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INFUSION OF BASIL, GINGER AND THEIR IMPACT ON HEALTH

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ABSTRACT

The infusion of (Occimum basilicum) and (Zingiber officinale) is of nutritional importance and has very beneficial effects on human health. The objective of this study is to prepare an infusion based on African basil (Occimum basilicum) and ginger (Zingiber officinale) and finally explore their impact on human health. The phytochemical analysis of basil powder, ginger and their mixture carried out in the proportions 50% and 50%, based on the characteristic coloring and precipitation tests in order to highlight the major chemical groups. At the end of this study, it appears that the Infusion contains polyphenols, catechin tannin, flavonoids and alkaloids.

KEYWORDS : Prepare, infusion (basil and ginger), impact, health.

INTRODUCTION

The different parts of medicinal plants have always been used for the treatment of many diseases. The therapeutic use of plants has been practiced by humanity since time immemorial, the different specific healing properties and all the knowledge of these plants have been identified and transmitted to the following generations in all human civilizations. According to the World Health Organization (WHO), 75% of the world's population uses herbs for their health needs[1]. Plants are considered as living chemical factories biosynthesizing many secondary metabolites of interest. These metabolites are chemical constituents playing an important role in the production of pharmaceutical drugs, as well as herbal remedies.[2] Aromatic, food and medicinal plants still remain undervalued

throughout the world in relation to their nutritional-health potential. Among these medicinal plants, basil or Ocimum basilicum is an aromatic plant belonging to the Lamiaceae family. It is found cultivated all over the world. It is native to the tropical and warm climates of Asia, Africa, South America and the Mediterranean.

Basil is widely used in the food industry as an aromatic culinary herb, especially in Italian and Indian cuisines among others. It is also used in traditional medicine for the treatment of various diseases including asthma, bronchitis, cough, gastrointestinal disorders, cardiovascular diseases as well as in the treatment of nausea, flatulence, as a tonic, vermifuge and febrifuge agent. Several studies have shown that basil essential oils, leaves and seeds have biological properties of antioxidant, anti-inflammatory, antimicrobial and antispasmodic activities.

As for ginger, it belongs to the Zingiberaceae family which are perennial monocots. It is a tropical herbaceous plant widespread throughout the world.[3] The rhizomes are the consumed parts of the plant.[4] and are used as spices and in traditional medicine for various diseases.[5] inger has the particularity of being able to produce very diverse natural substances of high nutritional value.

Preparing an infusion based on African basil and officinal ginger allows you to combine the beneficial properties of these two plants. This drink is increasingly popular for its supposed health benefits.

Problematic

African basil (Ocimum basilicum) and common ginger (Zingiber officinale) are plants traditionally used for their medicinal properties.

Although scientific studies have demonstrated the individual beneficial effects of these plants on health, data concerning the infusion resulting from their mixture remains limited.

Justification

Exploring the importance of this prepared infusion on health is of major interest for several reasons

- ✓ Improving public health: Research findings could contribute to the development of more effective nutritional strategies and public health recommendations for the prevention and management of chronic diseases.

- ✓ The development of new natural products: the information obtained on the composition and properties of this infusion could open the way to the development of new natural products based on African basil and officinal ginger, offering complementary or alternative therapeutic alternatives to conventional medicines.
- ✓ The valorization of traditional knowledge: The thesis will contribute to the valorization of traditional knowledge linked to the use of African basil and officinal ginger in medicine, by providing a scientific basis for their ancestral uses.

General objective of the study

The aim of this study is to prepare an infusion based on African basil (Occimum basilicum) and ginger (Zingiber officinale) and finally to explore their impact on human health.

Specific objectives

- - Prepare an infusion of basil and ginger
- - Indicate the impact of this infusion on human health

Hypotheses of the study

- ❖ African basil infusion with ginger is said to be rich in polyphenols, flavonoids and essential oils.
- ❖ The infusion has antioxidant properties; anti-inflammatory properties to reduce chronic inflammation; stimulates the immune system and strengthens the body's defenses against infections and diseases.

2.1. MATERIALS AND METHODS

2.1.1. The location of the dissertation internship

The experimental work was carried out at the Food Science Laboratory of the Department of Nutrition and Agro-Food Sciences and the phytochemical screening was done at the LACOPS Laboratory (Laboratory of Organic Chemistry Physical Synthesis specialized in the chemistry of natural substances, the synthesis of bioactive molecules and the study of chemical reactions). It is located within the University of Abomey-Calavi.

2.1.2. Material

- ❖ **Plants and ingredients**
- ➢ African basil leaves (Ocimum basilicum)
- ➢ Rhizomes of common ginger (Zingiber officinale)

- Drinking water

❖ **Tea preparation equipment**

- Pan
- Strainer
- Teaspoon
- Cup

❖ **Computer and communication equipment**

- Personal computer
- Internet access
- Word processing and presentation software (Microsoft Word, PowerPoint)

2.2. METHODS

2.2.1. Documentation phase

The documentary review took place throughout our internship and consisted of consulting books and published articles. It was very useful in analyzing and interpreting information in libraries and documentation centers. The Internet was also a very important source of information throughout the internship.

2.2.2. **Description of the stages of infusion production**

2.2.2.1. Drying of plants

African Basil

- Wash the basil leaves carefully in clean water.
- Spread the leaves on a tray or sieve in a dry, ventilated place.
- Let the leaves dry in an electric dryer at 60°C.

Ginger

- Wash the ginger rhizomes thoroughly in clean water.
- Peel the rhizomes and cut them into thin slices.
- Dry the ginger slices in an electric dryer at 60°C.

2.2.2.2. Preparation of the infusion

Infusion

- Bring water to a boil.
- Add 1 to 2 teaspoons of dried African basil leaves and dried ginger slices to a cup.

- Let steep for 5 to 10 minutes.
- Strain the mixture and enjoy it hot or cold.

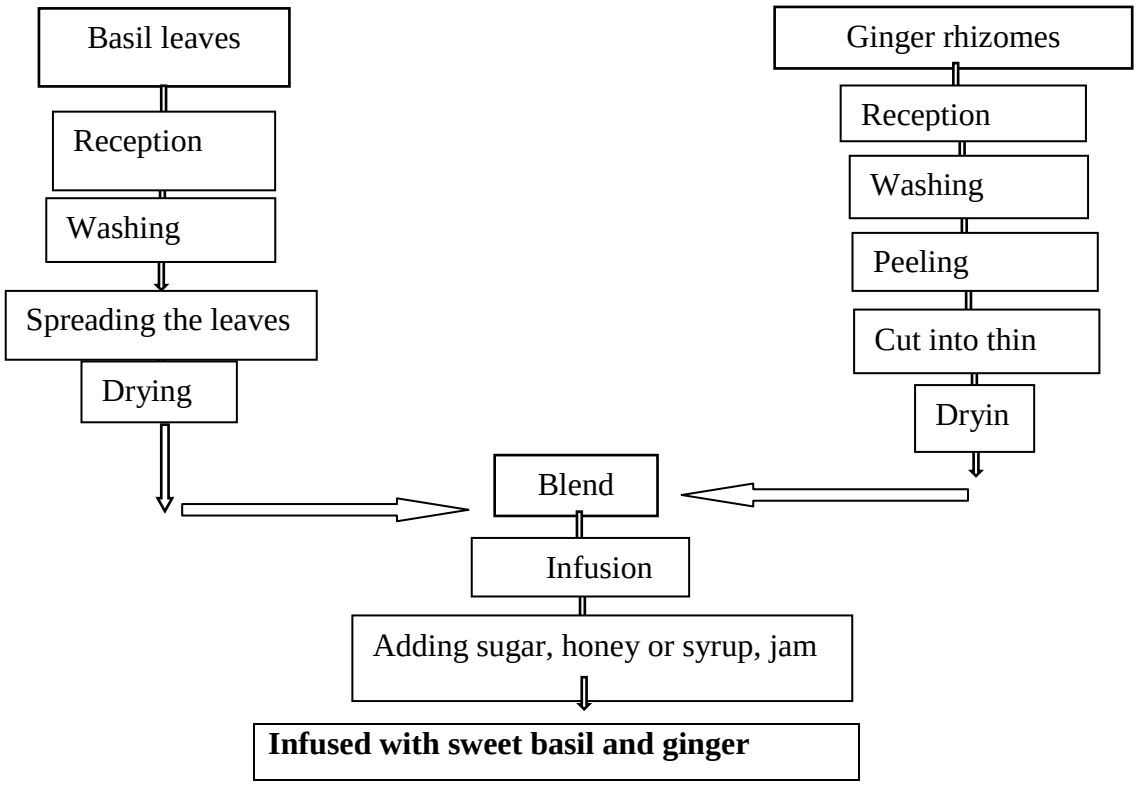

Fig: Technological diagram of production of ginger basil Infusion.

2.2.3. Extraction method

The extract used for each sample is obtained by infusion, a method of preparing a beverage that is usually done hot. It consists of letting a given quantity of ingredients such as herbs, flowers or leaves or their powder rest for a time in a previously boiled solvent to extract their aromas.

In our case, we used 5 g of sample powder in 250 mL of distilled water previously boiled for 10 minutes and the infusion time is five (5) minutes. Afterwards, the mixture is filtered through cotton (purchased at the pharmacy allowing to obtain a filtrate without powder). The filtrate is used for carrying out the phytochemical analysis.

2.2.3.1. Phytochemical screening

Phytochemical analysis is carried out on the basis of characteristic coloration and precipitation tests in order to highlight the major chemical groups. Several methods adapted to laboratory conditions have been used.[6,7,8,9,10]etc…).

Polyphenols test

Add a few drops of 1% $FeCl_3$ to 2 mL of extract. The appearance of intense green, purple, blue or black colors depending on the extract indicates the presence of polyphenols. The test for different types of tannins is carried out when the polyphenol test is positive.

Identification of tannins

Collect5 mL of infusion and add a few drops of $FeCl_3$ solution (5%). The appearance of a blue to black color indicates the presence of tannins.

Catechin tannins

Using Stiasny's reagent, a pink precipitate is obtained which indicates their presence.

Gallic tannins

Saturation of the filtrate of the mixture obtained for the test of catechic tannins of sodium acetate plus a few drops of $FeCl_3$ at 1%: a blue or black tint indicates the presence of gallic tannins.

Flavonoid test

A mixture of a few Mg^{2+} shavings and drops of concentrated HCl, placed in a tube, is added to 2 mL of extract. The appearance of a color ranging from orange to purple-red indicates a positive reaction.[11]

D) Alkaloid test

This test is carried out using two methods using different reagents

Dragendorff (potassium iodobismuthate): red precipitate

Wagner (diiodine and potassium iodide): brown color formed

Alkaloids are also detected by Mayer's reagent (10 g of KI and 2.70 g of HgCl2 dissolved in 20 mL of water). Adding a few drops of this reagent to 2 mL of the extract solution results in the formation of a white or white-yellow precipitate in the presence of alkaloid.[12]

To determine some nutritional constituents, we highlighted the presence or absence of proteins and lipids in the samples.

E) Protein test in food

Proteins are detected by the Biuret test, which uses 1% cupric sulfate and 40% sodium hydroxide as reagents. Take 2 mL of the extract. Add 0.5-1 mL of the NaOH solution and

then 3 to 5 drops of CuSO4. Gently shake the test tube to homogenize the mixture. Let the mixture stand for 5 minutes. The appearance of a blue-violet color indicates the presence of proteins in the sample (https://www.champignons-passion.be/BiuretTest2011.pdf)

F) Lipid test in food

Lipids are all fatty substances. They are characterized by their insolubility in water.

Lipids are detected using the emulsion test. The test substance is mixed with equal volumes of ethanol and distilled water and then shaken. A cloudy white emulsion will form if lipids are present.[13]

To detect lipids in a plant organ, the substance is vigorously floated on a sheet of paper (filter paper). The presence of lipid is indicated by the appearance of a translucent spot on the paper.

3. RESULTS AND DISCUSSION

3.1. Results

Phytochemical screening allowed the detection of the presence of secondary metabolites in the powder of each sample (ginger, African basil and their mixture). The results obtained were classified as negative (-) or positive (+) tests depending on the observed color and are recorded in the following table.

Table: Phytochemical analysis of samples and lipid and protein testing.

Samples / ***Phytochemical screening***	Aqueous extract infused with powder of OcimumgratissimumL.	Aqueous extract infused with Zingiber officinale powder	Aqueous extract infused with a mixture of Ocimum and Zingiber (50% + 50%)
Polyphenols	+	-	+
Tannins	+ (catechists) - (Gallic)	-	+ (catechists) - (Gallic)
Flavonoids	+ (flavones)	+ (flavones)	+ (flavones)
Alkaloids	+	+	+
Some nutrients			
Proteins	-	-	-
Lipids	+	-	+

From the analysis of the table, we note the presence of some large chemical groups in each sample and in the mixture. We note the presence of flavonoids (flavones) and alkaloids in all the extracts. Ocimum and the mixture presented positive results on the presence of polyphenols as well as tannins (especially catechic tannins) unlike the infused extract of

Zingiber. This result is consistent with those obtained by.[8,14] on the decoted extract of ginger roots. Furthermore, our results are contrary to those of.[15,16,17] revealed the presence of tannins in the extract of the rhizome powder of Zingiber officinale.

The variation of the different main chemical compounds in phytochemical studies of plants could be explained by environmental factors. These factors can influence the genetic variability and the production of secondary metabolites of a given species.[18] thus resulting in plants with different chemical composition and therefore sometimes different uses depending on the collection region.[19]

These differences may be due to several factors, such as the variety of ginger used, the extraction methods employed, the duration, the nature of the solvent and the temperature quantitatively and qualitatively affecting the composition of secondary metabolism in an extract.[14,17,20]

The infused extract of the mixture has an advantage, the tests reveal the presence of polyphenols, flavonoids, catechic tannins and alkaloids. This result could be due to a synergistic effect of the composition of Ocimum and Zingiber.

From the analysis made on the detection of some nutritive substances such as proteins and lipids, we note an absence of proteins in the extracts but the presence of lipids in the extract of Ocimum and the mixture. This presence noted at the level of the mixture would necessarily result from the powder of the African basil.

The presence of the different major chemical groups in the mixture would present biological properties beneficial to health; properties linked to the presence of certain main chemical compounds (bioactive) such as polyphenols, flavonoids, catechic tannins and alkaloids; specifically triple antioxidant properties, antidepressant properties, beneficial properties for the human brain, anti-cardiac properties, and considerably reducing oxidative stress.[17]

Phenolic compounds play an important role in protection against various diseases due to their ability to interact with many enzymes and their antioxidant properties.[21] (Fleuriet et al., 2005). Flavonoids, in particular, exhibit a diverse range of beneficial properties, such as venotonic, antitumor, antiradical, anti-inflammatory, analgesic, antiallergic, antispasmodic, antibacterial, hepatoprotective, estrogenic, and/or antiestrogenic effects.[22] Alkaloids have diverse pharmacological effects [23] and have a long history in medication.[24]

3.3. CONCLUSION

This study, which aims to prepare an infusion of basil and ginger and their impact on health, allowed us to find in this preparation, the presence of certain main chemical compounds (bioactive) such as polyphenols, flavonoids, catechic tannins and alkaloids which each have a beneficial role for the health of the human body. Regarding the analysis made on the detection of some nutrients such as proteins and lipids, we note an absence of proteins in the extracts but the presence of lipids in the Ocimum extract and the mixture. This presence noted at the level of the mixture would necessarily result from the powder of the African basil.

Given that our country has a great biodiversity of plants, each of which is characterized by a fairly large reservoir of secondary metabolites with particular therapeutic and pharmacological characteristics, we propose to the State to direct research towards the realization of in-depth and complementary studies of the biological activities of plants (Essential Oils, polyphenolic compounds and flavonoids).

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