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CHEMICAL COMPARATIVE ANALYSIS OF THE CARMINATIVE POTENTIAL OF GINGER AND GECROL FOR CLINICAL APPLICATION

[1]Asimi Tajudeen, [2]Bamisaye F. D., [3]Adebayo M. A., [4]Isola O. E. and [5]Owolabi S. A.

[1,2,3,4,5,] *Department of Science Laboratory Technology*
Federal Polytechnic, Ede Osun State
Author's Correspondence E-mail: aderemidemo@gmail.com

Abstract: Herbal medicine is the oldest form of health-care, the word herb as used in herbal medicine is known as botanical medicine, or in Europe as phytotheraphy, and ginger been a flowering plant that is among the healthiest and most delicious spices on the planet, thereby precipitate its wide clinical applications. Ginger root (Zingiber officinale) extracts and gecrol was comparatively analysed using both classical and instrumental techniques to identify and quantify their active components. The result shown that wet ginger had 74.89% moisture content, 1.97% Ash, 9.24% crude fibre, 5.32% protein, 6.37% crude fat, 2.21% carbohydrate and 87.45% Energy value. While the dry ginger had the moisture, ash, crude fibre, protein, crude fat, carbohydrate contents and Energy value of 14.00%, 1.80%, 21.82%, 29.64%, 18.29%, 14.45% and 340.97% respectively. Furthermore, the result of minerals analysis obtained shown that wet ginger contains 0.49mg/L (Na_2Co_3) 0.17Mg/L ($MgSiO_3$) and 0.25Mg/L (Mg), while the dry ginger contains 1.81Mg/L (Na_2Co_3) 16.05Mg/L ($MgSiO_3$) and 29.25Mg/L (Mg) with little difference from the commercially available specimen. The result obtained confirmed that both dry and wet ginger can be very useful as locally prepared anti-stomach upset drug (carminative drug) and the usefulness of ginger root as a potential functional food could be explored for further formulation.

Keywords: Analysis, Carminative, Classical, Ginger, Instrumental, Mineral, Proximate.

1.0 INTRODUCTION

Herbal medicine is the oldest form of health care. The word herb as used in herbal medicine, also known as botanical medicine or in Europe as phytotheraphy-medical treatment based exclusively on plant extracts and products, or phytomedicine- plants or plants parts that are used in making medicine to assist the healing process during illness and diseases. It also refers to using plants, seeds, berries, roots, leaves, bark or flowers for medicinal purposes. An herb can be a leaf, a stem, a root, a seed, a fruit, a flower or bark used for its medicinal properties. These may be used in many forms, for example fresh-dried cut, as a powder ointment, tincture or oil extract, or made into liquid by infusion or decoction, (Altman R. D., and Marcussen K. C., 2001).

Herbs have provided all living organisms with medicine from the earliest beginnings of civilization throughout the history; various cultures have handed down their accumulated knowledge of the medicinal use of herbs this vast body of information serves as the basis for allopathic medicine today. About 25% of the modern drugs currently used by doctors have a component of an herb whose origin is often from the Amazonian rain forest or similar climate. But in today's allopathic medicine, most remedies are synthetic preparations devoid of any life promoting vital energies: Nevertheless, allopathic medicine has its place and has saved many lives, (Felter, H. W and Lloyd J. U King's, 2010). Herbalism has a long tradition of life outside of conventional medicine. It is becoming more mainstream as improvements in analysis and quality control along with advances in clinical research show the value of herbal medicine in the treating and preventing disease, (Felter, et al., 2010).

The allopathic medicines-the orthodox system of medicine in which the use of drugs is directed to producing effects in the body that will directly oppose and so alleviate the symptoms of a disease. This form of medicine

should be saved for when there is no other option for a particular disease or illness. If a safer natural remedy is available, then it should be implemented before the use of a harsher, more powerful drug.

A patient suffering from a life threatening disease may require allopathic drugs combined with natural remedies providing the best of both worlds. The additional benefit of certain natural medicines is that they can counteract the side effects of allopathic drugs, (Felter, et al., 2010).

In controlled trials of ginger in the prevention of induced motion sickness, some results showed that individual had reduced vomiting following the ingestion of ginger, (Damery S, Gratus C, Grieve R, et al., 2011). Similarly, the effect of ginger on sea sickness, ginger reduced the tendency to vomit and of cold sweats significantly better than placebo, (Damery et al., 2011).

Other research found no difference in subjective reports of nausea and vertigo which are product of a central nervous system response to inner ear disturbance, for which ginger has no effect, (Apariman S, et al., 2006). Ginger might possibly reduce other nausea and vomiting. Ginger has been tested in preventing post – surgical nausea and vomiting. In two randomized, double-blind trials, parent who received ginger prior to surgery experienced less vomiting than those who received placebo, (Apariman S, et al., 2006).

In a third trial, there was no difference, Francis P. (2003), and in a fourth trial, the frequency with which both nausea and vomiting occurred increased with increasing dosage of ginger. Because information is lacking about the specific dry action of ginger and about possible, but undocumented side effects and interactions, ginger is not recommended for use during pregnancy by the German Commission E, by the World Health Organization, or by the U-S Pharmacopeia, (Birks J, Grimley Evans J. 2007). The aim of this study was to investigate the anti-stomach upset medicinal potential of ginger plant, in anticipation to reduce the associated side effects of western drugs, produced synthetically.

2.0 MATERIALS AND METHODOLOGY

2.1 MATERIALS

2.1.1 SAMPLING METHOD

The plant material used for this work were fresh and dry ginger root obtained from Oja - Timi Ede, Osun State, by market survey.

2.1.2 SAMPLE TREATMENT

The sample was washed with running water to remove adhering debris, after which the sample was cut into smaller pieces. Both the fresh and dry ginger was air dried at room temperature to remove the moisture content, after which it was blended into powdery form for further analysis.

2.1.3 APPARATUS

Some of the Equipment used for this project were beakers, whatman no 1 filter paper, centrifuge, mechanical shaker, measuring cylinder, conical flask, analytical weighing balance, crucible, aluminum foil, and masking tape. Among others were blender, litmus paper, volumetric flask, digital spectrophotometer, atomic absorption spectrum (AAS), flame photometer, fume cupboard, pipette, burette, water bath, digestion-tube, digestion block heater. Heating mantle, glass rod, funnel, wash bottle, sohxlet apparatus and accessories, oven, desiccators, sievescloth, muffle furnace, and fibre flask were also used.

2.1.4 CHEMICAL REAGENTS

The chemical used for this project were all analytical grade. They were methanol, Isopropyl alcohol, acetone, phosphomolybdic acid, 23% $NaCo_3$, distilled water, phenol, Ethanol, Conc. Hcl, 50% methanol, Folin-Denis reagent, Conc. H_2SO_4, 0.01 NHCL, 40% (W\V) NaOH, 2% boric acid solution, methyl red-Bromocresol green mixed indicator, Kjeldahl catalyst tablet, petroleum spirit or Ether, 2MHCL, Vanadate.

2.2 METHODOLOGY

2.2.1 RESEACH DESIGN

The research work was observational experimental study design.

2.2.2 EXTRACTION OF THE SAMPLE (COLD EXTRACTION)

2.0 gram of each sample (dry and wet ginger) was weighed accurately on analytical weighing balance and suspended in 80ml of methanol in a beaker. The same gram of each sample was repeated by suspending it in 80ml of isopropyl alcohol. which was shaken for three hours on a mechanical shaker at room temperature (37^OC) and later centrifuged at 4000 revolutions per minutes (rpm) for 5minutes and filtered with whatman No1 filter paper. This was repeated for both the fresh and dry ginger.

2.2.3 PROXIMATE ANALYSIS

The followings **were the chemical parameter determined using AOAC 2010;** Moisture Content, Ash Content, Acidity and Alkalinity, Fibre Content,
Crude Protein, Crude Fat, Carbohydrate Content, and Energy Content.

2.2.4 MINERAL COMPOSITION

Some of the elemental composition determined were, Sodium and Sodium Carbonate, Magnesium (Mg) and Magnesium Silicate ($MgSiO_3$) (Trace Element)

3.0 RESULTS AND DISCUSSION

3.1 RESULTS

Below were the tables shown results of the proximate, and minerals content of ginger plant samples in comparison with the commercially available anti–stomach drug (Gecrol).

3.1.1 PROXIMATE ANALYSIS

Table 1: The Proximate Composition of the Samples

Samples	**Moisture %**	**Ash %**	**Crude fibre %**	**Protein %**	**Crude fat %**	**CHO %**	**Cal / 100g energy Cal**
Fresh ginger	74.89	1.97	9.24	5.32	6.37	2.21	87.45
Dry ginger	14.00	1.80	21.82	29.64	18.29	14.45	340.97
Gecrol	54.21	0.14	6.70	3.92	4.61	1.61	63.31

3.1.2 MINERAL COMPOSITION

Table 2: Mineral Content of the Samples

Samples	**$NaCo_3$ (Mg)**	**$MgSiO_3$ (Mg)**	**Mg (mg)**
Fresh ginger	0.49	0.17	0.25
Dry ginger	1.81	16.05	29.25
Gecrol suspension	250	250	0.02

3.2 DISCUSSION

3.2.1 PROXIMATE CONTENT

The proximate composition of the fresh and dry ginger was shown in table 1, it was observed that the fresh gingers contain highest moisture content, with gecrol forming the intermediate. The moisture content in fresh ginger indicates that mold can easily grow on it if not stored in refrigerator. The moisture content in dry ginger was 0.25% higher than the result given by the analysis carried out in Iree Polytechnic by School of Applied Sciences. The ash content of fresh ginger and gecrol were slightly higher than that of dry ginger but all had low ash content indicated the level of essential or non-essential mineral contents of the samples.
The percentage crude protein in dry ginger was higher than that of fresh ginger which was even higher than the 12.6% reported by Altschuler et al (2007). The high amount in dry ginger indicated good source of protein in dry ginger than fresh ginger. The crude fiber content in fresh ginger was lower than that in dry ginger which was

of course lower than 17.6% reported by an earlier researcher. The crude fibre of fresh sample was moderate. Since diet low in fibre is desirable and it may be advantageous as they are known to reduce Serum cholesterol levels.

The percentage crude fat in wet sample was also lower than that of dry ginger. The low crude fat in fresh ginger was moderate because samples low in fat is advantageous as they may reduce the risk of coronary heart disease and lower the risk of hypertension. The dry ginger had higher percent carbohydrate than fresh ginger, which shown dry ginger as a good source of energy for the body likewise the percentage energy calorie in dry ginger was higher than that of the fresh one.

3.2.2 MINERAL CONTENT

Table 2, also shown that the amount of Na_2Co_3 in dry ginger (1.81mg) was higher than that in fresh ginger (0.49 mg), with gecrol having the highest (250 mg). While the amount of $MgSiO_3$ in fresh ginger (0.17 mg) was lower than that in dry ginger (16.05 mg) but gecrol had the highest (250 mg). It was also observed that dry ginger had the highest quantity of magnesium (29.25mg) with gecrol having the lowest (0.02 mg), which is in accordance with other clinical report. The levels of magnesium in the sample facilitate this research work, because Magnesium is one of the most abundant minerals in the body and is needed for over 300 biochemical reactions. The mineral helps maintain a steady heart rhythm, metabolize energy from food and build strong bones. A magnesium deficiency can be linked to stomach pain because magnesium plays a major role in nerve impulses and muscle contractions. Not only can a deficiency cause a loss of appetite, nausea and vomiting but it could also cause cramping in the stomach muscles, leading to abdominal pain, (Office of Dietary Supplements, 2015). Whereas the amount of Magnesium present in dry ginger was closed to the amount needed for the body, Report of National Institutes of Health (2010).

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 CONCLUSION

The presence of high amount of magnesium in dry and fresh ginger and their high nutritional values such as protein, carbohydrate, and essential minerals coupled with the therapeutic value of ginger root for anti-stomach upset drugs cannot be overestimated. This research work also revealed additional potentials of these plants in the area of pharmacology as an excellence source of useful anti-stomach upset drugs. This study therefore has provided some biochemical basis for pharmacological uses of these plants in the treatment and prevention of various diseases and stomach disorders.

4.2 RECOMMENDATION

Although, ginger has been used as medicinal herb for the treatment of stomach upset such as cancer cells nausea, vomiting and several other therapeutic purposes, it however been found to be without side effect like other types of antacid. Therefore, it is recommended that ginger (Zingiber officinale) or ginger extract will be of great help in developing countries with financial constraints. It is hereby recommended either locally or through scientific processes, particularly in the pharmaceutical companies.

The extract could be incorporated into specific drugs in the treatment of diseases and infections caused by microorganisms especially those that have shown certain degree of sensitivity to the extract. Finally, the government at all tiers should encourage research conferences and symposia at promoting the efficacy of this plant on some Clinical pathogens, as shown by the outcome of this research work.

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