mortal body and the foetus. Implicit goods of magpie use of medicinal shops are embryotoxicity, teratogenic, and abortifacient goods. This handwriting reviews available scientific information concerning implicit health hazards associated with the consumption of herbal drugs during gestation, sauces that are safe and pressing those sauces that should be avoided due to their implicit abortifacient and/ or teratogenic exertion.

KEY WORDS — Herbal medicine, Pregnancy, Teratogenicity, Abortifacient effects

INTRODUCTION

Teratogenicity or reproductive toxin astronomically refers to the circumstance of biologically adverse goods on the reproductive system that may affect from chemical exposure to several environmental agents which is characterized by differences to the womanish or manly reproductive organs Related to endocrine system, or gestation outgrowth.¹

Teratogenesis signifies the structural deformations during foetal development, in distinction from other kinds of medicine induce foetal damage similar as growth deceleration, dysplasia(e.g. Iodine – insufficiency – related goitre), or the asymmetrical branch reduction.²

The exposure of teratogenic chemical previous to branch generality, during antenatal or postnatal development leads to incarnation of experimental toxin including the death of the developing organism, structural abnormality, altered growth, and functional insufficiency.¹ It's estimated that roughly 10 – 15 of natural structural anomalies are the result of the adverse effect of environmental factors on antenatal development.³

Factors comprise not only chemicals but also herbal supplement, micro – organisms including infections, motherly conditions and conditions like diabetes and physical factors like radiations. The mortal teratogen is a chemical medicine, metabolic state, physical agents or physiological differences during development that produce a endless pathologic or pathophysiological revision in the seed at exposure or circumstances that generally do.⁴

Herbal supplement or medicines also play an measure part during gestation Despite a lack of wisdom- grounded substantiation, the use of herbal products for the operation of gestation- associated challenges is common, due to the common notion that they're free of poisonous goods and adverse responses because they're “ natural. ” still, factory- grounded remedies aren't free of adverse responses which gives numerous teratogenic goods.⁵

HERBAL MEDICINE

Herbal drug has its origins in ancient societies. It involves the medicinal use of shops to treat complaint and enhance general health and good. Some sauces have potent(important) constituents and should be taken with the same position of caution as medicinal specifics. exemplifications Coriander, Echinacea, Garlic, Ginger, Ginseng, etc.

HERBAL MEDICINAL USE: Herbal drug aims to return the body to a state of natural balance so that it can heal itself. Different sauces act on different systems of the body.

Some herbs that are commonly used in herbal medicine, and their traditional uses, include:

- **Echinacea** – To stimulate the vulnerable system and aid the body in fighting infection. Used to treat affections similar as boils, fever and herpes.
- **Dong quai (dang gui)** – Used for gynaecological complaints similar as premenstrual pressure, menopause symptoms and period pain. Some studies indicate that dong pier can lower blood pressure.
- **Garlic** – Used to reduce the threat of heart complaint by lowering situations of blood fats and cholesterol(a type of blood fat). The antibiotic and antiviral parcels of garlic mean that it's also used to fight snap, sinusitis and other respiratory infections.
- **Ginkgo biloba** – Generally used to treat poor blood rotation and tinnitus(ringing in the cognizance).⁶
- **Ginseng** – generally used to treat fatigue, for illustration during recovery from illness. It's also used to reduce blood pressure and cholesterol situations, still overuse of ginseng has been associated with raised blood pressure.⁷

TERATOGENICITY

- **HISTORY :**

- Teratology is the wisdom that studies the causes, mechanisms, and patterns of abnormal development.
- Teratology as a ultramodern wisdom was born in the 1930s with the publication of a set of trials in which gormandizers were fed a diet deficient in vitamin A. All of these piglets suffered a variety of deformations, generally a lack of eyes.⁸
- Nearly 60 times ago thalidomide was specified to treat morning sickness in pregnant women. What followed was the biggest man - made medical disaster ever, where over 10,000 children were born with a range of severe and enervating deformations.⁹

- **DEFINATION :**

A teratogen is a substance that interferes with normal fetal development and causes natural disabilities. medicines, alcohol, chemicals and poisonous substances are exemplifications of teratogens. Teratogens can also increase the threat for confinement, preterm labour or birth.

- **TERATOGEN :**

Teratogens are substances that beget natural diseases in a developing embryo or foetus. A teratogen is anything a person is exposed to or ingests during gestation that's known to beget foetal abnormalities. medicines, drug, chemicals, certain infections and poisonous substances are exemplifications of teratogens. Teratogens can also increase the threat for confinement, preterm labour or birth.¹⁰

- **Teratogens causing teratogenic effects are as follow :**

1. Synthetic Drugs	Abnormalities
a. Thalidomide	Phocomelia, Multiple defects
b. Anti-neoplastic drugs	Multiple defects, foetal death
c. Androgens	Virilisation, esophageal, cardiac defects
d. Tetracycline	Discoloured teeth, bone defects
e. Progestin	Virilisation of female foetus
f. Warfarin	Nose, eye, hand defects, growth defect
2. Herbal Drugs	Abnormalities
a. Funnel	Effects on embryo implantation
b. Mint	Cytotoxic, Emmenagogue
c. Carica papaya	Reduction in foetal weight
d. Rauwolfia vomitorica	Hyperplasia of bone cells of foetus
e. Lime	Effects on length & wt. Of umbilical cord
f. Coffee	Risk of Miscarriage , low birth weight

Table no. 1¹⁰

The following factors determine how dangerous teratogen exposure is during gestation

- The drug, substance or type of toxin.
- How long the pregnant person was exposed.
- The amount of exposure (dosage or quantity).
- The gestational age of the foetus (weeks of pregnancy) at exposure.
- Hereditary factors that could increase the foetus's risk.

It's stylish to avoid teratogens at all times during gestation. still, teratogenic exposure is more dangerous at certain times in foetal development.⁸

- **Herbs Considered Safe during pregnancy**

The popularity of natural medicine is growing worldwide. Unlike conventional licensed medicines, herbal medicine practices are usually not supported by effectiveness, efficacy, or safety studies, which raise concerns about potential risks involved in their usage, particularly in high-risk patients such as pregnant women where teratogenicity is a concern.

Despite a lack of wisdom-grounded substantiation, the use of herbal products for the operation of gestation-associated challenges is common, due to the common notion that they're free of poisonous goods and adverse responses because they're "natural."

The lack of concern about exercising herbal remedies during gestation is strengthened by the lack of regulation in utmost countries for their marketing. still, factory-grounded remedies aren't free of adverse responses.

Medicinal factory and herbal remedies contain substances that can be poisonous to the mortal body and the foetus. Implicit goods of magpie use of medicinal shops are embryotoxicity, teratogenic, and abortifacient goods.⁵

- **Herbs shows teratogenic effects**

When women are trying to conceive, numerous reach for herbal supplements to increase their chances of generality. While some sauces may be effective to this end, there are several sauces that can lower the chances of generality. numerous herbal supplements shows foetal abnormalities when consume in inordinate form or on diurnal base the teratogenic goods like:

- Neural tube defects
- Low IQ baby
- Foetal goitre
- Craniofacial, heart & CNS defects
- Growth retardation
- Viginal carcinoma in teenage female offspring

- Virilisation of female foetus
- Discoloured and disformed teeth
- Mandibular or ear abnormalities
- Intestinal abnormalities
- Foetal death ¹¹

Herbs to Avoid

Experts have set up that certain saucers contain estrogenic substances which have an impact on coitus hormone attention and fertility in males and ladies. Birth control capsules also contain estrogen, and they work to stop ovulation and help generality.

Saucers that have been called out as being mischievous to fertility include bitter melon, St. John's wort, echinacea, and ginkgo biloba. Echinacea and ginkgo biloba, in particular, have been shown to hurt sperm product and fertilizing capability.

Although these saucers can give certain health benefits, both men and women should stay down from them when they're trying to conceive. In some cases, saucers can contain substances that can beget confinement, unseasonable birth, uterine compression, or injury to the baby.

In general, herbal supplements don't suffer the same kind of scrutiny as compared to other specifics. They aren't FDA approved. thus, it's delicate to tell what kind of goods they will have, especially when taken by a pregnant woman or one that's trying to conceive.

Some herbal companies use their own rigorous norms of testing and numerous of them will indicate whether they're approved for pregnant women on their marker. still, it's always stylish to talk to a medical professional before using them while trying to conceive.¹¹

FDA CATEGORIES FOR DRUG USE IN PREGNANCY

Medicines that a pregnant woman takes can affect the foetus in several ways. They can act directly on the foetus causing damage or abnormal development leading to birth blights or death.

They can also alter the function of the placenta generally by constricting blood vessels and reducing the blood force of oxygen and nutrients to the foetus from the mama and therefore performing in a baby that's light and underdeveloped. Also they can beget the muscles of the uterus to contract strongly; laterally injuring the foetus by reducing the blood force or driving pre-term labour and delivery.

Gestation is a special physiological condition where medicine treatment presents a special concern because the physiology of gestation affects the pharmacokinetics of specifics used and certain specifics can reach the foetus and beget detriment.

Hence in 1979, Food and Drug Administration developed a system that determines the teratogenic threat of medicines by considering the quality of data from beast and mortal studies.

FDA classifies colourful medicines used in gestation into five orders, orders A, B, C, D and X. Category A is considered the safest order and order X is absolutely contraindicated in gestation. This provides remedial guidance for the clinician.¹²

FDA CATEGORIZATION OF DRUGS FOR USE IN PREGNANCY

Sr. No.	Category	Description
1	A	Adequate, well-controlled studies in pregnant women have not shown an increased risk of fetal abnormalities.
2	B	Animal studies have revealed no evidence of harm to the foetus; however, there are no adequate and well controlled studies in pregnant women. Or Animal studies have shown an adverse effect, but adequate and well-controlled studies in pregnant women have failed to demonstrate a risk to the foetus.
3	C	Animal studies have shown an adverse effect and there are no adequate and well-controlled studies in pregnant women. Or No animal studies have been conducted and there are no adequate and well-controlled studies in pregnant women.
4	D	Studies, adequate well-controlled or observational, in pregnant women have demonstrated a risk to the foetus. However, the benefits of therapy may outweigh the potential risk.
5	X	Studies, adequate well-controlled or observational, in animals or pregnant women have demonstrated positive evidence of foetal abnormalities. The use of the product is contraindicated in women who are or may become pregnant

Table no. 2¹²

HERBAL THERAPY

Herbal remedy is a form of holistic drug that uses sauces for mending. Believe it or not, there's an condiment that's claimed to help with nearly anything ailing you during gestation.

Homeopathy is a analogous type of indispensable drug grounded on the belief that "like cures like." In other words, you're given extremely minute boluses of medicines, sauces or indeed poisons that, in larger boluses, would produce the symptoms you're trying to treat.

Homeopathic drug is largely unproven by wisdom and may affect in unwanted side goods and potentially dangerous medicine relations.

• How does herbal remedy work:

Herbal curatives are made from shops or botanicals and can be taken in a number of forms, including maquillages, tinctures, teas, capsules and gels. Certain sauces are allowed to help with colourful symptoms and other aspects of gestation and labour.

Dealing with morning sickness :

Multiple studies have indicated that gusto can help palliate nausea, so you may want to pasture up on gusto tea and fresh gusto to help calm your stomach.

Want to get your body ready for labour :

Red jeer splint apparently induces labour naturally, but the wisdom is still out on its safety. It's study to boost blood inflow to the uterus and get the birthing process going by driving condensation. For that reason, it's always stylish to get the okay from your guru before trying it or any other herbal supplement.¹³

• Is herbal therapy safe during pregnancy

When it comes to using herbal remedies during gestation, be conservative; not all of them are safe. It's hard to know what you're getting because the Food & Drug Administration(FDA) doesn't regulate herbal supplements like other medicines.

You should take herbal drugs just as seriously as you take tradition specifics and guard of mixing the two. In other words, no way take any herbal remedies — not indeed in the form of teas or maquillages without first talking to your practitioner.

All pregnant women should avoid certain sauces because they might beget complications or else propregnancy.

• Herbs that are safe during gestation

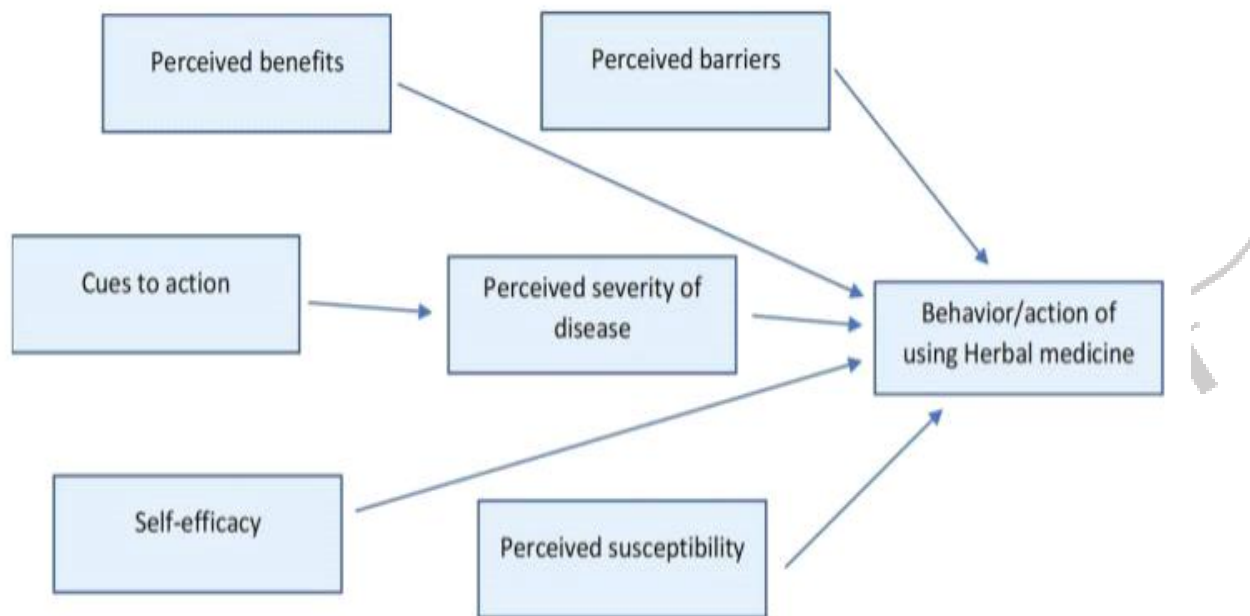
Although you should do with caution when it comes to herbal supplements, culinary sauces surely get the green light when you're pregnant.

Adding them to your refections not only gives them more flavor but also provides fresh vitamins and nutrients, so go ahead and use further of the following(but in food form, not capsules).¹³

Sr. No.	Drugs	Uses
•	Ginger	Promotes blood circulation, Control cholesterol, Improve digestion.
•	Basil	Cures constipation, Improve metabolism, Fight off flu.
•	Parsley	Excellent antioxidant, boost immune system.
•	Lemon	Support maternal health, and baby's development.
•	Mint	Helpful in easing nausea , not harm to foetus and mother.
•	Thyme	Treat colds, cough and sore throat.
•	Garlic	Has both antioxidant and anti-inflammatory properties.

Table no. 3¹⁴

Since the teratogenicity of Thalidomide has been proven, herbal drugs are more generally used during gestation to relieve gestation-related symptoms and help fight infections, among others. Sauces are constantly considered as natural and thus inoffensive. still, these products were suggested to influence the CYP superfamily, which is responsible for 65 – 80 of all CYP- intermediated medicine metabolism Some of the sauces which were observed to be used by pregnant women show potent inhibition into the following CYP1A2(black elderberry, gusto, and horsetail), CYP2D6(fennel and jeer splint), and CYP3A4(fennel and jeer splint).



Pregnant women Generally don't consult the use of sauces with a croaker or druggist. Data demonstrated that nearly 95 of Ethiopian pregnant women didn't consult the operation of herbal drugs with the croaker or nanny . In Norway, only lower than 12 of pregnant women were recommended to use sauces by healthcare labour force. Such a situation results from the fact that unborn maters aren't apprehensive that sauces contain active substances that can beget confinement, unseasonable birth, uterine condensation, or injury to the foetus. On the other hand, the clinicians don't always have sufficient knowledge on the safety of using herbal drugs during gestation and while breastfeeding.¹⁵

Figure No. 1 : Behaviour/ action of using herbal medicine ¹⁶



Parsley



Basil

Some examples which are safe during pregnancy ¹⁴



Mint



Thyme



Ginger



Garlic



Raspberry leaf



Lemon



Cranberry

- **Herbs that are not safe during pregnancy**

Some saucers are surely unsafe for gestation because they might beget unseasonable labour or other problems.

Saucers to avoid during gestation include Uterine instigations like aloe, barberry, black cohosh, blue cohosh, dong pier, feverfew, goldenseal, juniper, wild yam and motherwort.

Saucers that might potentially harm your baby, similar as afterlife crocus, mugwort(safe for moxibustion but not for ingestion), pokeroot and sassafras.

Saucers that have other poisonous goods, similar as comfrey and mistletoe Again, always consult with your health care provider before taking any herbal remedy and check whether it's safe for you and your baby.¹³

Sr.No.	Drugs	Causes
•	Fenugreek	Uterine contraction.
•	Dill	Start menstruation and cause miscarriage.
•	Black cohosh	Several chhanges , GIT affect , liver damage.
•	Ginseng careano	Ginsenoside Rb1 may cause defects in the embryos.
•	Angelica	Increased menstrual flow & cause miscarriage.
•	Ruta graveolens	Toxic internally & cause uterine contraction.
•	Rosemary	Stimulate uterine contraction, miscarriage.

Table no. 4¹⁴

MAJOR SITE OF ACTION OF TERATOGEN

The result of Teratogenesis is determined by its point of action and the stage of development of the target organ. These natural abnormalities are caused by defected genes or exogenous agents. In inheritable blights, genes or exogenous agents. In inheritable, the scheme indicates the point and stage of development at which the mutant gene is expressed; in non inheritable blights the point and stage relate to exposure to an axogenous teratogen. The four main spots of action of a imperfect gene or an axogenous teratogen are illustrated in figure 2. The primary point of action may be on the intracellular cube(on the chain of relations between the nexus and the cytoplasm leading to the specific metabolic products of the cell), abnormalities in the structure and function of the cell face, extracellular Matrix and foetal terrain(from abnormalities at the organismal position or in the feto- material relation).¹⁷

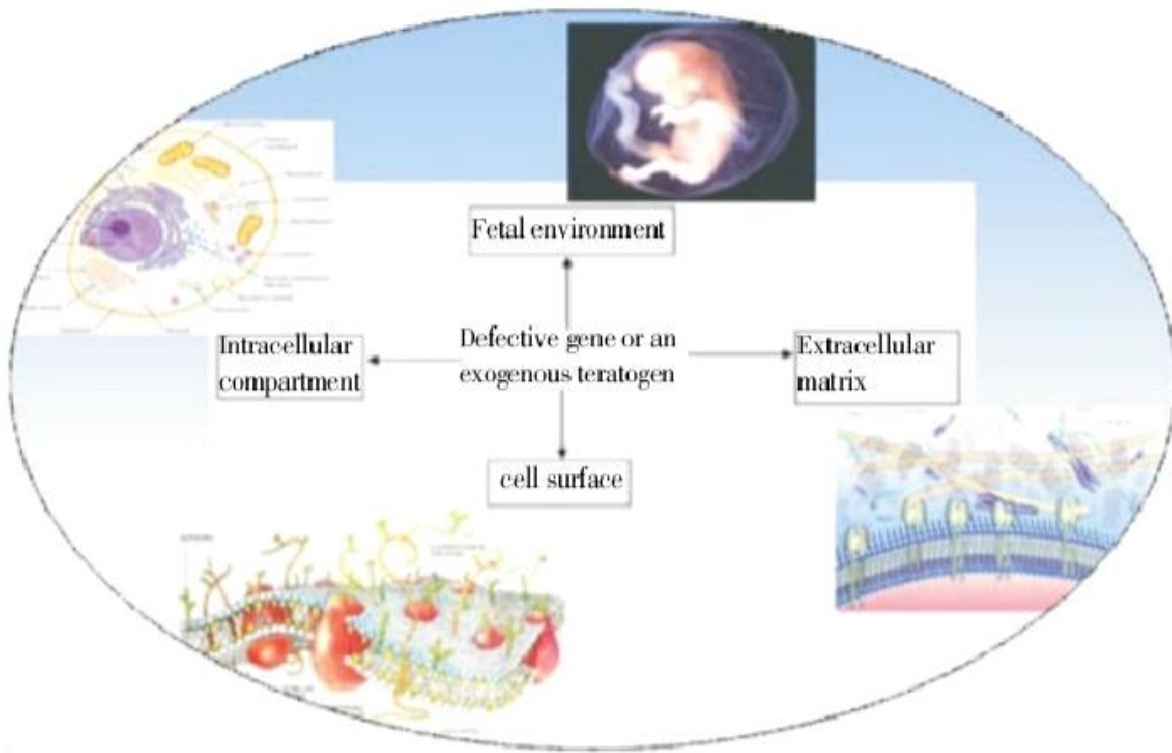


Figure No. 2 : Major site of action of defective gene or teratogen ¹⁷

MODE OF ACTION OF TERATOGEN

The timing of the teratogenic personality in relation to foetal development is critical in determining the type and extent of damage. Mammalian foetal development passes through three main phases blastocyst conformation, organogenesis, histogenesis and development of function. Administration of teratogen during the period of organogenesis(Day 17 – 60) leads to gross deformations. The type of deformations produced by teratogen depends on the time of exposure to association of the embryo. Some of the common mortal teratogenic agents are listed in table no. 5.¹⁷

TABLE NO. 5 ¹⁷

Common human teratogens.

Category	Examples
Drugs	ACE inhibitors–benazepril, enalapril, captopril Acid nonsteroidal anti–inflammatory agent–diclofenac Androgen hormones–oestrogen Antiepileptics–phenytoin, valproic acid, carbamazepine, trimethadione Antineoplastic–folic acid antagonists–methotrexate, amiopterine Retinoids–isotretinoin Penicillamine Thalidomide Warfarin Xanthine alcoloids–caffeine Pesticides–organophosphates Herbicides–glyphosate Sulfur mustard
Unnecessary chemicals	Alcohol Cocaine
Other chemicals	Methyl mercury Cigarette smoke
Physical agents	Ionising radiations–high doses at least >5 rad
Biological agents (embryo fetal infections)	Rubella Cytomegalovirus
Maternal diseases	Diabetes ID, epilepsy
Phytochemicals	<i>Veratrum</i> alkaloid cyclopamine
Miscellaneous agents	Lambda carrageenan

HERBAL MEDICINES SHOULD BE AVOID DURING PREGNANCY

The FDA recommends that pregnant women avoid using herbal products without consulting their healthcare professionals. The constituents that go into making herbal potions aren't always well known. It's a distinct possibility that some of these constituents may beget problems during your gestation.

Some of the risks associated with using herbs while pregnant include:

- Miscarriage
- Premature labor and birth
- Injury to the fetus
- Herbs may cause several other health hazards, which remain obscure due to the lack of scientific data.

According to research by numerous herbal companies, the following herbs are unsafe for use during pregnancy ¹⁸: Herbs images ¹⁴:



- **Saw Palmetto:** The oral intake of this medicinal herb can trigger hormonal activity.



- **Goldenseal:** pregnant women should avoid consuming goldenseal. It can cross the placenta and adversely affect the embryonic development of the brain in the foetus.



- **Dong Quai:** Pregnant women should stay away from Dong quai as it can cause uterine contractions and lead to a miscarriage.

- **Ephedra:** The oral use of this herb can cause uterine contractions and premature labour. So, do avoid herbal products that contain ephedra when you are pregnant.



- **Yohimbe:** The herb can cause poisoning and endanger the life of your unborn baby. Please, stay off the herb when you are pregnant.



- **Passionflower:** Passionflower offers a host of health benefits. But during pregnancy its use is avoidable.



- **Black Cohosh:** Another herb to avoid during pregnancy is black cohosh. It can trigger uterine contractions and cause premature labour.



- **Blue cohosh:** has abortifacient properties and may have teratogenicity and embryotoxicity effects. It is unsafe for use while expecting.



- **Roman chamomile:** Consumption of Roman chamomile even in medicinal amounts can increase the risk of miscarriage.



- **Pennyroyal:** The use of pennyroyal during pregnancy is unsafe. It can cause miscarriage and foetal death due to brain and liver damage.

Other toxic herbs that may cause a danger to maternal health and baby's growth during pregnancy include:

- Aloe
- Ginseng (American & Korean)
- Evening Primrose
- Feverfew
- Kava Kava

- Senna ¹⁸

Some other avoidable supplements

The following substances also have the potential to harm a developing baby when used in a concentrated formulation (not as a spice in cooking). Some are thought to cause birth defects, and some to encourage early labour. ¹⁹

Avoid these oral supplements	Avoid aromatherapy essential oils
• Arbour vitae	• Calamus
• Beth root	• Mugwort
• Blue cohosh	• Pennyroyal
• Cascara	• Sage
• Chaste tree berry	• Wintergreen
• Chine	• Basil
• Se Angelica (Dong quai)	• Hyssop
• Cinchona	• Myrrh
• Cotton root bark	• Marjoram
• Feverfew	• Thyme
• Ginseng	• Anise
• Golden seal	• Star anise
• Juniper	• Araucaria
• Kava kava	• Artemisia vestita
• Liquorice	• Atractylis
• Meadow saffron	• Sweet Birtch
• Poke root	• Black seed
• Rue	• Lesser calamint
• Sage	• Carrot seed
• Saint John's wort	• Cinnamon bark
• Senna	• Sweet & Bitter funnel
• Transy	• Indian dill seed
• White peony	• Rue
• Wormwood	• Parsley leaf
• Yarrow	• Zedoary

Table No. 6 ¹⁹

- **How can you avoid teratogens during pregnancy**

The stylish way to avoid teratogens is to plan for gestation, if possible. Planning for gestation allows you to get habitual medical conditions under control and make life changes similar as quitting smoking.

still, this is n't always possible. Once you 're pregnant, some effects you can do to lower your threat of teratogen exposure are:

- Talk with your healthcare provider about any medications you're taking.
- Avoid cigarettes, alcohol and recreational drugs.
- Don't take any supplements, medications or prescription drugs without checking with your healthcare provider.
- Avoid cleaning litter boxes.
- Avoid hot tubs, saunas and anything that raises your internal body temperature.
- Remove tuna, swordfish and other fish high in mercury from your diet.
- Talk with your supervisor or human resources about harmful chemicals in your workplace.

It's important to have open and honest exchanges with your obstetrician during gestation. This includes being veracious about alcohol or medicine use. They're there to make sure your gestation is safe and healthy. Do n't be hysterical to communicate your provider before taking drugs or supplements. It's better to be exorbitantly conservative during gestation.⁸

CONCLUSION :

In conclusion, the herbal medicines are natural but they also caused teratogenic effects. This is very harmful for foetus and mother's health, which caused high risk of foetal abnormalities or may leads to death of foetus. Self medication of pregnant women may cause pregnancy unsafe, therefore Every pregnant women must be concern to their provider or physician before taking any kind of medicines and herbal supplement. This is very helpful to make pregnancy safe and healthy.

REFERENCE :

- Duong A, Steinmaus C, Mc- Hale CM , Vaughan cp, Zhang L. Reproductive & developmental toxicity of formaldehyde: a systematic review. *Mutat Res* 2011.
- Rang HP , Dale MM , Ritter JM , fowler RJ Rang and dale pharmacology. 6th edition Edinburgh, UK : Churchill, Livingstone; 2007.
- Gilbert – Barness E. Teratogenic causes of malformations. *Ann clin Lab Sci* 2010.
- Bertollin R. Pagano M, Mastroiacovo P. What is human teratogen; clinical and epidemiological criteria. *Ann 1st super sanita* 1993.
- Nirit Bernstein, Muhammad Akram, Zohara Yaniv – Bachrach , Muhammad Daniyal It is safe to consume traditional medicinal plants during pregnancy? *Phytother Res* 2021 apr.
- Complementary and alternative care explained, NPS medicine wise, better health channel, Google scholar.
- Arring NM, Millstine D, Marks LA, Nail LM 2018, Ginseng as a treatment for fatigue: a systematic review, *Journal of Alternative & complementary Medicine*.
- Reviewed by a cleveland clinic medical professional in 2022.
- Articles from Birth defects Research are provided here courtesy of Wiley – Blackwell , John Wiley & sons.

- Teratogen information and abnormalities caused by synthetic and herbal drugs Refere from Google scholar.
- Written by Guest Author for the Healthy mom's magazine & legally licensed through the matcha publisher network.
- Department of pharmacology A.R. college of pharmacy, vallabh Vidyanagar India, FDA categories for drugs use in pregnancy, Indian Journal of pharmaceutical sciences, Pubmed.
- From 'What to Expect' for Herbal therapy, editorial team & Heidi Murkoff , author of what to expect.
- Uses , side effects, pictures of Herbal Medicines from Google scholar.
- Beata sarecka-Hujur & Beata Szolc – MuSiol , Herbal Medicines – they are effective & safe during pregnancy, Pubmed central.
- Dziwenji Makombe , Enalla Thombozi, Winnie Chilemba, Alexander Mboma, Herbal Medicines use during pregnancy and childbirth, BMC women's Health.
- Prasad Jamkhande , kalyani Chintawar , Prakash Chandak , Teratogenicity: A mechanism based short review on common teratogenic agents, Asian Pacific Journal of tropical Disease, 2014.
- Medically reviewed by Dr. Miguel Angel Razo Osorio (MD) , 10 Dangerous Herbs should be avoid during pregnancy, Mom Junction, 2023
- Medically reviewed by Traci C. Johnson , MD on Aug 2021, Alternative Therapies & pregnancy, Health & balance guide, WebMD.

