

Regular Article

Preliminary Phytochemical Analysis and Conservation of Herbs used by the Tribal people of Bolangir (Orissa), India as a Remedy against Threatened Miscarriage

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A phytochemical analysis of herbal plants used as a remedy against threatened miscarriage was made in the tribal dominated village panchayat of Bolangir, Orissa. The tribes like Sabar, Kondha, Gond and Mahar etc dominated the area of study where five species were identified such as *Corchorus olitorius*, *Carica papaya*, *Sida acuta*, *Ceiba pentandra* and *Heliotropium indicum*. The alkaloid, saponins, resins, flavonoids content of these plants mainly control the miscarriage without any side effects as they are of natural products. So the proper conservation of such precious medicinal plants is required for future use as these are in a verge of extinction due to various environmental constraints.

KEY WORDS- Phytochemical analysis, Herbs, Threatened miscarriage, Bolangir

A miscarriage is the spontaneous loss of a foetus before twenty weeks gestation i.e. before it can survive outside the womb. Miscarriage can occur even before a woman is aware that she is pregnant and it has been estimated that 1-5% pregnancies end in miscarriage (Homier, 2005). There are signs that reveal the probable occurrence of miscarriage which includes vaginal bleeding that may start as brownish discharge, cramps in the pelvic area, pain in the lower back and tissue or blood clots passing from the vagina. Miscarriage can be subdivided into threatened, inevitable, incomplete, complete, missed and habitual (Ifeoma, 2007). The focus of this study is on threatened miscarriage.

A threatened miscarriage is characterized by the absence of passing/passed tissue and the presence of a closed cervix. The treatments prescribed by

conventional doctors for this type of miscarriage are open to criticism, since there are no empirical data to support them. The prescription includes bed rest, avoidance of strenuous exercises and abstinence from sexual intercourse for sometime (Pokipoki, 2005). In this study we, therefore provide information on the herbs used by the tribal people for arresting threatened miscarriage as per the advice of village medicine man or kabiraj of panchayat called Bhutiyarbahal and chikalbahal of Bolangir, one of the backward districts of Orissa. Phytochemical analyses of identified herbal plants were also performed in order to search for bioactive agents.

The World Health Organization estimated that about 80% of people worldwide rely on herbal medicines for some aspect of their primary healthcare, especially

the tribal people as they have to travel a long distance to have their treatment in the Government hospital and also due to easy availability of the medicinal plants in the nearby forest on which they completely depends for their food to healthcare (Mohapatra and Sahoo, 2008). In this paper an attempt has been made to analyze the various herbal plants used by the tribal people of Bolangir (Orissa) as a remedy against the miscarriage.

STUDY AREA

The district of Bolangir (Orissa) is flanked in the North West by Gandhamardhan hills, a

name of Ramayan fame, the north east by the rock infested Mahanadi. It lies between 20°11' 40" - 21° 05' 08" northern latitude and 82° 41' 15" - 83° 40' 22" east latitude (Fig-1). The district is situated in the valley of rivers like Ang and Tel. It is in the western highlands of Orissa state with an average rain fall of about 1230 cm. and red sandy to red loamy soil nature. Out of 6 million tribal people about 62 notified tribe are seen in Orissa (Mohapatra, 1993). The three villages i.e. Chikalbahal, Kudasingha and Bhutiyarbahal are dominated by tribal like Kondha, Sabar, Gond, Mahar etc.

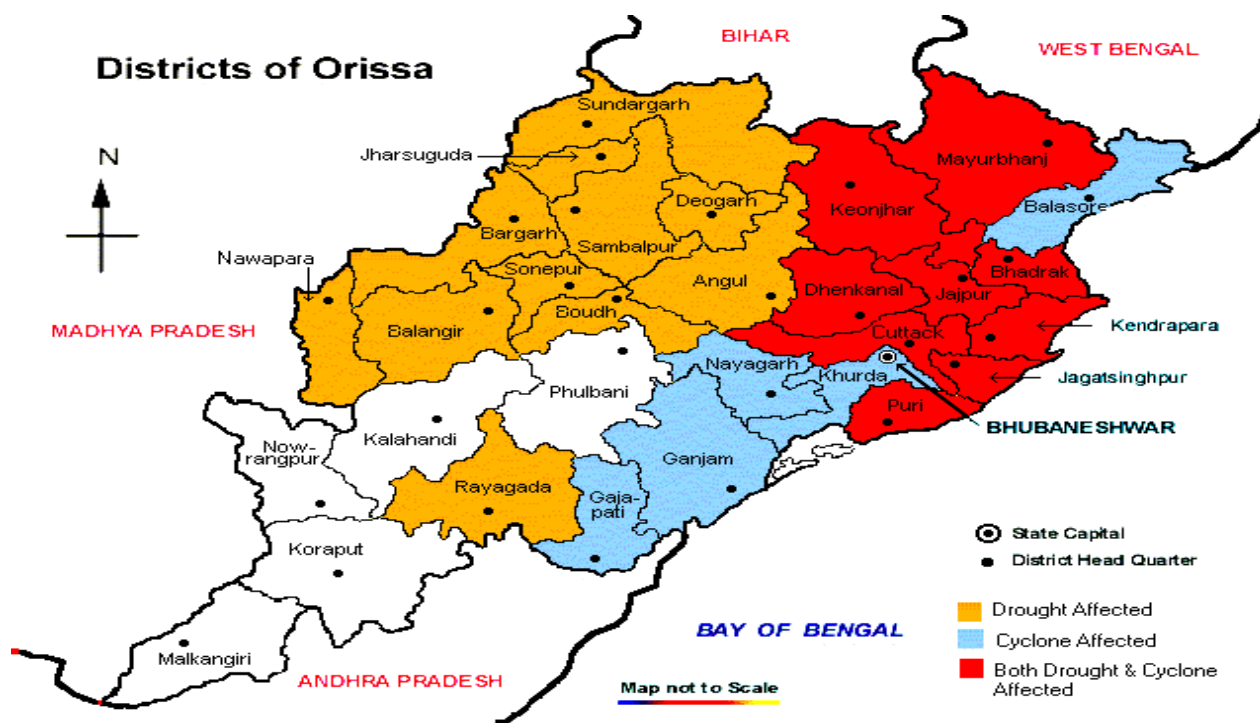


Fig-1 Map of Orissa showing Bolangir as draught affected district bordering Madhya Pradesh state

Bolangir is one of the drought affected district of Orissa due to less rainfall. The three study villages are about 30 Km. away from the Bolangir town. The villagers mainly depend on the forest available near village Chikalbahal for their lively hood.

METHODOLOGY

Identification and sample collection of herbs that can arrest threatened miscarriage

An oral interview method was used to obtain information on the availability of herbs that can be used against threatened miscarriage. Two herbal medical practitioners were

interviewed and were requested for spot verification to get additional information on the method of preparation of the said drug. In addition to this the women of sabar tribe of Chikalbahal village (Fig-7) were also interviewed about the disease. With the help of the practitioners the sample was collected and stored in the Department of Botany, Ravenshaw University, Cuttack for reference.

Sample preparation

The plant parts were sun-dried and separately ground into powder and the powdered materials were stored in airtight bottles before analysis.

Preliminary phytochemical analysis

The chemical tests were carried out on the powdered materials, using the procedures outlined by Harbourne (1973), Trease and Evans (1989).

RESULTS AND DISCUSSION

The herbal plants identified, the parts used, the method of preparation of the herbal drugs and dosages are shown in **Table 1**. The commonest parts of the plants that are used are leaves and the dosages are all the same and the decoctions are administered orally with the exception of *H. indicum*. The different phytochemicals found are shown in **Table 2**.

Generally, it could be observed that *Carica papaya* had more phytochemicals than the others. The species with least phytochemicals was *ceiba pentandra* (**Graph**). The presence of terpenoids and proteins was detected in all the plant species. Glycosides and saponins were detected in *Carica papaya* and *Sida acuta* only while acidic compounds were found only in *Carica papaya*

The presence of proteins and carbohydrates in most of the herbal plants may be a factor in arresting threatened miscarriage which is specifically due to malnutrition or infection. In other words, the

herbal plants may supply the needed micronutrients or their precursors.



Fig-2 *Carica papaya*, Family- Caricaceae



Fig-3 *Sida acuta*, Family- Malvaceae



Fig-4 *Corchorus olitorius*, Family- Tiliaceae

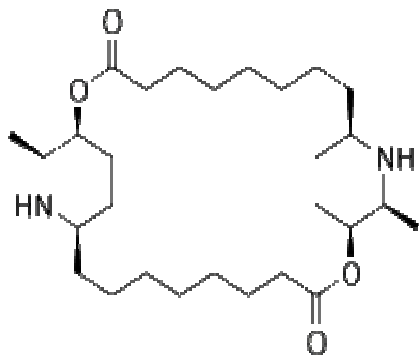


Fig-5 *Ceiba pentandra*, Family- Bombaceae

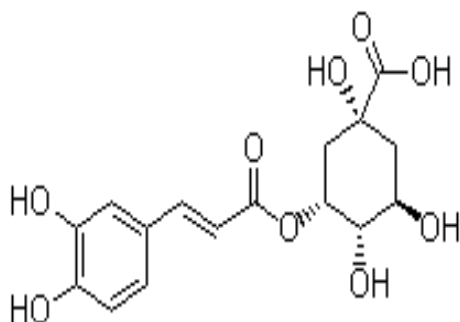
Natural oils are compounds of glycerol and fatty acids. One function of essential fatty acids is to serve as a precursor for the synthesis of eicosanoids, such as prostaglandins. The prostaglandin is a class of compounds whose effects are like those of hormones and they participate in many physiological processes (Garret and Grisham, 1995). The traces of oil observed in some of the plants may be involved in these processes and ultimately play a part in correcting hormonal imbalances which is one of the causes of threatened miscarriage.

Alkaloids have analgesic, anti spasmodic and bactericidal effects and this is the basis for their use as basic medicinal agents. The alkaloids identified in this study may function to control threatened miscarriage through these processes. Their analgesic properties may help to relieve pain in the lower back and abdomen; their antispasmodic properties may relieve cramps which may accompany bleeding from the uterus while their bactericidal effects may help to control infections. Infections may also be controlled by the presence of saponins which are identified in only two species in the present study. Oliver-Bever, 1986 had earlier reported that saponins have antibiotic properties and so help the body to fight infections and microbial invasion.

Tannins have also astringent properties, which hasten the healing of wounds and inflamed mucous membranes. These properties support the use of lemon juice in herbal medicine for the treatment of hemorrhoids among other disorders. This conclusion could be extrapolated to the use of plant species identified in this study for the treatment of threatened miscarriage which is characterized by bleeding from uterus.



Structure of Carpaine from *Carica papaya*



Structure of 5- Caffeoylquinic acid from *Corchorus olitorius*

The above two structure are Carpaine an alkaloid derived from the plant *Carica papaya* and 5- Caffeoylquinic acid (Neochlorogenic acid) is a phenolic compound derived from the leaves of *Corchorus olitorius* plant which has some antioxidant property.

The flavonoids have long been recognized to possess anti allergic, anti-inflammatory, antiviral, anti-proliferative and anti-carcinogenic activities as well as to affect some aspect of mammalian metabolism. The phytochemical analysis revealed the presence of flavonoids in all the herbal plants identified in the study. The anti-allergic function of flavonoids is particularly advantageous since it may help in the treatment of immune system disorders which are responsible for 5-10% of recurrent miscarriages. Since flavonoids prevent platelet stickiness they are probably wonderful remedies for the treatment of all

types of miscarriages. There is a synergy between the conventional and herbal treatment of miscarriage. Conventional treatment of recurrent miscarriage involves the use of daily doses of aspirin or heparin to 'thin the blood' and thus inhibit the clotting pathway (Randine, 2003). Flavonoids may also help to arrest threatened miscarriage due to their biological function of protection against microbes.



Fig-6 *Heliotropium indicum*, family- Boraginaceae

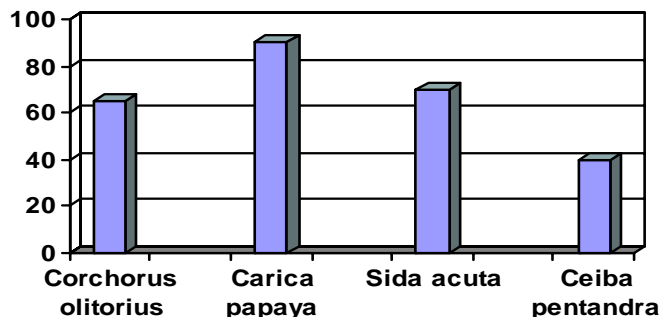
Plant steroids are collectively known as phytosterols (Roberts, 1971). They are mainly restricted to the plant membrane and may function there as cholesterol does in animal membranes (Goodwin and Mercer, 1983). Chiras (1999) had observed that cholesterol in humans is a raw material for the synthesis of other steroids such as vitamin D, bile salts and the sex hormones-oestrogen, testosterone and progesterone. Progesterone plays a role in the menstrual cycle and also helps to maintain pregnancy. Sterols identified in this study may perhaps involve in the synthesis of progesterone. **Figures 2-6** show the habit photographs of identified plants.



Fig-7 Author S.P.Mohapatra with the women of sabar tribe of Chikalbahal village

CONCLUSION

The present study has authenticated the usefulness of the identified plants for medicinal purposes. These species could also be seen as potential sources of useful drugs due to their rich contents of phytochemicals. The results that we get here will definitely add to the documentation of indigenous knowledge of herbal medicine.



Graph showing % of phytochemical content of identified plant species

Table 1. Herbal plants, parts used methods of preparation and dosages.

S N	Family and Scientific name	Common names	Parts used	Method of preparation	Dosage
1	Tiliaceae <i>Corchorus olitorius</i> L.	English- Jew's mallow Oriya- Jhota	Leaves	Collect equal quantities of tender leaves of <i>C. olitorius</i> and <i>Carica papaya</i> . Cook to a boiling point. Allow to cool very well and then dispense.	One tumbler, 3 times daily.
2	Caricaceae <i>Carica papaya</i> L.	English- Papaya Oriya- Amrut bhanda	Tender leaves	Same as in (1) above.	One tumbler, 3 times daily.
3	Malvaceae <i>Sida acuta</i> Burm. F.	Oriya- Bajramuli	Whole leaves	Cook the leaves to a boiling point. Allow to cool very well.	One tumbler, 3 times daily.
4	Bombacaceae <i>Ceiba pentandra</i> L.	English- White silk cotton Oriya- Sweta simuli	Stem bark	Cook the stem bark to a boiling point. Allow to cool very well.	One tumbler, 3 times daily.
5	Boraginaceae <i>Heliotropium indicum</i> L.	Oriya- Hatisundha	Whole plant and clay	Collect a reasonable quantity of the whole plant. Grind them very well. Then mix with clay in an ointment form.	Apply some quantity of the ointment around the waist of the patient.

Table 2 Phytochemicals detected in the identified plants.

Phytochemical	<i>Corchorus olitorius</i> L.	<i>Carica papaya</i> L.	<i>Sida acuta</i> Burm. F.	<i>Ceiba pentandra</i> L.
Carbohydrate	++	++	-	-
Reducing sugar	+	++	-	+
Alkaloids	-	++	+++	+
Glycoside	-	++	+	-
Saponins	-	++	+	-
Tannins	++	+++	+	+
Flavonoids	++	++	++	+
Resin	-	+	-	+
Proteins	+++	+++	+++	+
Oil	+	-	-	-
Steroids	+	-	+	+
Terpenoids	+	+	+	++
Acidic compound	-	+	-	-

+ - Present; ++ - Strongly present; +++ - Very strongly present; and - = absent.

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