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Information on the use of Eepo –Ira; Bridelia Ferruginea by Yoruba people and its side effects during marathon fasting

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Abstract

Bridelia-ferruginea is a species of flowering plant in the family of Phyllanthaceae. It is native to tropical Africa and is commonly found in savannas, woodlands, and grasslands. It is called eepo-ira in Yoruba land, kwakwakwai in Hausa land and okpoukpaka in Ibo land. This research focuses on Yoruba people because they use eepo-ira for medication and they engage in religious activities and marathon fasting.Adaobi etal 2011 found that constituents of the stem bark of Bridelia-ferruginea possess antiulcer properties. Adewole etal 2021 discovered that antidiarrheal activity possibly occurs via the activation of ATPases activities and inhibition of M3 and EP3. While Bridelia-ferruginea is considered safe for use in traditional medicine, there are potential side effects and interactions to consider, especially when combined with marathon fasting. Some possible side effects and considerations include: Gastrointestinal upset as Bridelia-ferruginea may cause stomach upset, nausea, and diarrhea in some individuals, allergic reactions as some people may be allergic to Bridelia-ferruginea, which can cause symptoms like hives, itching, and difficulty in breathing, interactions with medications as Bridelia-ferruginea may interact with certain medications, such as blood thinners, diabetes medications, and blood pressure medications. It was found from the people interviewed that marathon fasting can lead to dehydration, while Bridelia-ferruginea may exacerbate this effect due to its potential diuretic properties. Fasting can also disrupt electrolyte balances, and Bridelia-ferruginea may further alter electrolyte levels, potentially leading to muscle cramps, weakness, and other symptoms. Bridelia-ferruginea may lower blood sugar levels, which can be problematic when combined with marathon fasting, potentially leading to hypoglycemia (low blood sugar). Fasting can lead to nutrient deficiencies, and Bridelia-ferruginea may further deplete certain nutrients, such as potassium, magnesium, and vitamin B12.

Keywords: Eepo-Ira, Bridelia-Ferruginea, Health-properties, Marathon-fasting, Side-effects

Introduction

Bridelia ferruginea is a species of flowering plant in the family of Phyllanthaceae. It is native to tropical Africa and is commonly found in savannas, woodlands, and grasslands. It is called Eepoira in Yoruba land, Kwakwakwai in Hausa land and Okpoukpaka in Ibo land. *Bridelia ferruginea* is used in traditional medicine for various purposes, including: fevers and malaria, digestive issues, skin conditions ,antibacterial and antifungal properties. The plant's roots and leaves are used to treat fevers, malaria, and other infectious diseases. The plant is used to treat digestive problems such as diarrhea, dysentery, and stomach ulcers. The plant's leaves and roots are also used to treat skin conditions such as eczema, acne, and ringworm. Also, the plant has been shown to exhibit antibacterial and antifungal properties, making it effective against a range of microorganisms.

Phytochemical Constituents of Bridelia ferruginea contains a range of phytochemical constituents, including: alkaloids, terpenoids flavonoids and glycosides. The plant contains alkaloids such as brideline and ferruginine. The plant contains flavonoids such as quercetin and kaempferol.It contains terpenoids such as lupeol and betulin.Also it contains glycosides such as bridelineside *and ferruginoside.* Afolayan (2023) described phytochemicals, as secondary metabolites, which are chemical compounds formed by plants and they are accountable for their biological, therapeutic,or toxicological activities. These phytochemicals help plants blossom against competitors, predators,or pathogens.

Afolayan (2023) noted that Bridelia Ferruginea is found in Savannah regions and it is used as an ethnomedicine for the treatment of many ailments in many parts of Africa. In the present study, crude methaonolic extract and fractions of Bridelia Ferruginea and pythonnigii were examined their phytochemical constituents and antioxidant activity using standard protocols. Quuanlitative phytochemical screening of Bridelia Ferruginea crude extract revealed the presence of tannins, saponins, phlobatanins, flavonoids, steroids, alkaloids and glycosides.

Research on Bridelia ferruginea has shown promise in several areas, including: antimicrobial activity, antioxidant activity and anti-inflammatory activity .This implies that the plant's extracts have been shown to exhibit antimicrobial activity against a range of microorganisms, the plant's extracts have been shown to exhibit antioxidant activity, making it a potential natural remedy for oxidative stress-related diseases,and the plant's extracts have been shown to exhibit anti-inflammatory activity, making it a potential natural remedy for inflammatory diseases. Overall, Bridelia ferruginea is a plant with a rich history of traditional use and a promising future in terms of its potential applications in medicine and other fields. Brideliaferruginea has been found to interact with microorganisms in several ways:

Antimicrobial Activity of Bridelia Ferruginea is often noticed in inhibition of bacterial growth, antifungal activity and antiviral activity . Bridelia ferruginea extracts have been shown to inhibit the growth of various bacteria, including Escherichia coli, Staphylococcus aureus, and

Pseudomonas aeruginosa. The plant's extracts have also been found to exhibit antifungal activity against fungi such as Candida albicans and Aspergillus niger.: Some studies suggest that Bridelia ferruginea extracts may also possess antiviral activity against certain viruses. Yeboah etal (2022) maintained that *Bridelia ferruginea* contains different phytochemicals including flavonoids, phenolics, phytosterols, triterpenes, saponins, alkaloids and cardiac glycosides. Gallocatechin-(4'-O-7)-epigallocatechin, 3,5-dicaffeoylquinic acid, 1,3,4,5-tetracaffeoylquinic acid and some derivatives of 3-methoxyflavone, such as quercetin-3-methyl ether, quercetin 3-,7,3',4'-tetramethyl ether, myricetin 3',4',5'-trimethyl ether, myricetin 3,3',4',5'-tetramethyl ether, myricetin and quercetin 3-O-glucoside specific flavonoids and biflavonoids like apigenin, kaempferol and glycosides of both have been isolated and further characterized from *B. ferruginea*. *B. ferruginea* has several pharmacologically beneficial properties including anti-inflammatory, anti-diabetic, antioxidant, antimicrobial, anti-infective, antipyretic, analgesic, diuretic and natriuretic activities.
Looking at mechanisms of its action, cell membrane disruption may occur as Bridelia ferruginea extracts may disrupt the cell membranes of mic roorganisms, leading to their death. Inhibition of enzyme activity is another one. The plant's extracts may inhibit the activity of certain enzymes essential for microbial growth and survival. Also, interference with DNA replication; Brideliaferruginea extracts may interfere with the replication of microbial DNA, preventing the microorganisms from multiplying. Mahomoodali etal (2021) assess the various antioxidant and enzyme inhibition properties of leaf and stem bark extracts (ethyl acetate, water and methanolic) of *B. ferruginea.* Anti-proliferative effect was also investigated against human colon cancer cells (HCT116) as well as the antimicrobial potential against multiple bacterial and fungal (yeasts and dermatophytes) strains. The methanolic and water extracts of the stem bark demonstrated the highest phenolic content (193.58 ± 0.98 and 187.84 ± 1.88 mg/g, respectively), while the leaf extracts showed comparatively higher flavonoid contents (24.37–42.31 mg/g). Overall, the methanolic extracts were found to possess the most significant antioxidant potency. Compared to the other extracts, methanolic extracts of the *B. ferruginea* were revealed to be most potent inhibitors of acetyl- and butyryl-cholinesterases, tyrosinase α-amylase, except α-glucosidase. Only the ethyl acetate extracts were found to inhibit glucosidase.

With its potential applications new antimicrobial agents may develop, Brideliaferruginea extracts may serve as a source of inspiration for the development of new antimicrobial agents. Treatment of infectious diseases is certain as the plant's extracts may be used to treat various infectious diseases, including bacterial, fungal, and viral infections. Preservation of food and other products is a part of its property as Brideliaferruginea extracts may be used as natural preservatives to extend the shelf life of food and other products Bridelia ferruginea has been found to affect microorganisms in several ways.

Inhibitory effects of *Bridelia ferruginea* include bacteriostatic and bactericidal effects as its extracts have been shown to inhibit the growth of various bacteria, including Gram-positive and Gram-negative bacteria. Fungistatic and fungicidal effects are also there as the plant's extracts have also been found to inhibit the growth of fungi, including Candida and Aspergillus species.

It possesses antiviral effects as some studies suggest that Bridelia ferruginea extracts may also exhibit antiviral activity against certain viruses. Microorganisms are affected with the bacteria it produces .Brideliaferruginea extracts have been found to inhibit the growth of various bacteria, including Escherichia coli, Staphylococcus aureus, and Pseudomonas aeruginosa. The plant's extracts have also been found to inhibit the growth of fungi, including candida albicans and aspergillus niger. Some studies suggest that Bridelia ferruginea extracts may also exhibit antiviral activity against certain viruses. Brideliaferruginea has been found to possess antioxidant properties, which can help protect against oxidative stress and cell damage. Here are some of the antioxidant properties of Bridelia ferruginea:

Antioxidant Compound and Antioxidant Activities

Brideliaferruginea contains flavonoids such as quercetin, kaempferol, and isorhapontigenin, which have been shown to have antioxidant activity.The plant also contains phenolic acids such as ferulic acid, sinapic acid, and caffeic acid, which have antioxidant properties.Brideliaferruginea contains terpenoids such as lupeol and betulin, which have been shown to have antioxidant activity.Brideliaferruginea extracts have been shown to scavenge free radicals, which can help protect against oxidative stress and cell damage. The plant's extracts have been found to increase the activity of antioxidant enzymes such as superoxide dismutase, catalase, and glutathione peroxidase. Brideliaferruginea extracts have been shown to inhibit lipid peroxidation, which can help protect against cell damage and oxidative stress

Potential Health Benefits
Pootential health benefits of Bridelia ferruginea include: protection against chronic diseases, anti-aging and immune system support. The antioxidant properties of Bridelia ferruginea may help protect against chronic diseases such as cancer, cardiovascular disease, and neurodegenerative disorders.The plant's antioxidant properties may also help to reduce the visible signs of aging, such as wrinkles and age spots.Brideliaferruginea's antioxidant properties may also help to support the immune system, reducing the risk of illnesses and infections. Yeboah etal (2022) gave account of ethnopharmacological relevance of *Bridelia ferruginea* as it belong to the family of euphorbiaceae, identified as an important commonly growing shrub, used in traditional medicine for managing arthritis, dysentery, constipation, chronic diabetes, skin diseases, bladder and intestinal disorders, oral infections, thrush, bites and as an arrow poison antidote. This review aims at providing information on the traditional medicinal uses, pharmacological activities, phytochemistry and toxicity studies of *Bridelia ferruginea* to bridge the gap between traditional medicinal uses and preclinical studies on *B. ferruginea* and subsequently lead to the development of valued added medicines from *B. ferruginea*.

Common Side Effects
While Bridelia ferruginea is considered safe for use in traditional medicine, there are potential side effects and interactions to consider, especially when combined with marathon fasting. Here are some possible side effects and considerations Common side effects of Bridelia ferruginea

include: gastrointestinal upset, allergic reactions and interactions with medications: Brideliaferruginea may cause stomach upset, nausea, and diarrhea in some individuals. Some people may be allergic to Bridelia ferruginea, which can cause symptoms like hives, itching, and difficulty breathing. Brideliaferruginea may interact with certain medications, such as blood thinners, diabetes medications, and blood pressure medications. Yeboah etal (2022) argued that the wide distribution, traditional medicinal uses and wealth of phytochemicals present in *B. ferruginea* suggests that the plant can be useful in lead compound discovery. Although *B. ferruginea* has been widely studied, further studies on the mechanism of action, bioavailability, pharmacokinetics, toxicity and side effects in humans need to be investigated.

Objective of the Study

Objective of this study is to investigate if eepo ira (bridelia ferruginea) can course ulcer or any damages to human body as it is consumed during fasting or pregnancy

Research Question

Can eepo-ira (bridelia ferruginea) in any form course ulcer or any damage to human body as it is consumed during fasting or pregnancy?

Literature Review

Jamshidikia etal (2018) concluded that the demand for plant derived products has increased across the world. In the Middle East, Latin America, Africa and Asia, more than 85 percent of the populations predominantly rely on traditional medicine especially on herbal medicines for their health care needs. About 100 million people in the European Union and in some countries as high as 90% of the population still use traditional complementary or herbal medicines. The herbal medicine has an increasing big market.

Bridelia ferruginea has the possibility to be exploited in the prevention/treatment of oxidative stress-related diseases. In ethnomedicine, *B. ferruginea* is commonly used as an antidote against arrow poison, and for the treatment of various ailments, including diabetes, diarrhea, arthritis, dysentery and sexual dysfunctions (Gill, 1992; Watcho et al., 2019; Yeboah et al., 2022). Experimentally, *B. ferruginea* possesses aphrodisiac , antidiabetic (Bakoma et al., 2014; Oyebode et al., 2023), antidiarrheal (Omolaso et al., 2021) and anti-inflammatory (Olajide et al., 2012) activities. However, the antioxidant effects and cytotoxicity study of this plant have not been studied.

Adaobi et al (2011) investigated antiulcer and gastrointestinal effects of methanol stem bark extract (BFME) of BrideliaferrugineaBenth. (Euphorbiaceae) and its solvent fractions-dichloromethane (DCMF) and methanol (MF)-were studied using indomethacin- and ethanol-induced ulcers in rats, small intestinal transit of charcoal meal in mice, and the effects on acetylcholine-induced contractions of the isolated guinea pig ileum. The extract and fractions significantly ($P<0.05$) protected the rats against ethanol and indomethacin-induced ulcers and inhibited small intestinal propulsion in the order of magnitude: DCMF>MF>BFME. On the guinea pig ileum, MF (0.05 - 6.40 mg/ml) elicited no inhibition, DCMF (5 - 40 µg/ml)

antagonized acetylcholine-induced contractions of the guinea pig ileum with IC50 of 10.47μg/ml, while BFME (0.05 - 12.80 mg/ml) contracted the guinea pig ileum with EC50 of 1 mg/ml. Oral LD50 of BFME in mice was estimated to be 2,154 mg/kg. Phytochemistry tests revealed the presence of tannins, saponins, steroids, terpenoids, flavonoids and resins in BFME, MF tested positive for tannins, saponins, steroids, terpenoids, and flavonoids, while DCMF gave positive reactions for flavonoids, steroids, terpenoids and resins. These findings suggest that constituents of the stem bark of B. ferruginea possess antiulcer properties. In addition, some non-polar constituents possess spasmolytic activity while spasmogenic activity is likely associated with some polar constituents.

Adewole et al (2021)evaluatedBfME antidiarrheal activity in mice model of castor oil-induced diarrhea and enteropooling. To evaluate motility, gastrointestinal transit time was carried out using phenol red meal, while intestinal activities of selected ATPases were also evaluated. Furthermore, the active components in BfME were detected by GC-MS analysis, while molecular docking of the most abundant compounds with muscarinic acetylcholine receptor (M3) and prostaglandin E2 receptor 3 (EP3) were conducted. They got that BfME at 400 and 800 mg/kg showed antidiarrheal activity by delaying onset of diarrhea, reduced gastrointestinal transit and increased intestinal activities of Na+ K+-ATPase, Ca2+ Mg2+-ATPase and Mg2+-ATPase. Molecular docking revealed that γ-sitosterol, α-amyrin, and stigmasterol have outstanding binding affinity for M3 and EP3. They concluded that antidiarrheal activity possibly occurs via the activation of ATPases activities and inhibition of M3 and EP3.

B. ferruginea contains different phytochemicals including flavonoids, phenolics, phytosterols, triterpenes, saponins, alkaloids and cardiac glycosides. Gallocatechin-(4′-O-7)-epigallocatechin, 3,5-dicaffeoylquinic acid, 1,3,4,5-tetracaffeoylquinic acid and some derivatives of 3-methoxyflavone, such as quercetin-3-methyl ether, quercetin 3-,7,3′,4′-tetramethyl ether, myricetin 3′,4′,5′-trimethyl ether, myricetin 3,3′,4′,5′-tetramethyl ether, myricetin and quercetin 3-O-glucoside specific flavonoids and biflavonoids like apigenin, kaempferol and glycosides of both have been isolated and further characterized from B. ferruginea. B. ferruginea has several pharmacologically beneficial properties including anti-inflammatory, anti-diabetic, antioxidant, antimicrobial, anti-infective, antipyretic, analgesic, diuretic and natriuretic activities.

Research Question

Can eepo-ira (bridelia ferruginea) in any form course ulcer or any damage to human body as it is consumed during fasting or pregnancy?

To answer the above question, ten women were interviewed at Enu-Odi market where stew ingridients could be bought in Ado Ekiti . Their interviews were collated and explained in the table below.

S/N	INTERVIEW	YES	%	NO	%	TOTAL
1	Do you know eepo ira (bridel ia ferruginea) as being medicinal?	10	100	0	0	100
2	Eepo ira can clean internal organs effectively	9	90	1	10	100
3	I engage in fasting often and often and also consume stew made of eepo ira	7	70	3	30	100
4	I feel healthy after consumption of stew made of eepo ira	10	100	0	0	100
5	I feel dehydrated when I engage in marathon fasting at the same time consuming stew made of eepo ira	9	90	1	10	100
6	Do you think that a pregnant woman can consume eepo ira stew	5	50	5	50	100
7	At early stage, a pregnant woman should not consume anything made of eepo ira	7	70	3	30	100
8	Ulcer patient must be careful using eepo ira	6	60	4	40	100
9	Eepo ira cleans intestines as detergents cleans cloth	8	80	2	20	100

Analysis of the Interview

The above table shows that ten persons were interviewed in Enu-Odi market in Ado Ekiti about eepo-ira. It revealed that the whole population interviewed indicated that they use eepo ira because it is medicinal; ninety percent agreed that eepo ira can clean internal organs effectively, and seventy percent of the respondents submitted that they do engage in fasting at the same time consuming the stew made of eepo-ira while breaking the fast. The entire respondents agreed that they feel healthy after the consumption of stew made of eepo-ira, ninety percent 90% agreed that they feel dehydrated while observing marathon fasting and consuming stew made of eepo-ira. Fifty percent 50% agreed that a pregnant woman can consume eepo-ira during pregnancy while 50% disagreed. Seventy percent 70% agreed that a pregnant woman, during the early stage should not consume anything made of eepo-ira. Sixty percent 60 % of the respondents agreed that Ulcer patients must be careful using eepo ira while eighty percent 80 % of the respondents agreed that Eepo ira cleans intestines as detergents cleans cloth.

Conclusion

The wide distribution, traditional medicinal uses and wealth of phytochemicals present in Bridelia ferruginea suggests that the plant can be useful in lead compound discovery. Although Bridelia ferruginea has been widely studied, further studies on the mechanism of action, bioavailability,pharmacokinetics, toxicity and side effects in humans need to be investigated. There is the need to carefully observe marathon fasting as it can lead to dehydration, and Bridelia ferruginea may exacerbate this effect due to its potential diuretic properties. Fasting can disrupt electrolyte balances, and Bridelia ferruginea may further alter electrolyte levels, potentially leading to muscle cramps, weakness, and other symptoms.

Bridelia ferruginea may lower blood sugar levels, which can be problematic when combined with marathon fasting, potentially leading to hypoglycemia as this can be a result of being dehydrated. Fasting can lead to nutrient deficiencies, and Bridelia ferruginea may further deplete certain nutrients, such as potassium, magnesium, and vitamin B12. Brideliaferruginea should be used with caution during pregnancy and breastfeeding, as its effects on the fetus or baby are unknown. Further research still need to be carried on this. Brideliaferruginea may lower blood sugar levels, so individuals with diabetes should monitor their blood sugar levels closely when using this herb. Bridelia ferruginea may worsen kidney or liver disease, so individuals with these conditions should use this herb with caution and under medical supervision.

Recommendations

Every individual needs to consult a healthcare professional before using Bridelia ferruginea, especially when combined with marathon fasting, consult a healthcare professional to discuss its potential risks and benefits. We need to regularly monitor vital signs, electrolyte levels, and blood sugar levels when using *Bridelia ferruginea* during marathon fasting. There is the need to drink plenty of water and consider electrolyte supplements to prevent dehydration and electrolyte imbalances.
One should begin with a low dose of *Bridelia ferruginea* and gradually increase as the need arises and under medical supervision.
Bridelia ferruginea consumption may potentially cause or exacerbate ulcers in some individuals, although more research is needed to confirm this association.

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