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AN ETHNOBOTANICAL STUDY OF HERBAL CONTRACEPTIVES USED BY LOCAL MEDICINE PRACTITIONERS IN BIDA, NIGER STATE, NIGERIA

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ABSTRACT

Background/Aim: *Most plants are naturally endowed with curative abilities now commonly sourced in phytotherapy. Medicinal plants usage for regulating fertility in Nigeria is popular due to their effectiveness, cheapness, easy accessibility and minimal side effects. Nigeria is the most populous country in Africa with about 218.5 million people as at 2021 and 232.68 - 237.5 million in late 2024 to 2025 mid-year; where birth rate outnumbers the death rate and most users are young women who prefer the medicaments after sexual intercourse; so, there is the need to control birth rate to prevent further escalation in population growth.*

Methods: *Questionnaires were administered to both the Traditional Medicine Practitioners (TMPs) and users of herbal birth control medicines in three major markets in Bida metropolis, Niger state.*

Results: *Data presented are from the ethnobotanical survey from 220 participants. The names of the plants used as contraceptives or abortifacients and the methods of preparation of these recipes are presented. The results from the survey contained 26 species of medicinal plants including Crotalaria mucronata, Mangifera indica, Securidaca longepedunculata and Vernonia amygdalina. The most frequently used plants for contraception or abortifacient are Newbouldia laevis, Ricinus communis and Azadirachta indica.*

Conclusion: *Further pharmacological screening into the reported plants distributed in 28 genera belonging to 24 families is strongly suggested to ascertain or disprove the claims of the TMPs.*

Keywords: Contraceptives, Pharmacological screening, Questionnaires, Recipes, Traditional Medicine Practitioners (TMPs)

INTRODUCTION

The alarming increase in the world population has warranted the search for fertility regulatory drugs of plant origin due to the various adverse effects that are usually associated with synthesized contraceptives.

The Population Reference Bureau (PRB) estimated the world population as 7.4 billion which was projected to reach 9.9 billion in 2050, up to 33% from the 7.4 billion estimated now (PRB, 2016). World Population Data Sheet 2024 calls for investment in primary health care (SDG Knowledge Hub) mentions the current global population is over 8 billion, projecting nearly 9.6 billion by 2050 (PRB, 2024). As part of a project funded by the Bill and Melinda Gates Foundation, PRB has been supporting Young Ambassadors (YA) for family planning from the nine member states of the Ouagadougou partnership (OP). The OP focuses on meeting unmet family planning needs in its nine member states (Benin, Burkina Faso, Côte d'Ivoire, Guinea, Mali, Mauritania, Niger, Senegal and Togo) in francophone West Africa, which have collectively pledged to add 2.2 million more family planning users between 2015 and 2020 (PRB, 2016). The OP has been widely recognized for making significant progress towards its goals, having reached over 4 million additional contraceptive users by 2021. Its current goal is to reach 13 million modern method users by 2030.

Nigeria according to National Population Commission (NPC) is the most populous country in Africa with about 218.5 million people as at 2021 and 232.68 – 237.5 million in late 2024 to mid-year 2025 as against the 140, 431,790 million recorded in the last census in 2006; using an annual

growth rate of 3.5% weighed against other variables such as rising expectancy and a declining infant mortality rate (NPC, 2015; PRB, 2024).

The need for birth control methods of plant origin is therefore urgently needed as 80% of population in the developing world of which Nigeria belongs depend on herbal treatment due to gross unemployment resulting in poverty, low cost of herbal medicines and non-availability of modern medicine (WHO, 2000). It has been estimated that traditional medicine is the only healthcare resource accessible to one third of the Nigerian population (Ogunbodede, 1997; Joel *et al*., 2025). Ethnotherapies are now acceptable in many parts of the world and no longer seen as witchcraft, myth, ungodly practices or superstition (Wanzala *et al*., 2005; Ebo *et al*., 2019).

There is now an increasing usage of medicinal plants, botanicals or herbal preparations especially in developing countries where majority depends on herbal treatments which are readily available. There is an estimate of about 80% of world population that depend primarily on herbal treatment for both human and animal diseases (Farnsworth *et al*., 1975; WHO, 2023). The use of herbal treatment of local health problems has been encouraged by WHO where the herbal preparations were already integrated in the culture of the people and are affordable (WHO, 2003). Herbal contraceptives are commonly used because they are affordable, availability from local sources and with lesser side effects compared to the factory synthesized drugs (Gupta *et al*., 2006; Aina and Aina-Pelemo, 2019; Sewani-Rusike and Nkomo, 2022). Numerous plants are widely used as contraceptives, abortifacient or sterility agents in many developing countries (Hubscher *et al*., 2005; Adia *et al*., 2025). Herbs and herbal products have proved to be effective and safe alternatives to costly and toxic factory-made drugs, hence, there is a renewed interest in the use of herbal preparations (Hoet *et al*., 2004; Abubakar and Haque, 2023; Kamble and Patil, 2025).

HERBAL CONTRACEPTIVES

Herbal contraceptives are those plants used for birth control or in the prevention of pregnancy. Many plants have been reported to have sterilizing, contraceptive properties. Plants that have contraceptive properties may act through rapid expulsion of the fertilized ova from the fallopian tube, inhibition of implantation due to a disturbance in oestrogen-progesterone balance, foetal abortion, perhaps due to lack of supply of nutrients to the uterus and the embryo, and also on the male side through affecting sperm count, motility and viability (Kaunitz and Benrubi, 1998; Nounmi and Tchakonang, 2001; Ciganda and Laborde, 2003; Tran *et al*., 2020; Banerjee *et al*., 2025). In Nigeria, some women prefer this alternative means of birth control as it constitutes little or no side effects when compared to the synthetic contraceptives and other abortion pills; because of a number of reasons, patronage of traditional medicine practitioners (TMPs) by the people has been on the increase in the recent times. People patronize them for a wide range of ailments which they claim are cured by herbs. The herbal preparations or recipes are formulated by traditional healers who have enviably great knowledge of medicinal herbs, though many, if not all, do not know the active properties or toxicological effects of these herbs. In this research, the Traditional Medicine Practitioners (TMPs) recommended water, 'Schnapps' (hot drink), corn pap and palm oil for preparing the recipes. The recipes are available as decoctions, concoctions, milled powder, burnt black preparations and masticatory. Other approaches involve use of rings and other waist wands which have been previously soaked in recipe(s). The efficacy of the preparations was expounded both by the TMPs and users. All parts of the plants were also reported to contain the bioactive compounds.

TYPES OF CONTRACEPTIVES

Both women and men wish to have control over when to become parents. Making choices about birth control methods is not easy. There are many types of birth control methods, also referred to as contraception and fertility control to prevent pregnancy. Some common options are abstinence, natural family planning or the rhythm method, barrier methods like female or male condoms, hormonal methods like oral contraceptives, implantable devices and emergency contraception, such as the 'morning after pill'. Those who do not want to have children may opt for a permanent sterilization solution. There is no best method of birth control and even the most effective birth control methods can fail, with the exception of abstinence. Some herbal solutions also can be used for birth control. Certain herbs have the ability to interfere with implantation, which means the herbs make it difficult for a fertilized egg to implant or maintain its grip on the uterine wall. If the egg is unable to implant on the uterine wall, it begins to break down and menstruation will occur as usual (Ellington *et al*., 2013; David *et al*., 2024).

MODE OF ACTION

Contraceptives from plant origin block progesterone synthesis, disrupting implantation, and are most effective as emergency contraception. The extracts of the seeds disrupt the implantation process, and a fertilized egg will find implantation very difficult. Some herbs have spermicidal action; for instance, in women, a single injection of a minute amount of neem oil in the uterine horns (the points where the uterus and fallopian tubes meet) will create a reversible block in fertility for a year without causing changes in menstrual cycle or ovarian function (Top 10 Home

Remedies Team, 2018; Adeyemi and Idris, 2022; Praveena and Gajalakshmi, 2025).

Neem, also called Indian lilac, is a popular herb used extensively for birth control for women as well as men. For men, ingesting Neem leaf tablets for one month produces reversible male anti-fertility. As a birth control method, Neem leaf extract and oil are used. Oil extracted from Neem can slow the motility of sperm, preventing their ability to reach their destination to fertilize the egg. In fact, Neem oil can kill sperm in the vaginal region within 30 seconds. Even daily oral doses of Neem seed oil in gelatin-capsule form can also be taken as birth control. Using Neem as a birth control method does not affect sperm production or libido. Along with preventing pregnancy, Neem also provides protection from vaginal and sexually transmitted diseases due to its antibiotic, antiviral and immune-stimulating properties (Top 10 Home Remedies Team, 2018; Tiwaskar, 2023; Priya *et al*., 2025).

Some of these herbs contain two uterine-contracting substances e.g. Blue cohosh, one that mimics the hormone oxytocin, and the other a saponin called Caulosaponin. Some herbs work as an emmenagogue (induce) to promote menstrual flow and as an abortifacient to initiate self-abortion e.g. Pennyroyal (Dugoua *et al*., 2008; Top 10 Home Remedies Team, 2018).

HEALTH/SIDE EFFECTS

Natural birth control should be taken cautiously as it can cause liver, kidney and nervous system damage and a host of other problems e.g. Pennyroyal. Some people may experience mild side effects like constipation for a few days when using these herbs. For example, Queen Anne's Lace may not be suitable for those with a history of kidney or gallstones. Each has pros and cons such as toxicity to gonads, infertility on temporary or permanent basis, testicular germ cell cancer, breast or prostate cancer, brain developmental problems, endometriosis and early puberty etc. Some people after taking these herbs experiences nausea and vomitting (Kauntz, 2016; Feng *et al*., 2023).

This study is a contribution to ethnobotanical and floristic studies in Nigeria carried out with the intents of throwing more light on the patronage of herbal medicine in Nigeria, especially in the area of birth control, to document some of the well-known plant species which are used for controlling birth for further chemical and pharmacognostic research into the bioactive compounds. Moreover, it also serves as a record of useful medicinal plants in Nigeria because most African herbalists do not keep records.

MATERIALS AND METHODS

Questionnaires were administered to both the Traditional Medicine Practitioners (TMPs) and users of herbal birth control drugs in three major markets (New market, Old market and Small market) in Bida Metropoly, Niger state (Kayode, 2002, John *et al*., 2023). Two Hundred and twenty (220) voluntary respondents agreed to provide answers to questions raised in the Questionnaire, some of which were answered correctly and multiple answers were given by others. Some of the questions asked were: source of knowledge, experience in the trade, plant names used, source of plant materials, method of preparation, age of users or customers, solvent for preparation, application methods (before pregnancy or after pregnancy; before sexual intercourse or after sexual intercourse) and Nuptial status of customers(single or married).The botanical identities of the plants used in the medicinal preparations were determined using Flora and Plant Science and Biotechnology Unit of Biological Science Department in Nasarawa State University, Keffi, Nigeria. However, it was pretty difficult to obtain information from most of the respondents because of fear of defrauding and attrition of knowledge. As usual, leaf, bark, stem, root, rhizome, bulb, fruit, seed and whole plant are the materials used in various combinations for the medicinal preparations; they can be harvested during vegetative and reproductive growth (Sofowora, 2006; Birhan, 2022). The preparations may be drunk or worn as local rings made from Aluminium or alloy steel after soaking in the medicinal preparations.

RESULTS

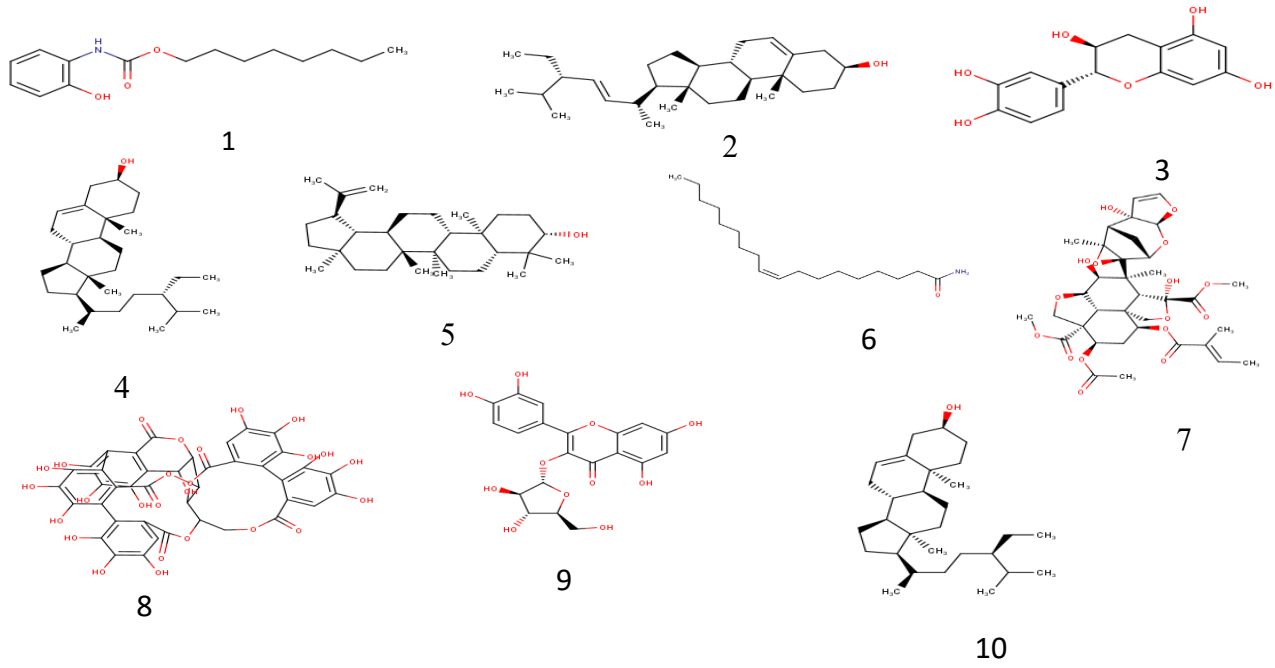
In this paper, plant species focused mainly on those reported by the local people in and around the study area for their therapeutic uses. Presented data are the general results of the ethno-medicinal survey from 220 participants interviewed. The current research contains 26 species of ethnomedicinal plants distributed in 28 genera belonging to 24 families used commonly as traditional remedies for contraceptive purpose (Table 1). The plant species were enumerated, and arranged alphabetically with their scientific, family and local names, plant parts used and mode of action (Table 1). The most frequently used contraceptive plants were *Newbouldia laevis*, *Ricinus communis*, Azadirachta indica, *Crotalaria mucronata*, *Mangifera indica*, *Securidaca longepedunculata* and *Vernonia amygdalina*.

Table 1: **List of plants with Anti-fertility activity either as contraceptive or abortifacient**

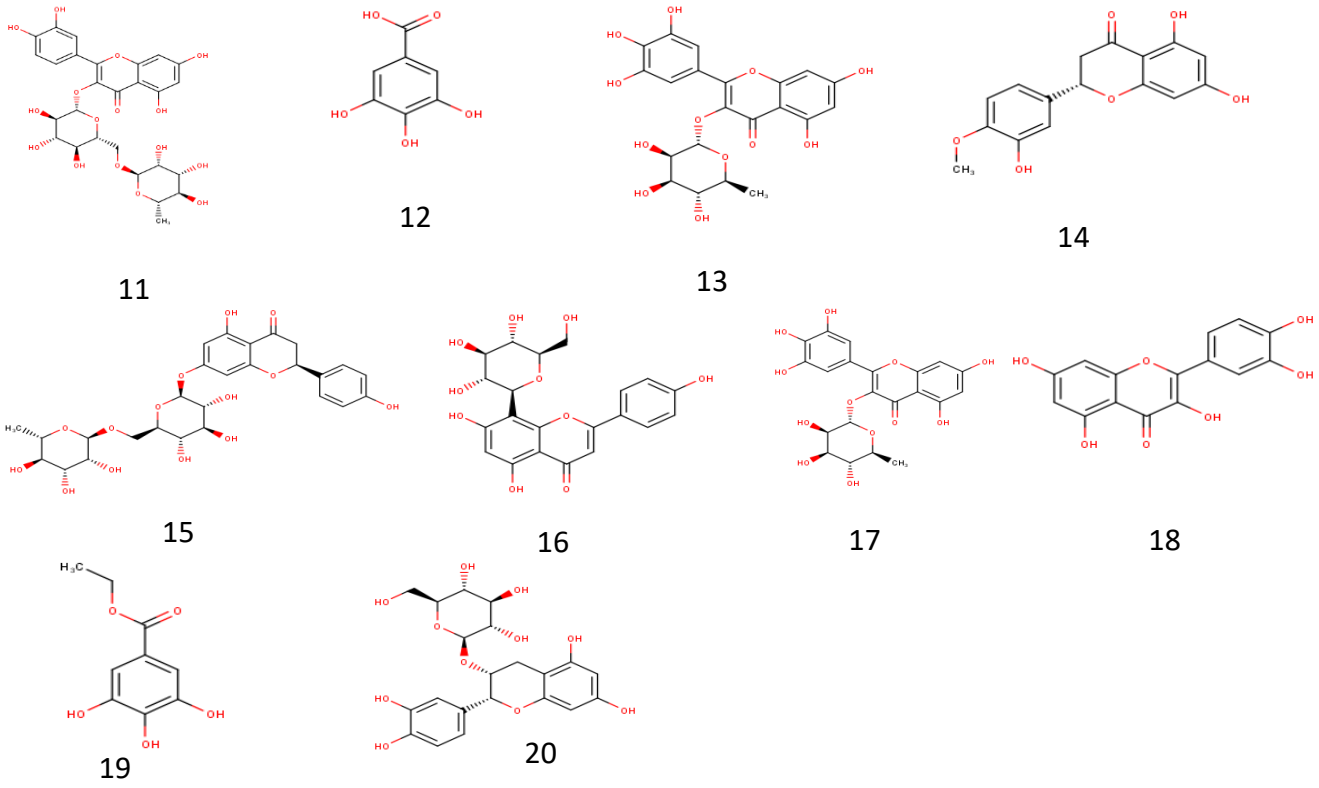
BOTANICAL NAME	COMMON NAME	FAMILY NAME	LOCAL NAME: HAUSA	LOCAL NAME: IBO	LOCAL NAME: YORUBA	PLANT PARTS USED	MODE OF PREPARATION	EFFECTS
Acacia nilotica	Egyptian mimosa	Fabaceae	Cika-gidaa	Ogiri – ugba	Baani, Booni, lara	Seed	Soaked in water	To reduce sperm count
Acacia seyal	Wild mango	Fabaceae	Kiraafi	Obono		Leaves, roots	Decoction of leaves and roots	Ccontraceptive
Aframumum melegueta	Alligator pepper/ Grains of paradise	Zingiberaceae	Tsita, Chita	Atare	Ose oji	Seed	The seeds are eaten raw	Contraceptive
Annona senegalensis	Afrcan custard apple	Annonaceae	Gwándàndààjìì	Utu	Abo, Ibobo	Leaves, Roots	Decoction of leaves and roots is taken orally	Contraceptive
Ansellia congoensis	African leapard	Orchidaceae	Màntàúúwáá			Leaves	Decoction of leaves is taken orally.	Contraceptive
Azadirachta indica	Neem	Meliaceae	Dar bejiya Dogwon-yaro	Ogwuiba, Dogoyaro	Dongoyaro	Leaves	Juice extracted from leaves is taken orally	Contraceptive
Calotropis procera	Sodom apple	Asclepiadaceae	Tùmfááfìyáá		Bomubomu	Leaves	Juice extracted from the leaves is taken orally	Contraceptive/ Abortifacient
Carica papaya	Pawpaw	Caricaceae	Gwándà	Okwuru bekee	Ibepe	Leaves	Juice extracted from leaves is taken orally	Contraceptive/ Abortifacient
Cassia arereh	Golden shoutes	Fabaceae, Leguminosae-Caesalpinnioid-eae	Màrgáá		Papa eyinju	Leaves	The boiled leaves are taken orally	Contraceptive
Citrus aurantifolia	Lime	Rutaceae	Lèèmóó, Dankabuya	Oroma-nkirisi, Epenkirisi	Osan wewe	Leaves, fruit	Decoction of Leaves and juice from fruitis taken orally	Contraceptive
Chrysophyllum africanum/ *C. albidum*	Cherry, African Star Apple	Sapotaceae	Agwaliba Agwalima	Udara	Agbalumo	Seed	Grind and mix with honey, sun-dry and roll into balls, insert	Contraceptive/ Abortifacient

							into the private part (female).	
Citrus aurantifolia	Lime	Rutaceae	Leemo, Dankabuya	Oromank-irisi	Osan wewe	Leaves, fruits	Decoction of leaves and juice from fruits is taken orally	Contraceptive
Crotalaria mucronata	Rattle pod	Fabaceae	Ráánáá	Akidi-mmuo	Koropon-eniju	Whole plant	Whole plant is crushed and extracts taken orally.	Contraceptive
Gardenia erubescens	Cape jasme	Rubiaceae	Gáudȅ	Ulimili	Orotu	Roots	Decotion of root is taken sorally	Contraceptive
Guiera senegalensis	Gardenia	Combretaceae	Sàábáràà		Barbatta, Olotun	Leaves	Decoction of leaves is taken orally.	Contraceptive
Hymenocardia acida	Large red heart	Hymenocardiaceae	Jányáárò	Ikalaga	Abopa, Orupa	Leaves, Stem bark	Decoction of leaves, stembark is taken orally	Contraceptive
Khaya ivorensis	African mahogany	Meliaceae	Máɗàácíí	Ono	Oganwo	Leaves	Decoction of leaves is taken orally	Contraceptivev e
Mangifera indica	Mango	Anacardiaceae	Màngwàrò	Mangoro	Mangoro	Leaves	Decoction of leaves is taken orally	Contraceptive
Moringa oleifera	Drum stick, Horse radish tree	Moringaceae	Zogala gandi	Okwe oyibo	Adagba malero	Flower and Exudates	Decoction of flower is taken orally. Exudates should be dissolved in hot water and taken orally	Contraceptive
Newbouldia laevis	Tree of life, Fertility plant	Bignoniaceae	Àdùrúúkù	Ogirisi	Akoko	Leaves	Decoction of leaves is taken orally before sexual intercourse	Contraceptive
Ocimum gratissimum	Balsam, Scent leaf	Cesalpiniaceae	Ɗâɗɗóóyàtágídáá	Nchuanwu	Efirin-nla, Oromoba	Leaves	Juice extracts from the leaves is taken	Contraceptive
Ricinus communis	Castor	Euphorbiaceae	Zùrmân	Kpiikpi	Lapalapa adete, Ewe-laa, Laa-funfun	Seed	Seed is eaten raw	Contraceptive
Securidaca longepedunculata	Violet tree /Mother of all medicines	Polygalaceae	Sányáá		Ofodu, Ipeta, Epeta	Leaves	Decoction of leaves taken	Contraceptive/ Abortifacient

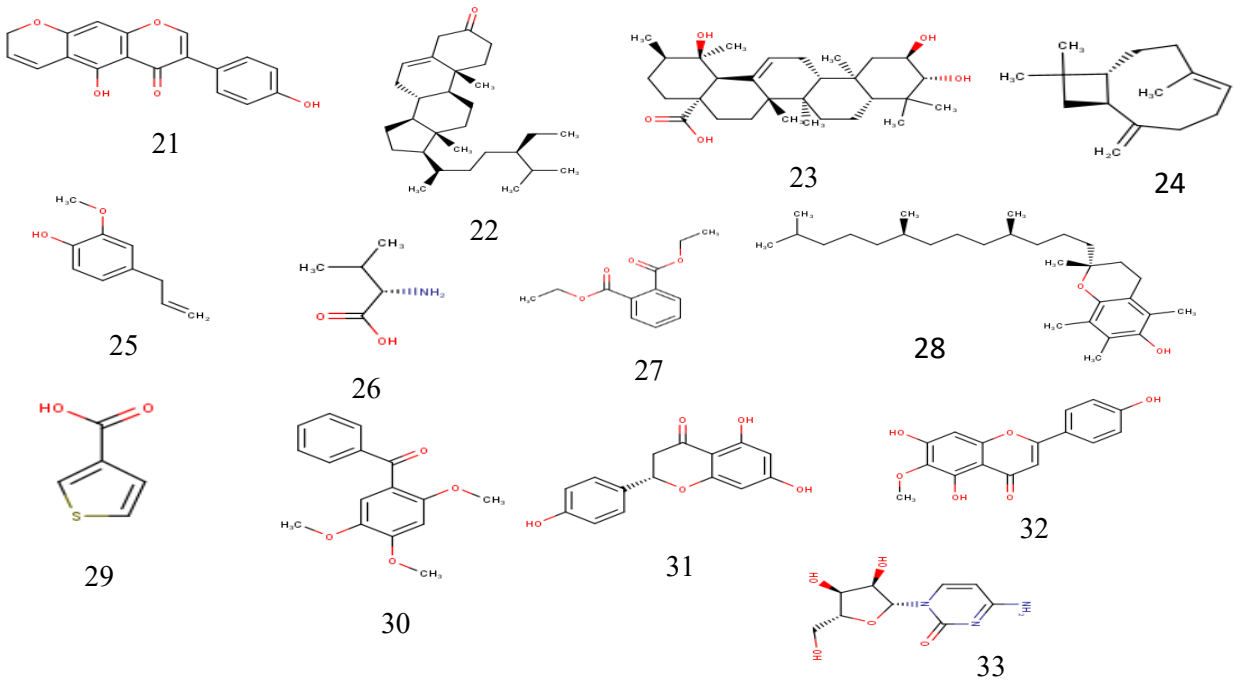
							Decoction of root bark taken	
Sorghum vulgare	Guinea corn	Poaceae	Karandafi	Dawa	Okaa baba, Poporo	Stem	Grind stems with potash and alum, mix with hot drink (Schnapp/dry gin) or lime water	Contraceptive
Terminalia spp	Tropical Almond tree	Combretaceae	Báushè		Furuutu	Leaves	Juice extracts from the leaves is taken orally	To reduce sperm count
Vernonia amygdalina	Bitter leaf	Asteraceae	Shìwáákáá	Onugbu	Ewuro / Olubu	Leaves / Root	Decoction of leaves and roots is taken orally	Contraceptive
Waltheria indica	Sleepy morning	Malvaceae	Hànkúfáá		Ewe-epo Epa-esure	Leaves	Decoction of leaves are taken	Contraceptive
Xylopia aethioca	Guinea pepper	Annonaceae	Kanafari	Uda	Eeru –alamo; Olorin	Seeds	Decoction of grinded seeds is taken	Contraceptive at low concentration. Abortifacient at high concentration.
Zingiber officinale	Ginger	Zingiberaceae	Tchita	Oseala	Ataare	Root	Decoction of blended root is taken orally	Contraceptive



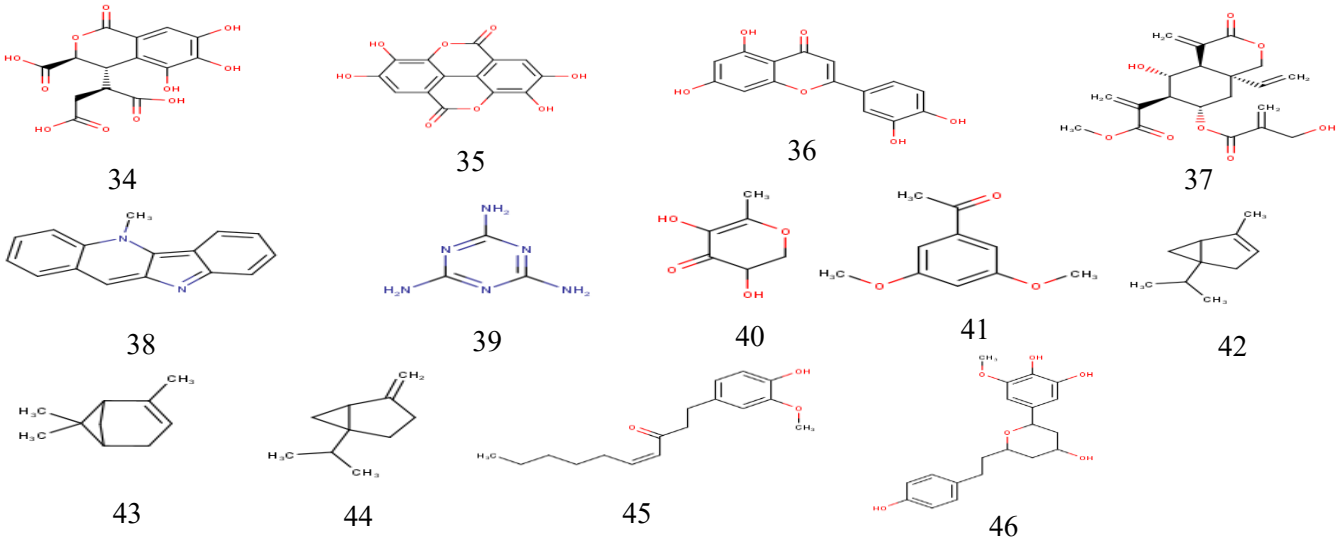
Figures 1-10: Some molecules reported in some contraceptive plants used in Bida, Niger State
Nilocarbamate **1**, Stigmasterol **2**, Catechin **3**, Clionsterol **4**, Lupeol **5,** Oleamide **6**, Azadirachtin **7**, Castalagin **8**, Avicularin **9**, β-sitosterol **10**



Figures 11-20: Some molecules reported in some contraceptive plants used in Bida, Niger State
Rutin **11**, Gallic acid **12**, Myricetin 3-rhamnoside **13**, Hesperitin **14**, Narirutin **15**, Vitexin **16**, Myricitrin **17**, Quercetin **18**, Ethylgallate **19**, Epicatechin-3-O-β-glucopyranoside **20**



Figures: 21-33: Some molecules reported in some contraceptive plants used in Bida, Niger State
5-hydroxy-3-(4-Hydroxylphenyl)pyrano[3,2-g]chromene-4(8H)-one **21**, β-sitosterone **22**, Tormentic acid **23**, β-caryophyllene **24**, Eugenol **25**, L-valine **26**, Diethyl Phthalate **27**, Tocopherol **28**, 3-Thiophenecarboxylic acid **29**, 2,4,5-trimethoxybenzophenone **30**, Naringenin **31**, Hispidulin **32**, Cytidine **33**



Figures 34-46: Some molecules reported in some contraceptive plants used in Bida, Niger State
Chebulic acid **34**, Ellagic acid **35**, Luteolin **36**, Vernodalol **37**, Cryptolepine **38**, 1,3,5-Triazine-2,4,6-Triamine **39**, 2,3-Dihydro-3,5-Dihydroxy-6-methyl-4Hpyran-4-one **40**, 3',5'-Dimethoxyacetophenone **41**, α-Thujene **42**, α-Pinene **43**, Sabinene **44**, 6-shogaol **45**, 1,5-epoxy-3-hydroxy-1-(3-methoxy-4,5-dihydroxyphenyl)-7-(4-hydroxyphenyl) heptane **46**

DISCUSSION

Plants have been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been isolated from plant sources. Plants as contraceptives were well known to the traditional doctors in Nigeria. A variety of medicinal plant extracts have been tested for their antifertility activity both in male and female animal models' activity and the bio-active agents. Many herbs have been used traditionally to decrease fertility and current scientific research has long established the true antifertility effects in at least some of the plants tested. Herbal contraceptives may never reach the level of contraceptive protection as the synthetic contraceptives, but they present an alternative for women who have difficulty with modern contraceptive options or who just want to try a different way. The medical researchers have recorded plants that could be used as anti-fertility agents, anti-serotonergic, anti-ovulating, anti-spermatogenic and abortifacients (Olatunji-Bello and Aliu, 2000; Shaik *et al*., 2017; Goswami and Basak, 2021). The use of medicinal plants as decoction and infusion may be consistent with phyto-pharmacological effects. So many scientists have already proved plants with male antifertility properties (Liu and Lyle, 1987; Qian, 1987; Lohiya *et al.*, 2001; Kamal, 2003; Chauhan *et al.*, 2007; Jahan *et al*., 2009; Shaik *et al*., 2017; Iftikhar *et al*., 2022; Adeniyi and Alo, 2025) and the present study shows the additional medicinal plants which can be used for further studies on antifertility activities.

Recently, many laboratories are engaged in developing male contraceptives from plants (Singh and Singh, 2009; Chandramouly *et al*., 2024; Sethi *et al*., 2019; 2025). Natural products as contraceptives will be more satisfactory for financial purposes in terms of self-sufficiency and the likely practicability for a male pill approach in countries such as Nigeria where population is high. Studies on the effects of medicinal plants on male reproductive system and fertility are relatively rare and unbelievable e.g. *Azadirachta indica* (Udoh and Kehinde, 1999; Sathiyaraj *et al*., 2010; Alahmadi, 2020; Amir-Zarga *et al*., 2022; Oguntibeju and Owira, 2025).

CONCLUSION

The study of modern herbalism (phytotherapy) on contraception is rapidly evolving throughout the world. The curative parts of a plant are not simply its wood, stem or its leaves but the phytocompounds such as saponins, flavonoids, alkaloids, tannins, phenols, carotenoids, etc. present in these plants. Hence, this contribution is not a campaign against synthetic contraceptives and abortion pills. It was reported that some women respond well to herbal means of contraception and abortion, while others respond or react better to the synthetic pills. The sole objective of both types of medicine is to restore the patient to good and normal or desired health condition. This attempt has documented names of plants which have the potential to control fertility or child birth rate. The claims of the Traditional Medicine Practitioners should be investigated by subjecting these plants to further pharmacognostic screening and government support is strongly solicited. Thus, this study is a contribution to ethnobotanical and floristic studies in Nigeria.

Ethics approval and consent to participate

Not Applicable

Consent for publication

Not Applicable

Competing interests

The authors declare that there is no conflict of interest regarding this research.

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Authors' contributions

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Writing the paper: Olayinka T. Ogunmefun, Pauline U. Obi and Onome M. Adeboye

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REFERENCES

Abubakar, A. R. and Haque, M. (2023). Advancing herbal medicine: enhancing product quality and safety through contemporary analytical techniques. *Frontiers in Pharmacology*, 14: 1265178.

Adebayo, B., Olorunfemi, O. and Moronkola, O. (2013). An examination of the usage of herbal contraceptives and abortifacients in Lagos State, Nigeria. *Journal of African Studies and Development*, 5(5): 114–122.

Ademoye, M. A., Lajide, L., Owolabi, B. J. and Onubogu, C. C. (2018). GCMS analysis of raw and roasted seeds of *Chrysophyllum albidum*, a medicinal plant used

for the treatment of tuberculosis. *International Journal of Scientific Research and Management*, 6(08): 18–27.

Adeniyi, A. A. and Alo, O. (2025). Exploring the Male Antifertility Potential of Medicinal Plants. *Pharmacognosy Research*, 17(2), 462-475.

Adeyemi, M. M. H. and Idris, M. A. (2022). Reproductive Effects of Medicinal Plant (*Azadirachta indica*) Used as Ethnoveterinary Medicine in Breeding Female Rats. *Molecules*, 27(16): 5174.

Adia, M. M., Kamatenesi-Mugisha, M., Musaya, S. and Rupwom, J. G. (2025). Medicinal plant species used for contraception and reproductive health care in rural communities of Western Uganda. *Heliyon,* 11(1): e000000.

Ahmed, M. E., Senabe, J., Yahaya, E. S., Fouche, G., Steenkamp, P. and Steenkamp, V. (2022). Isolation and antioxidant activity of 5-methyldihydroflavasperone from ethanol leaf extract of *Guiera senegalensis* JF Gmel. *Journal of Medicinal Plants for Economic Development*, 6(1): 137.

Ahmed, M. U., Arise, R. O., and Umaru, I. J. (2022). Identification and biochemical characterization of anti-enteropooling compounds from *Annona senegalensis* root bark. *Scientific African*, 15: e01128.

Aina, O. O. and Aina-Pelemo, A. R. (2019). Production and Development of Herbal Contraceptives in Nigeria: The Roles of the Ethnobotanist and Standards Organization of Nigeria. *Global Journal of Research in Engineering*, 19(2): 35–42.

Aladejare, T. T., Obuotor, E. M. and Aderogba, M. A. (2018). Isolation and characterization of antioxidant compounds from *Annona senegalensis* leaf extracts. *Nigerian Journal of Natural Products and Medicine*, 22: 124-128.

Alahmadi, B. A. (2020). Effect of Herbal Medicine on Fertility Potential in Experimental Animals – an Update Review. *Materia Socio-Medica* (*Mater Sociomed*), 32(2): 140-147.

Al-Taweel, A. M., Perveen, S., Fawzy, G. A., Rehman, A. U., Khan, A., Mehmood, R. and Fadda, L. M. (2017). Evaluation of antiulcer and cytotoxic potential of the leaf, flower, and fruit extracts of *Calotropis procera* and isolation of a new lignan glycoside. *Evidence-Based Complementary and Alternative Medicine*, 2017: 1-14.

Ambali, O. A., Oguntimehin, S. A., Ajaiyeoba, E. O., Ogbole, O. and Adeniji, A. J. (2021). Bioassay-guided isolation of cytotoxic constituents of *Aframomum melegueta* K. Schum. seeds. *Nigerian Journal of Natural Products and Medicine*, 25(1): 80-85.

Amir-Zargar, H., Ghorbani, A. and Shahrestani, S. (2022). The most important medicinal plants affecting sperm and testosterone production: a systematic review. *Journal of Brazilian Association of Assisted Reproduction* (*JBRA Ass Reprod*), 26(3): 522-530.

Bader, A., Abdelhady, M. I., Shaheen, U., El-Malah, Y., Abourehab, M. A. S. and Barghash, M. F. (2015). *Azadirachta indica* as a source for antioxidant and cytotoxic polyphenolic compounds. *Biosciences Biotechnology Research Asia*, 12(2): 1209-1222.

Banakar, P. and Jayaraj, M. (2018). GC-MS analysis of bioactive compounds from ethanolic leaf extract of *Waltheria indica* Linn. and their pharmacological activities. *International Journal of Pharmaceutical Sciences and Research*, 9(5): 2005-2010.

Banerjee, D., De, B., Bhowmick, S., Roy, D. and Reang, D. (2025). Seeds of Plants as Natural Contraceptives. *Acta Scientific Pharmaceutical Sciences*, 9(8): 03-12.

Birhan, Y.S. (2022). Medicinal plants utilized in the management of epilepsy in Ethiopia: ethnobotany, pharmacology and phytochemistry. *Chinese Medical Journal* 17: 129 https://doi.org/10.1186/s13020-022-00686-5

Chandramouly, A., Ganesan, N. and Venkatesan, P. (2024). Utilisation of medicinal plants for their antifertility activities. *Heliyon*, 10(15), e000551. doi.org

Chauhan, A., Agarwal, M., Kushwaha, S. and Mutreja, A. (2007). Suppression of fertility in male albino rats following the administration of 50% ethanolic extract of *Aegle marmelos Contraception*, 76: 474–481.

Chen, H., Fu, J., Chen, H., Hu, Y., Soroka, D. N., Prigge, J. R., Schmidt, E. E., Yan, F., Major, M. B., Chen, X. and Shen, T. L. (2014). Ginger compound [6]-shogaol and its cysteine-conjugated metabolite (M2) activate Nrf2 in colon epithelial cells *in vitro* and *in vivo*. *Chemical Research in Toxicology*, 27(9): 1575–1585.

Chen, H., Xu, Y., Chen, H., Liu, H., Yu, Q. and Han, L. (2022). Isolation and identification of polyphenols from fresh sweet sorghum stems and their antibacterial mechanism against foodborne pathogens. *Frontiers in Bioengineering and Biotechnology*, 9: 770726.

Ciganda, C. and Laborde, A. (2003). Herbal Infusions used for induced abortion. *Journal of toxicology and Clinical toxicology*, 41(3): 235–239.

David, D., Airaodion, A. I. and Ekenjoku, J. A. (2024). Anti-implantation and uterotonic properties of *Mentha pulegium* L. in female Sprague-Dawley rats.

International Journal of Scientific Reports, 10(1): 1384.

Dirar, A. I., Adhikari-Devkota, A., Hassan, M. M., Wada, M., Watanabe, T. and Devkota, H. P. (2019). Phenolic compounds as potent free radical scavenging and enzyme inhibitory components from the leaves of *Guiera senegalensis*. *Natural Product Communications*, 14(6): 1934578X19857364.

Djeujo, F. M., Stablum, V., Pangrazzi, E., Ragazzi, E. and Froldi, G. (2023). Luteolin and vernodalol as bioactive compounds of leaf and root *Vernonia amygdalina* extracts: effects on α-glucosidase, glycation, ROS, cell viability, and in silico ADMET parameters. *Pharmaceutics*, 15(5): 1541.

Dugoua, J. J., Perri, D., Seely, D. and Koren, G. (2008). Safety and efficacy of blue cohosh (*Caulophyllum thalictroides*) during pregnancy and lactation. *Canadian Journal of Clinical Pharmacology*, 15(1): e66-e73.

Dzoyem, J. P., Nganteng, D. N. D., Melong, R., Wafo, P., Ngadjui, B., Allémann, E. and Delie, F. (2021). Bioguided identification of pentacyclic triterpenoids as anti-inflammatory bioactive constituents of *Ocimum gratissimum* extract. *Journal of Ethnopharmacology*, 268: 113637.

Ebbo, A. I., Bello, A., Ismail, M. S., Dauda, A. M., Idris, S. B. and Sani, A. A. (2019). Ethno-Veterinary Survey of Medicinal Plants used for the Treatment of Ruminant Ailments in Billiri Local Government Area of Gombe State, Nigeria. *Direct Research Journal of Health and Pharmacology*, 7(3): 42-51.

Egga, S. E., Ekwenchi, M. M., Theophilus, A., Achuenu, C. and Lokta, S. D. (2023). GC-MS analysis and the establishment of mass spectrometric fingerprints of chemical constituents present in ethanol extract of *Securidaca longipedunculata* leaves. *World Journal of Pharmaceutical Research*, 12(4): 2152–2167.

Ellington, S. R., Kourtis, A. P., Curtis, K. M. et al. (2013). Contraceptive availability during an emergency response in the United States. *Journal of Women's Health (Larchmt)*, 22: 189–93.

Elmi, A., Spina, R., Risler, A., Philippot, S., Mérito, A., Duval, R. E., ... and Laurain-Mattar, D. (2020). Evaluation of antioxidant and antibacterial activities, cytotoxicity of *Acacia seyal* Del bark extracts and isolated compounds. *Molecules*, 25(10): 2392.

Fadzil, S. R., Yap, A. C., and Choo, Y. M. (2017). A New cyclopentylidene and other chemical constituents from Malaysian *Crotalaria pallida*. *Sains Malaysiana*, 46(9): 1581-1586.

Fahmy, N. M., Al-Sayed, E. and Singab, A. N. (2015). Genus Terminalia: A phytochemical and biological review. *Medicinal and Aromatic Plants*, 4(5): 1-22.

Farnsworth, N. P. (1975). Potential value of plants as sources of new antifertility agents. Part 1. *Journal of Pharmaceutical Sciences*, 64 (April): 535-598. Part 2 64 (May): 717-754.

Feng, C., Fay, K. E., Burns, M. M. (2023). Toxicities of herbal abortifacients. *American Journal of Emergency Medicine*, 68: 42-46. doi: 10.1016/j.ajem.2023.03.005. PMID: 36924751; PMCID: PMC10192026.

Goswami, P. and Basak, M. (2021). Medicinal Plants Exhibiting Antifertility Activity: A Review. *Journal of Pharmaceutical Research International*, 33(60B): 230–237. doi.org.

Gupta, R. S., Kachhawa, J. B. and Chaudhaury, R. (2004). Antifertility effects of methanolic pod extract of *Abizzia lebbeck*. *Asian Journal of Andrology*, 6: 155-159.

Hoet, S., Opperdoes, F., Brun, R., Adjakidje, V. and Quetinleclercq, J. (2004). *In vitro* anti trypanosomal activity of ethnopharmacologically selected Beninese plants. *Journal of Ethnopharmacology*, 91(1): 37-42.

Hubscher, G. H., Brook, D. L. and Johnson, J. A. (2005). A quantitative method for assessing stages of the rat estrous cycle. *Biotechnic and Histochemistry*, 80 (2): 79-87.

Hussein, A. O., Hameed, I. H., Jasim, H. and Kareem, M. A. (2015). Determination of alkaloid compounds of Ricinus communis by using gas chromatography-mass spectroscopy (GC-MS). *Journal of Medicinal Plants Research*, 9(10): 349-359.

Iftikhar, S., Abbas, R., Zafar, U. and Fatima, S. (2022). Determination of possible contraceptive potential of methanolic leaf extract of *Mentha longifolia* L. on the reproductive system of male rats by assessing sperm parameters, histological, and biochemical analysis. *PubMed Central* (*PMC*): 9773058: 13740.

Indriyani, N. N., Anshori, J. A., Permadi, N., Nurjanah, S. and Julaeha, E. (2023). Bioactive Components and Their Activities from Different Parts of *Citrus aurantifolia* (Christm.) Swingle for Food Development. *Foods*, 12(10): 2036.

Jahan, S., Saeed, N., Ijla, l. F., Khan, M. A., Ahmad, M., Zafar, M. and Abbasi, A. M. (2009). Histomorphological study to evaluate anti-fertility effect of *Abrus precatorius* L. in adult male mice. *Journal of Medicinal Plants Research* 3(12): 1021-1028.

Joel, O. J., Bamidele, J., Joel, A. F. and Sennuga, S. O. (2025). The Role of Traditional Medicine in Public Health Systems: Perspectives from Practitioners, Healthcare Professionals and Patients in Abuja, Nigeria. *International Journal of Clinical Case Reports and Reviews*, 25(3); DOI:10.31579/2690-4861/768

John, E. O., Oloye, T. S., Ekere, K., Ajeh, J. I., Abdullahi, R., Olayemi, O. *et al*. (2023). Knowledge, attitude and perception of Nigerians towards herbal contraceptive: A questionnaire – based study. *Journal of Complementary and Alternative Medical Research*, 23(4): 33–46.

Kamal, R., Gupta, R. S. and Lohiya, N. K. (2003). Plants for male fertility regulation. *Phytotherapy Research*, 17(6): 579–90.

Kamble, S. and Patil, S. (2025). Emerging trends in advanced herbal pharmaceuticals. *GSC Biological and Pharmaceutical Sciences*, 30(01): 221-229.

Kanwal, Q., Hussain, I., Siddiqui, L. H. and Javaid, A. (2011). Antimicrobial activity screening of isolated flavonoids from *Azadirachta indica* leaves. *Journal of the Serbian Chemical Society*, 76(3): 375-384.

Kaunitz A. M. (1992). Oral contraceptives and gynecologic cancer: an update for the 1990s. American Journal of Obstetrics and Gynecology, 167(4 Pt 2): 1171-6. doi: 10.1016/s0002-9378(12)90407-x. PMID: 1415442.

Kauntz, A. M. (2016). Contraceptive counselling and selection. Up to date. Http/www.update.com/contents/contraceptive. Counselling-and-selection.

Kayode, J. (2002). Conservation and Ethnobotanical Exploration of Compositae in Ekiti State, Nigeria. *Compositae Newsletter*, 34: 62-68.

Krishnasamy, V. and Muruhan, S. (2021). Evaluation of Preliminary Phytochemical Screening, Antioxidant Activity, Isolation and Characterization of Bioactive Compounds in *Waltheria indica* Linn. *Journal of Pharmaceutical Research International*, 33(62A): 129-143.

Liu, G. Z. and Lyle, K. C. (1987). Clinical trial of gossypol as a male contraceptive drug. Part II. Hypokalaemia study. *Fertility and Sterility*, 48(3): 462–465.

Lohiya, N. K., Manivannan, B., Mishra, P. K. and Pathak, N. (2001). Prospects of developing a plant based male contraceptive pill. In: Chowdhury, S. R., Gupta, C. M., Kamboj, V. P. editors. Current Status in Fertility Regulation: Indigenous and Modern Approaches. Lucknow: Central Drug Research Institute, pp 99-119.

Mbatchou, V. C., and Oumar, A. A. (2012). Antifungal activity of Nilobamate isolated from *Acacia nilotica* Wild. *Phytopharmacology*, 3(1), 208-213.

Muhammad, M. J., Mann, A., Fadipe, L. A., Kamdem, M. H. K., Mmutlane, E. M. and Ndinteh, D. T. (2023). Isolation of Stigmasterol and Gastroprotective Activity of the Ethyl Acetate Portion from *Acacia nilotica* Linn. (Fabaceae) Seeds. *Journal of Chemical Society of Nigeria*, 48(1): 12 - 21.

Nacira, B., Mebarka, B., Yacine, L., Mohamed, H., Roukia, H., and Mahfoud, H. M. (2023). Isolation and structural elucidation of phenolic components from *Calotropis procera* (ait) and evaluation of insecticidal activity. *Journal of Animal and Plant Sciences*, 33(4): 770-779.

Ndoye, S. F., Tine, Y., Seck, I., Ba, L. A., Ka, S., Ciss, I., ... and Seck, M. (2024). Chemical Constituents and Antimicrobial and Antioxidant Activities of Essential Oil from Dried Seeds of *Xylopia aethiopica*. *Biochemistry Research International*, 2024, 1-10, Article ID 5914321.

Nicolas, M. A., Alvine, N. M., Gaëtan, B. B. N., Kevin, M. D. Y., Darline, D., Alida, T. E. M., ... and Emmanuel, P. D. (2021). Bioguided isolation, structure elucidation and evaluation of new antimicrobial flavonoid from *Carica papaya* leaves. *Journal of Pharmacognosy and Phytochemistry*, 10(1), 32-39.

Noumi, N. Y. C. and Tchakonang, C. (2001). Plants used as abortifacients. *Ethnopharmacology*, 76(3): 263-268. National Population Commission, 2015.

Nowak, J., Kiss, A. K., Wambebe, C., Katuura, E. and Kuźma, Ł. (2022). Phytochemical analysis of polyphenols in leaf extract from *Vernonia amygdalina* Delile plant growing in Uganda. *Applied Sciences*, 12(2), 912.

Nugroho, A., Heryani, H., Choi, J. S. and Park, H. J. (2017). Identification and quantification of flavonoids in *Carica papaya* leaf and peroxynitrite-scavenging activity. *Asian Pacific Journal of Tropical Biomedicine*, 7(3), 208-213.

Ochora, D. O., Kakudidi, E., Namukobe, J., Heydenreich, M., Coghi, P., Yang, L. J., … and Yenesew, A. (2022). A new benzophenone, and the antiplasmodial activities of the constituents of *Securidaca longipedunculata* fresen (Polygalaceae). *Natural Product Research*, 36(11), 2758-2766.

Ogunbodede, A. J. (1997). Mental illness and traditional therapy in Nigeria, *Ibom Journal of Social Issues* 4, pp. 56-66.

Oguntibeju, O. O. and Owira, P. M. (2025). Selected Medicinal Plants Used in the Treatment of Male

Infertility in Ondo State, Nigeria. *Pakistan Journal of Life and Social Sciences*, 23(1): 9212 – 9235.

Okoye, T. C., Akah, P. A., Omeje, E. O., Okoye, F. B., & Nworu, C. S. (2013). Anticonvulsant effect of kaurenoic acid isolated from the root bark of Annona senegalensis. *Pharmacology Biochemistry and Behavior*, 109, 38-43.

Olatunji-Bello, I., Aliu, O. N. (2000). On the anti-fertility effects of castor seeds (*Ricinus communis*). *Journal of Medicine and Medical Sciences*, 2(1): 74 - 76.

Oluwasegun, A., Ogochukwu, U., Ugochukwu, O., Mussaddiq, I. and Bunyamin, A. (2023). Lupeol: A Triterpenoid Isolated from the Stem Bark of *Hymenocardia acida* (Tul.) Exhibits a van der Waal Antagonism on the Alpha Subunit of Gastric H+ K+ Atpase–A Promising Antiulcer Principle. *Drug Research*, 73(08): 448-458.

Oraibi, A. I. and Hamad, M. N. (2018). Phytochemical investigation of flavanoid of *Calotropis procera* in Iraq, Isolation and identification of rutin, quercitin and kampferol. *Journal of Pharmaceutical Sciences and Research*, 10(9): 2407-2411.

Pan, J., Yi, X., Zhang, S., Cheng, J., Wang, Y., Liu, C., and He, X. (2018). Bioactive phenolics from mango leaves (Mangifera indica L.). *Industrial Crops and Products*, 111: 400-406.

Parcha, V., Dobhal, Y., and Dhasmana, D. C. (2019). Isolation, characterization and cardioprotective potential of gratissinol from chloroform extract of *Ocimum gratissimum* (Linn.) Leaves. *Journal of Biologically Active Products from Nature*, 9(4): 260-268.

Piccinelli, A. L., García Mesa, M., Armenteros, D. M., Alfonso, M. A., Arevalo, A. C., Campone, L. and Rastrelli, L. (2008). HPLC-PDA-MS and NMR characterization of C-glycosyl flavones in a hydroalcoholic extract of *Citrus aurantifolia* leaves with antiplatelet activity. *Journal of Agricultural and Food Chemistry*, 56(5): 1574-1581.

Population Reference Bureau (PRB). (2016). World Population Data Sheet 2 Pp. 20.Population Reference Bureau (PRB). (2024). *2024 World Population Data Sheet*. https://2024-wpds.prb.org/

Praveena, K. and Gajalakshmi, G. (2025). A Comprehensive Review on Neem Seed Oil as a Natural Contraceptive. *International Journal of Pharmaceutical Sciences Review and Research*, 17(1).

Priya, A., Singh, B. and Devi, P. (2025). A Comprehensive Review on Neem Seed Oil as a Natural Contraceptive. *International Journal of Pharmaceutical Sciences*, 16(1): 71-80.

Punia, J. and Singh, R. (2018). Isolation, characterization and biological potential of compounds from flowers of Moringa oleifera. *Journal of Indian Chemical Society*, 95: 1107-1120.

Qian, S. Z. (1987). Tripterygium wilfordii, a Chinese herb effective in male fertility regulation contraception. *International Journal of Medicinal Plants Research*, 36(3): 335–345.218.

Salem, M. M., Davidorf, F. H. and Abdel-Rahman, M. H. (2011). In vitro anti-uveal melanoma activity of phenolic compounds from the Egyptian medicinal plant *Acacia nilotica*. *Fitoterapia*, 82(8): 1279-1284.

Sathiyaraj, K., Sivaraj, A., Vinoth K. P., Devi, K., Senthil, K. B. (2010). Spermicidal Activity of *Azadirachta indica* (Neem) Aqueous Leaf Extract on Male Albino Rats. *International Journal of Pharmacy Research and Tech*nology, 2 (1): 588- 591.

Sethi, J., Singh, J., Gurung, N. and Aggarwal, A. (2019/2025). Medicinal Plants as a Potential Source of Male Contraceptive Agents. *Madridge Journal of Pharmaceutical Research*, 3(2):116-121.

Sewani-Rusike, C. R. and Nkomo, M. (2022). Phytochemical Profile, Safety and Efficacy of a Herbal Mixture Used for Contraception by Traditional Health Practitioners in Ngaka Modiri Molema District Municipality, South Africa. *Molecules*, 27(2): 193.

Shaik, A., Yalavarthi, P. R. and Bannoth, C. K. (2017). Role of Anti-Fertility Medicinal Plants on Male & Female Reproduction. *Journal of Complementary and Alternative Medical Research*, 3(2): 1–22. https://doi.org/10.9734/JOCAMR/2017/34632.

Shimbe, R.Y., Tor-Anyiin, T.A., Khan, M.E. & Anyam, J.V. (2016). β-sitosterol from Hymenocardia acida root extract and its antimicrobial activity. *Journal of Chemical Society of Nigeria*, 41(1).

Singh A, Singh, SK. 2009. Evaluation of antifertility potential of Brahmi in male mouse. *Contraception*, 79:71–79.

Sofowora, E.A. (2006). Medicinal Plants and Traditional Medicine in Africa. 2nd Edn., Spectrum Books Limited, Ibadan, pp 151.

Tiwaskar, G. H., Mahure, P., Mowade, P., Tiwari, A., Sawarkar, K. and Pise, A. G. (2023). *Exploring The Spermicidal Properties of Extracted Neem Seed Oil: An Ex-Vivo Study Investigation Based on Tribal Knowledge*. *European Chemical Bulletin*, 12(10): 7793-7812.

Top 10 Home Remedies Team, 2018. Four Herbs that act as Natural Birth Control. http//www.top10homeremedies.com/wp-contents/uploads.

Tran, D. S., Antonyan, A. and Polli, J. (2020). Herbal product development for female fertility regulation:

preclinical studies. *Journal of pharmaceutical sciences*, 109(1): 475-485.

Udoh, P., Kehinde, A. (1999). Studies on anti-fertility effect of pawpaw seeds (*Carica papaya*) on the gonads of male albino rats. *Phytotherapy Research*, 13: 226–228.

Ugbogu, E. A., Emmanuel, O., Dike, E. D., Agi, G. O., Ugbogu, O. C., Ibe, C. Iweala, E. J. (2021). The phytochemistry, ethnobotanical, and pharmacological potentials of the medicinal plant-*Vernonia amygdalina* L. (bitter Leaf). *Clinical Complementary Medicine and Pharmacology*, 1(1), 100006.

Unegbu, C. C., Uzohuo, E. N., Ajah, O., Anyanwu, O. O. and Anyanwa, C. (2021). Extraction and characterization of alkaloid and tannin from *Newbouldia laevis* leaves.

Vildina, J. D., Ndjonka, D., Schmidt, T. J. and Liebau, E. (2021). Identification of anti-Caenorhabditis and anti-Onchocerca constituents from leaves of *Annona senegalensis* Pers. (Annonaceae). *South African Journal of Botany*, 138: 84-93.

Wanzala, W., Zessin, K. H., Kyule, M. N., Baumann, M. P. O., Mathias, E., and Hassan, B. (2005). Ethnoveterinary practices in the pastoral Maasai communities of Kajiado District, Kenya. *Tropical Animal Health and Production*, 37(S1), 23-33.

WHO (2000). General Guidelines for Methodologies on Research and Evaluation of Traditional Medicine. Geneva, Switzerland. pp 1-80.

WHO (2003). Calls on African Governments to Formally Recognize Traditional Medicine. Johannesburg, South Africa.

WHO (2023). Integrating Traditional Medicine in Health Care. World Health Organization, Regional Office for South-East Asia. 1.3.3

World Health Organization (WHO). *WHO Medicines Strategy: 2000–2003: Framework for Action in Essential Drugs and Medicines Policy* (WHO/EDM/2000.1). Geneva: World Health Organization; 2000. This document is available on the Reproductive Health Supplies Coalition website.

Yamasaki, R. B., Klocke, J. A., Lee, S. M., Stone, G. A. and Darlington, M. V. (1986). Isolation and purification of azadirachtin from neem (*Azadirachta indica*) seeds using flash chromatography and high-performance liquid chromatography. *Journal of Chromatography A*, 356: 220-226.

Zhao, Y., Tao, Q. F., Zhang, R. P., Zhou, C. X., Dou, H., Shi, S. Y. and Li, X. K. (2007). Two new compounds from Zingiber officinale. *Chinese Chemical Letters*, 18(10): 1247-124

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APPENDIX 1

Fig.1: *Aframomum melegueta*

Fig.2: *Moringa oleifera*

Fig.3: *Xylopia aethiopica*

Fig.4: *Newbouldia laevis*

Fig.5: *Crotalaria mucronata*

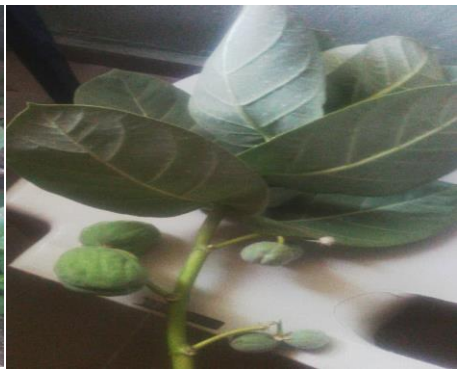

Fig.6: *Calotropis procera*

Fig.7: *Azadirachta indica*

Fig.8: *Carica papaya*

Fig.9: *Terminalia catappa*

Fig.10: *Mangifera indica*

Fig.11: *Ricinus communis*

Fig.12: *Citrus aurantifolia*

Fig.13:*Vernonia amygdalina*

Fig.14: *Zingiber officinale*

Fig.15: Samples of prepared herbal decoctions

Figures 1-15:Pictures of some plants used as herbal contraceptives in Bida, Niger State, Nigeria

APPENDIX 2

QUESTIONNAIRE

Department of Biological Sciences,
College of Sciences,
Afe Babalola University,
Ado Ekiti, Ekiti State.

Dear Sir/ Madam,

This questionnaire is on a research work titled, "Ethnobotanical study of herbal contraceptives used in Bida, Niger State, Nigeria."Kindly complete this questionnaire as objectively as you can. You are assured that all the information supplied will be treated with utmost confidentiality".

Thanks for your anticipated cooperation.

Yours faithfully,

.....

Obi, P. U.

SECTION A

PERSONAL INFORMATION:

Name: .....

Age: .....

Sex: .....

Town / State:.....

Native Language:.....

Occupation: .....

Experience in the T M P:.....

Source of knowledge: .....

Nuptial status (single or married): .....

SECTION B

Read carefully and give your answers in the spaces/column provided:

S/N	ITEMS	RESPONSES
1	Common Name of Plant(Herbal Contraceptive)	
2	Botanical Name of plant	
3	Local (Native) Name of plant	
4	Family of Plant	
5	Plant's Habitat / Source	
6	Nature of plant	
8	Parts of the Plant used	
9	Ethnobotany of the plant	
10	Solvent for preparation	
11	Method of preparation	
12	Does it work alone or mixed	
13	If mixed, what are the materials used	
14	Mode of application (before or after sexual intercourse / before or after pregnancy)	
15	If it is applied, to which part of the body	
16	Does it have dosage, if yes, specify	
17	What are their effects on the body	
18	What is the dosage-duration	