

Full Length Research Paper

# The use of *Ficus capensis* Thunb (Moraceae) in African traditional medicine against female infertility and hypogalactia: literature review

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## Abstract

Treatment of infertility and promotion of exclusive breastfeeding are important components of strategies to promote progress in reproductive health. Given the difficulties in accessing medically assisted reproductive techniques and commercial dairy products, African populations sometimes rely on medicinal plants. *Ficus capensis* is a fig tree used in African traditional medicine to treat female infertility and hypogalactia. The objective of this work was to review the use of *Ficus capensis* in African traditional medicine treatment of female infertility and hypogalactia. Data were collected from the PRELUDE database, Persée, Google Scholar, ScienceDirect and Researchgate. Data collected showed that *Ficus capensis* extracts were used in the treatment of female infertility and hypogalactia in at least thirteen African countries. All regions of sub-Saharan Africa were concerned. The organs of the plant used to treat these two diseases were the roots, bark, leaves and fruits. Roots were most commonly used for infertility and bark for hypogalactia. These organs were used isolated or combined in various forms, including decoctions, macerations and infusions. These preparations were administered orally, intrauterine or by external application to the abdomen or breast. Histological and physiological effects of *Ficus capensis* extracts on breast and on female reproductive organs were not well documented.

**Key words:** *Ficus capensis*, female infertility, breastfeeding, hypogalactia, African traditional medicine.

## INTRODUCTION

Procreation and breastfeeding are part of the great function of reproduction, which remains necessary to the survival of the human species. According to the World Health Organization (WHO), infertility is a disease of the male or female reproductive system

defined to the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse (WHO, 2023). Infertility impacts millions of people worldwide. Lifetime infertility prevalence was 17.8% in high-income countries and 16.5% in low- and middle-income countries. Period infertility prevalence was 12.6% in high-income countries and 12.6% in low- and middle-income countries ones (WHO, 2023). Estimated period prevalence of infertility is highest in

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the WHO African Region (16.4%). In Burkina Faso, for example, the infertility prevalence was 9.3% and 10.4% for men and women respectively, and the overall hospital prevalence was 17.76% (Somé EN, 2016; Somé EN, 2016). In many sub-Saharan countries, women are the most affected by infertility. In these countries, female infertility is a cause of discrimination, stigma and violence against women (Mbow F, 2019; Ndikumana JDD, 2020). Unfortunately, access to assisted reproduction is difficult in low-income countries. This is due to the high cost of treatment and the lack of government subsidies (Njagi P, 2023). Reproductive health includes not only the treatment of infertility, but also the right to have a healthy child (United Nations Population Fund, 2021). In this context, the WHO and the United Nations Children's Fund (UNICEF) recommend exclusive breastfeeding for the first six months after childbirth (WHO/UNICEF 2019). In Africa, 80% of infants are breastfed. However, the recommended exclusive breastfeeding practice is not followed in all cases. In Burkina Faso, only 40-50% of infants are exclusively breastfed (Somé AMT, 2020). In sub-Saharan Africa, failing to breastfeed costs US\$557 million in additional health care costs and 55 million IQ points each year. (Ahsan S, 2022). Breastfeeding has the greatest impact on preventing malnutrition. Factors contributing to introducing other foods during the first six months of breastfeeding include agalactia and hypogalactia. Agalactia (Concept ID: C0152158) is the failure of secretion of milk following childbirth associated with an inability to breastfeed an infant. Hypogalactia (Code NCI Thesaurus: C34717) is the decreased secretion of breast milk.

The treatment of infertility and the promotion of exclusive breastfeeding are therefore important components of strategies to promote progress in reproductive health. Given the difficulties in accessing medically assisted reproductive techniques and commercial dairy products, some African populations use traditional medicine. African traditional medicine offers plants such as *Ficus capensis* as a solution to these two problems of female reproductive health. *Ficus capensis* is a fig tree. Traditional medicine is the sum total of the knowledge, skill, and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness (WHO, 2013). The WHO recommends the promotion of traditional medicine in the health policies of its member States. In its Strategy for Traditional Medicine 2014-2023, one of the strategic actions is to identify the sources of data, whether historical or scientific, that support or invalidate a particular therapy (WHO, 2013-traditional medicine strategy). We would like to contribute to this approach

by reviewing the literature on the use of *Ficus capensis* extracts in traditional medicine for the treatment of female infertility and hypogalactia. The aim of this work was to highlight African traditional medicine knowledge using *Ficus capensis* to treat infertility and hypogalactia.

## METHODOLOGY

This paper is a literature review on the use of *Ficus capensis* extracts in the traditional treatment of female infertility and hypogalactia. Data were collected from the PRELUDE database, Persée, Google Scholar, ScienceDirect and Researchgate using validated keywords and research equations. The sources of data on the use of *Ficus capensis* for female infertility and hypogalactia are published documents such as scientific articles and communications and edited books. Simple postings on social network sites or books, not supported by any ethno-pharmacological or ethnobotanical research, were not included. The WHO's 2014-2023 strategy for traditional medicine recommends the use of historical data. We have therefore selected data sources that go back several decades. The research focused on data related to concerned African countries. Extracts therapeutic methods of use and their physiological and histological effects on the mammary glands and female internal genital organs were also included. The data have been manually extracted from the selected sources and have been edited and processed using Microsoft Word and Excel 2016.

## RESULTS

The results are presented in the following order:

- distribution and botanical description,
- use in the treatment of infertility and hypogalactia in African traditional human medicine,
- use in the treatment of infertility and hypogalactia in African traditional veterinary medicine,
- available knowledge on the histological and physiological evidence of the pharmacological properties traditionally attributed to the plant.

### Distribution and botanical description

*Ficus capensis* Thunb also known as *Ficus sur* Forssk is widespread throughout tropical Africa, from Cape Verde to Somalia and as far south as Angola and South Africa. It is a 5 to 8 or even 30-metre-high plant (Arbonnier M, 2019). The trunk has an average diameter of 150 cm. The outer bark is brownish, grey or whitish and the inner bark goes greenish to pink. The tree top is massive and extensive. The spiral leaves are simple, bright red when they are young. The blade goes elliptic to oval (FIG. 1A), sometimes lanceolate (*Lumbile*



**Figure 1:** leaves (A) and green figs (B) of *Ficus capensis* Thunb (Moraceae). (Personal source).

**Table 1:** distribution of countries, methods of preparation and administration routes of products according to the organs of the plant used to treat human female infertility.

Organs of the plant used	Countries	Methods of preparation	Administration routes	Authors
Fruit only	Benin	Maceration	Abdominal massages, uterine enema	Natabou Dégbé F, 1991
	Benin	Maceration	Oral route	Houmenou V, 2017
	Senegal	Decoction	Oral route	Kerharo J and coll., 1964
Roots only	Zimbabwe	Infusion in water	Oral route	Bizimana N, 1994
	Mali	Powder + roasted maize + water or milk	Oral route	Malgras D, 1992
	South Africa	infusion	Unspecified	Van Wyk BE and coll., 2000
	Burkina Faso	Decoction	Oral route	Zerbo P and coll., 2011
	Senegal	Unspecified	Unspecified	Esievo K, 2018
Stem bark only	Senegal	Unspecified	Unspecified	Tignokpa, M, 1986
	Togo	decoction	Oral route	Assouma AF, 2018
Leaves, roots, bark and fruit	Nigeria	Unspecified	Unspecified	Olowokudejo J D and coll., 2008
	Senegal	Unspecified	Unspecified	Diop D, 2012
Latex	Ivory Coast	Unspecified	Oral route	Lansky EP and coll, 2010

AU, 2008). *Ficus capensis* produces figs on small, ramified, leafless branches. These branches grow on the trunk or older branches. The figs go ovoid to spherical (FIG. 1B). They are 1 to 4 cm in diameter and greenish yellow when ripe (Arbonnier M, 2019). All aerial organs produce a white latex.

### Use of *Ficus capensis* extracts in African traditional human medicine

#### Treatment of female infertility

Nine African countries were mentioned in this section.

**Table 2:** distribution of countries, methods of preparation and administration routes of products according to the used organs of the plant to treat human hypogalactia.

Organs of the plant used	Countries	Methods of preparation	Administration routes	Authors
Fruit only	Benin	Maceration	Unspecified	NatabouDégbé F, 1991
	Mali	Powder and water	Oral route and external application on the breast	Nordeng H and coll., 2013
Stem barksingly	Mozambica	Infusion with water	Oral route	Lansky EP and coll, 2010
	Ivory Coast	Decoction with water	Oral route	Ake Assi L, 1990
	Tanzania	Decoction	Oral route	Esievo K, 2018
Rootssingly	Senegal	Unspecified	Oral route and applied to the breast	Kerharo J and coll., 1964
Roots and bark	Guinea-Bissau	Unspecified	Unspecified	Catarino L and coll., 2016
Leaves and fruits	Ivory Coast	Maceration	Unspecified	Tra Bi Fézan H and coll., 1997
	Ghana	Decoction	Oral route	Addo-Fordjour P and coll., 2008
Leaves, roots and fruits	Nigeria	Unspecified	Unspecified	Olowokudejo J D and coll., 2008

**Table 3:** number of countries by plant organ used, method of preparation and administration route according to human therapeutic indication.

		Against infertility	Against hypogalactia
Plant organs	Fruits	3	5
	Roots	6	2
	Bark	3	7
	Leaves	1	3
Methods of preparation	Maceration	2	3
	Decoction	3	3
	Infusion	2	1
	Unspecified	2	3
Administration routes	Oral	7	6
	Local	1	3
	Unspecified	2	4

The countries, the methods of preparation and administration routes of the products according to the organs of the plant used are presented in Table 1.

**Treatment of hypogalactia**

This use was practised in nine African countries. Table 2 presents the countries as well as the methods for the

preparation and administration routes of the products according to the organs of the plant used.

Table 3 presents the number of countries found in the literature by plant organ used, method of preparation and administration route according to human therapeutic indication.

## Use of *Ficus capensis* extracts in African traditional veterinary medicine

### Stimulation of reproduction

In Senegal, the roots are used separately, roasted and applied on the udders by massage (Kerharo J and coll., 1974). There, the fruits are also used separately as a macerate to massage the abdomen and irrigate the uterus (Kerharo J and coll., 1974). In Ivory Coast, the leaves and fruits are administered orally in separate forms. Specifically, the leaves are taken in the form of a decoction and the fruits in a macerate, (Koné W M and coll., 2008; Ake-Assi Y A, 1992).

### Improve lactation

*Ficus capensis* has been used on ruminants. In Tanzania, an infusion of roots, bark and leaves was used to massage animals' udders to induce milk production (Lansky EP and coll, 2010). In South Africa, a mixture of leaves and bark has been used as an infusion, but the administration route is not specified (Bizimana N, 1994).

### Biological effects on breasts and reproductive organs

In this context, a study has reported that *Ficus capensis* extracts have increased prolactin secretion in Ivory Coast cercopithecidae (Sawadogo L, 1993).

## COMMENTS

*Ficus capensis* extracts have been used in at least thirteen African countries in the traditional treatment of female infertility and hypogalactia. It has been used in traditional human and veterinary medicine. Included countries were mainly those in the tree area of distribution. This area is vast and has many peoples with different cultural backgrounds. This may suggest that *Ficus capensis* extracts have a potential benefit in the treatment of female infertility and hypogalactia. All the organs of the plant have been used in the treatment of infertility and hypogalactia (Table 1, Table 2). These different organs of the plant have been used in isolated or combined form. In some preparations, extracts of *Ficus capensis* were combined with extracts of other plants. Preparation methods and administration routes were varied and adopted in all user countries (Table 1, Table 2).

Fruits and roots were the most commonly used in the treatment of infertility. Table 3 shows that roots were the most commonly used, with six out of thirteen countries using them. Decoction and maceration were the most common methods of preparation. Roots may

concentrate many active substances and are more suitable for adults (Zerbo P, 2011). However, harvesting the roots and figs of *Ficus capensis* can seriously affect its development or spread in the wild. However, as all plant organs have been used in isolated form in many countries, the active antifertility compounds are probably present in all tree organs. Phytochemical screening of *Ficus capensis* extracts has identified several active substances. Among the compounds found were flavonoids, polyphenols, quinones and tannins (Esievo K, 2018; Muanda NF, 2010; Sienawska E, 2022; Uchegbu NN, 2023). Flavonoids, polyphenols and tannins have been reported to have a beneficial effect on reproductive function (Novakovic R, 2022; Pasquariello R, 2020; Rahman SU, 2018; Rizzo G, 2022; Yin Z, 2021). Their beneficial effects would be mediated through estrogenic, anti-inflammatory and antioxidant actions. However, quinones and tannins are said to have dose-dependent adverse effects on reproductive functions (Manzoor F, 2020; Wocławek-Potocka I, 2013; Zhang Q, 2009).

Experimental studies have been carried out in Asia and Europe to verify the scientific evidence and safety of several plants reputed to be lactogenic (Bekoe EO, 2018; Chao J, 2021; Dietz BM, 2016; Forinash AB, 2012; Thakur M, 2023). In Africa, however, there is very little scientific evidence of the lactogenic properties of plants used to increase milk production. It is the case for *Ficus capensis*. In seven and five countries, respectively, bark and fruit were the most commonly used organs to treat hypogalactia. However, in these organs, compounds have been isolated from *Ficus capensis* that may enhance milk secretion. These compounds that could improve lactation are glycosides, flavonoids and phytosteroids (Novakovic R, 2022; Pasquariello R, 2020; Rizzo G, 2022; Sawadogo L, 1993). The lactogenic effects of the various compounds mentioned above are thought to involve increased prolactin production, oestrogenic activity and improved mammary blood flow (Dietz BM, 2016).

In the treatment of infertility and hypogalactia, maceration and decoction were the most commonly reported preparation methods. For preparations based on lactogenic plants, maceration and decoction were the most commonly cited in other studies (Agani Z, 2021; Nkounkou-Loumpangou C, 2005; Salifou CFA, 2017). Water was also the most commonly reported solvent. This could be because the active ingredients are soluble in water. This would be interesting as water is available and used by all populations. Oral administration was the most commonly reported administration route in the literature.

This administration route would suggest that *Ficus capensis* extracts would not always interact directly with the mammary gland or reproductive organs. The limited number of experimental studies on the biological effects

on lactation and infertility is at the origin of these many hypotheses. Toxicity studies have already been initiated. Some extracts have not shown toxicity (*Eluka P, 2015; Ezeigwe OC, 2020; Modamiro OD, 2021*). Other extracts have shown a toxic effect (*Aboaba SA, 2010*). Histological, physiological and pharmacological studies are needed to provide scientific evidence of the therapeutic effects of *Ficus capensis* on infertility and hypogalactia. These scientific research will provide an important contribution to African traditional medicine and, in particular, to the promotion of reproductive health.

## CONCLUSION

*Ficus capensis* extracts are used in several African countries to treat female infertility and hypogalactia. Few scientific studies have been conducted to investigate its lactogenic and anti-fertility properties. It would be useful to investigate the effects of these extracts on reproduction and lactation to confirm the biological effects traditionally attributed to them.

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