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Research Article

Microbiological and Toxicity of Lippi Classic Drink for Wellness

Raphael Nyarkotey Obu, RND, PhD.
Nyarkotey College of Holistic Medicine Tema C7 Ghana.

*Corresponding Author
Raphael Nyarkotey Obu, RND, PhD. Email: oburalph30@yahoo.co.uk

Abstract: **Objective:** Certain microbial impurities can change the physicochemical physiognomies which can further lead to harmful make up of herbal medicinal products. The present paper discusses the safety issues of Lippi Classic Drink formulated for general wellness. **Methods:** Six samples of the product, with the brand name Lippi Classic Drink were sent to the Department Of Pharmaceutics for microbiological analysis, Department of Pharmacology for the toxicological analysis and the Department of Herbal Medicine for the Phytochemical and Physiochemical studies**.** **Result:** The Product, Lippi Classic Drink passed both the toxicological and microbiological studies required for the FDA registration of Herbal product in Ghana. **Conclusion:** The Product, Lippi Classic Drink is safe. The bacterial load obtained for the aerobic viable count was within the acceptable limit. Also the fungal load was also within the acceptance limit (BP2015). The product can also be regarded as of low toxicity in the rats**.**
Keywords: Toxicity, Microbiological, Lippi classic Drink, Herbal Medicine, Tea.

INTRODUCTION:

Herbal Medicinal products contamination is a subject of interest. Contamination involved chemical or microbiological or foreign matter (WHO. 2007). It could trigger from a starting material, intermediate product or finished herbal product during production, packaging, storage or transport of this product (WHO. 2007).

Furthermore, certain microbial impurities can change the physicochemical physiognomies which can further lead to harmful make up of herbal medicinal products. To further avert further futuristic problems, the World Health Organization (WHO) therefore requires all local and international regulatory bodies to set up policies to ensure that herbal medicinal products meet the recommended standard of safety prior to be legalized for human consumption but this has remained an ideal situation as most of countries are still far from achieving this goal (WHO. 2007; Ekor, M. 2014; Walther, C. *et al.* 2016).

The further use of herbal medicine has received several boosts with several jurisdictional governments and individual supports. It has increased as a result of easily accessibility to raw materials and cheap cost compared to pharmaceutical formulations (Aschwanden, C. 2001). There is a further need to monitor these remedies to not worsen the plight of the public (WHO. 2007; Aschwanden, C. 2001).

The present study assessed the microbial and toxicity of Lippi Classic Drink formulated for general wellness to be use in Ghana.

METHODOLOGY

Six (6)samples of the Lippi Classic Drink were sent to the Kwame Nkrumah University of Science and Technology, KNUST, Ashanti region, Ghana to the Department of Pharmacology to assessed the acute toxicity using Eighteen(18) males, Sprague-Dawley rates in 3 groups (n=6). The Department of Pharmacognosy of the College of Health Sciences also assessed the Phytochemical and Physicochemical properties of the product and the Department of Pharmaceutics also assessed the microbial loads.

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Below are the findings:

Fig 1 **(A)**

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MICROBIAL TEST PROTOCOL – (BP level of Microbial Contamination)

1. **Assessment of total viable count of aerobic bacteria and fungi.**
2. **Test for specific harmful organisms**

TEST RESULTS

LEVEL OF MICROBIAL CONTAMINATION

- The total aerobic viable count of sample 1.83*102cfu/mL
  (BP 2015 Specification - < 1*105cfu/mL)
- Test for Escherichia coli- MAC/37OC/48hrs none detected
  (BP 2015 Specification –Nil/mL)
- Test for Staphylococcus aureus – MSA/37OC/48hrs none detected
  (BP 2015 Specification – Nil/mL)
- Test for Salmonella spp. BSA/37OC/48hrs none detected
  (BP 2015 Specification – Nil/mL)
- Test for Pseudomonas aeruginosa/PCA/37OC/48hrs none detected
  (BP 2015 Specification – Nil/mL)
- Test for Yeast and Moulds – SB/25C/5days 1.26*102cfu/mL
  (BP 2015 Specification - < 1.0*105cfu/mL)

REMARKS

- The bacterial load obtained for the aerobic viable count was within the acceptable limit.
- The fungal load was also within the acceptance limit (BP2015). No harmful microorganisms were detected.

(B)
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Table. 1 PHYTOCHEMICAL AND PHYSICOCHEMICAL STUDIES

1.ORGANOLEPTIC PROPERTIES		
Form	-	Liquid
Colour	-	Green
Taste	-	Bland
Odour	-	characteristic
2.PHYSICOCHEMICAL PROPERTIES		
pH	-	5.63
Dry weight per mL	-	0.0086g
Specific gravity/ mL	-	0.9689
3.PHYTOCHEMICAL PROPERTIES		
Reducing sugars	-	Positive
Saponins	-	Positive
Alkaloids	-	Negative
Flavonoids	-	Positive
Phytosterols	-	Negative
Terpenoids	-	Positive
Tannins	-	Positive

Table. 2

1.	**FOURIER-TRANSFORM INRARED FINGERPRINT OF HERBAL MITURE** **Sample preparation**: About 20mL of the herbal mixture was evaporated to dryness. **Instrumentation**: a small amount of the dried mixture was placed on the sample area of the Bruker Fourier transform infrared (FT-IR) spectrometer and scanned between 4000-400 cm^{-1} with a resolving power of 4cm^{-1} and a cumulative scanning limitation of 24 times. **Results**: Principal peaks appeared at wavenumbers 3285.47, 2917.74, 2849.96, 1617.23, 1316.23, 1019.43 cm^{-1}

(C)

II. TOXICOLOGICAL REPORT

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Table. 3 Acute Toxicity

Animal Species	no. of animals/group	Route of administration	Doses administered	No. of death Recorded	Approx. lethal dose	Duration of study
Sprague-Dawleg Rats	18 males, 3 groups (n=6)	Oral	0,9.52 and 19.05g/kg	No deaths recorded	Above 19.05 g/kg	48h

REMARKS/CONCLUSION

330 ml of the drink was evaporated to dryness to obtain a semi-solid mass. The yield obtained was 1.13% w/v. this was reconstituted by dissolving in distilled water (2 g/ml). Rats were treated with 0, 9.52 and 19.05 g/kg of the test product and observed over 48 hours for signs of toxicity attributable to the test product treatment were observed. The lethal dose (LD_{50}) of the product was estimated to be above 19.05 g/kg (Table 3). The result indicates that the LD_{50} of the extract from Lippi classic drink was greater than 19.05 g/kg body weight in rats, which can be regarded as of low toxicity in the rats.

DISCUSSION

The present study has revealed that the product, Lippi Classic Drink is safe for public used. Also the toxicological report(Tab 3) on Rats treated with 0, 9.52 and 19.05 g/kg of the test product and observed over 48 hours for signs of toxicity attributable to the test product treatment revealed that, The lethal dose (LD50) of the product was estimated to be above 19.05 g/kg (Table 3). The results indicate that the LD50 of the extract from Lippi classic drink was greater than 19.05 g/kg body weight in rats, which can be regarded as of low toxicity in the rats.

Also, important phytochemical components such as saponins, Tannins, Reducing sugars, Terpenoids and flavonoids were present in the Lippi Classic Drink (Tab 1). No harmful microorganisms were detected (Fig 1) with good wave numbers (Tab 2).

Also the phytochemical makeup of the product such as saponins (Tab 1) which have many health benefits. For instance, Studies (Saponins – Phytochemicals. www.phytochemicals.info) have illustrated the beneficial effects on blood cholesterol levels, cancer, bone health and stimulation of the immune system. Most scientific studies investigate the effect of saponins from specific plant sources and the results cannot be applied to other saponins. The presence of saponins has been reported in more than 100 families of plants and in a few marine sources such as star fish and sea cucumber. Triterpene saponins are present in many taxonomic plant groups (Kregiel, D. *et al.* 2017). The product also has a good taste as a result of the positive nature of the presence of Tannins. Tannins contribute too many aspects of our daily lives (Kregiel, D. *et al.* 2017). They are responsible for the astringent taste we experience when we partake of wine or unripe fruits, and for the enchanting colors seen in flowers and in autumn leaves (Kregiel, D. *et al.* 2017).

Terpenoids (Dr. Mercola. 2017) another beneficial phytochemical is also present in the drink (Tab 1). Terpenoids represent the largest and most diverse class of beneficial chemicals. More than 40,000 individual terpenoids exist, and new ones are discovered every year. Plants use terpenoid metabolites to support basic functions like growth, repair and development. Among humans, terpenoids have long been valued for medicinal purposes in traditional Indian and Chinese medicines, and they've also been used for food, pharmaceutical and chemical purposes. The cancer drug Taxol and the antimalarial drug artemisinin are both terpenoid-based drugs, (Dr. Mercola. 2017) but the plant compounds are perhaps most well-known for

being the main constituents of the essential oils in many plants.

The uniqueness of the Drink also contains flavonoids (Tab 1). Flavonoids (The World's Healthiest Foods, www.whfoods.com) are one of the largest nutrient families known to scientists, and include over 6,000 already-identified family members. Some of the best-known flavonoids include quercetin, kaempferol, catechins, and anthocyanidins. This nutrient group is most famous for its antioxidant and anti-inflammatory health benefits, as well as its contribution of vibrant color to the foods we eat.

Reducing sugar also present in the drink (Tab 1). A reducing sugar is a chemical term for a sugar that acts as a reducing agent and can donate electrons to another molecule. Specifically, a reducing sugar is a type of carbohydrate or natural sugar that contains a free aldehyde or ketone group. Reducing sugars can react with other parts of the food, like amino acids, to change the color or taste of the food (The Definition of Reducing Sugars, www.livestrong.com).

The product is purely herbal and not adulterated. It is devoid of alkaloid properties (Tab 1) As Alkaloid are a member of a large group of chemicals that are made by plants and have nitrogen in them. Many alkaloids possess potent pharmacologic effects. The alkaloids include cocaine, nicotine, strychnine, caffeine, morphine, pilocarpine, atropine, methamphetamine, mescaline, ephedrine, and tryptamine (www.medicinenet.com). However, the drink is devoid of phytosterol (Tab 1).

Phytosterols, are plant-derived compounds that are structurally related to cholesterol. Early human diets were likely rich in phytosterols, providing as much as 1 g/day; however, the typical Western diet today is relatively low in phytosterols (Phytosterols, https://lpi.oregonstate.edu).

Although phytosterols are present in the diet in amounts similar to cholesterol, they are poorly absorbed and blood concentrations tend to be low (Phytosterols, https://lpi.oregonstate.edu). Also several clinical trials have demonstrated that daily consumption of phytosterols from phytosterol-enriched foods can significantly lower serum low-density lipoprotein (LDL)-cholesterol. An average phytosterol intake of 2 g/day lowers serum LDL-cholesterol by 8%-10%. The results of a few clinical trials suggested that phytosterol supplementation at relatively low doses can improve urinary tract symptoms related to benign prostatic hyperplasia, but further research is needed to confirm thesefindings(Phytosterols, https:// lpi.oregonstate.edu).

CONCLUSION:

The product Lippi Classic Drink has been proven to be safe and passed the toxicological analyses. The product also contains very significant phytochemicals for wellness.

CONFLICT OF INTEREST

The author of this paper reports no conflict of interest.

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