

Healing Medicine and the Power of Pharmaceutical Reciprocity

Haggard AA^{1,*} and Gwathmey JK²

¹Department of Biology, Community College of Qatar, ad-Doha, State of Qatar

²Boston University School of Medicine, Department of Medicine, Massachusetts, USA

*Corresponding author: Haggard AA, Department of Biology, Community College of Qatar, ad-Doha, State of Qatar, Tel; 7135407865; E-mail: Alfreda.haggard@ccq.edu.qa, ariella6@swbell.net

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Introduction

According to recent estimates by the World Health Organization (WHO), more than 4.8 billion people in developing nations rely on plants and animals as components of their primary health care, and that eighty-five percent of traditional medicine involves the use of plant extracts. As a result, Ethnobotanical research cannot be over emphasized [1].

Ethnobotanical research on Bitter Kola (*Garcinia kola*), which is the fruit from an evergreen tree belonging to the family of Guittiferales, has been presented. Bitter Kola is classified as a “higher plant” and is described as a chemical factory capable of synthesizing unlimited numbers of highly complex and unusual chemical substances whose structures could escape the imagination of synthetic chemists indefinitely. It has been used for generations by traditional healers and is known throughout South and Central Africa by a variety of names, such as Orogbo in Yorubaland, Namijin Gora in the Hausa society, and Aki Ilu, ‘Adi or Agbilu by the Ibbo.

Indigenous healers’ possess a resource that is termed ethnobotanical knowledge, which encompasses both wild and domesticated botanicals, is rooted in observation, relationships, needs, and traditional ways of knowing. Their knowledge evolved over time, and is, therefore, dynamic with continual discoveries, ingenuity, and methods. The United States Department of Agriculture defines ethnobotany as the study of how people in a particular culture and region make use of indigenous (native) plants [2]. Ethnobotany is an integrative, multi-disciplinary field of learning, and the tools of ethnobotanical investigation are many, including botany, mycology, taxonomy, anthropology, ethnography, archaeology, comparative folklore, religious studies, medical chemistry, and pharmacology. According to the Botanical Dimensions organization, ethnobotany is much more in that involves mythology, cosmology, and ancient history, or colonial social-economic histories, and the examination of modern social movements [3].

Keywords: Ethnobotanical; Ethnobotany; Ethnopharmacology; Ethnomedicine; Pharmaceutical reciprocity; Bitter kola (*Garcinia kola*); Sweet wormwood (*Artemisia annua*)

Review

Although the paper presented entitled “Physico-Chemical; Nutritive Properties; Bitter Kola (*Garcia Kola*)” by Mazi et al. [4] is informative, there are several additional points to be considered before gaining the interest of the pharmaceutical industry. Statements such as the Bitter Kola would be a good source of carbohydrates would require more in-depth study because there are various forms of carbohydrates. The authors do not present information on the quantity of raw materials

used for the extraction. In the pharmaceutical industry, production of natural products is based upon the efficacy of the extraction method and the yield. The extraction process is evaluated based on time and materials. Pharmaceutical companies look more favorably on the development of novel therapeutic agents if the yield is high upon extraction and lower amounts of raw materials are needed. Another important point that the authors do not present is whether their reported percentages are in line with recommended minimal daily requirements. This would be particularly relevant for Africans with limited access to a nutrient-dense diet.

In order to shed some light on the level of interest expressed by pharmaceutical companies regarding the benefits of natural products, some information should be provided on the protocols of pharmaceutical companies that are now examining the efficacy of natural remedies. In 1985, approximately 3,500 new chemical structures from natural sources were reported according to information compiled on the University of Illinois’ Natural Product Alert (NAPRALERT) database. Of these, 2618 were obtained from “higher plants,” 512 from “lower plants” (bacteria, fungi, filamentous and lichens), and 372 from other sources (marine organisms, protozoa, arthropods and chordates) [5].

The importance of daily nutritive values and the yields of agents are not as critical as educating readers on the long history of plant-based pharmaceutical drugs and medicines which empowers consumers in their decisions making regarding medicinal treatment options. Lesile Taylor, N.D., author of “Plant Based Drugs and Medicines,” states that there are approximately 120 distinct chemical substances known to science that are derived from “higher plants” and that several pharmaceutical drugs sold in today’s market are simple synthetic modifications, if not copies, of the naturally occurring substances obtained from plant sources [6].

For example, for over two thousand years traditional Chinese healers treated fever by preparing tea made from the leaves of *Artemisia annua*. *Artemisia annua* belongs to the plant family of Asteraceae and is also known as sweet wormwood, sweet annie, sweet sagewort, annual mugwort and annual wormwood [7]. Today, artemisinin, material derived from the sweet wormwood plant, is the main ingredient in the most effective treatment for malaria. However the volatility of the crops is a challenge.

In 2001, when the WHO recommended Artemisinin-based Combination Therapy (ACT), as the standard treatment for malaria worldwide created a global demand for artemisinin, and it skyrocketed. It is estimated that more than 620,000 lives a year could be saved using the ACT protocol, which combines artemisinin with other drugs providing a highly effective and safe treatment for uncomplicated cases of malaria [8].

Producing artemisinin synthetically is a complicated and expensive process; however, a grant from the Bill & Melinda Gates Foundation Program for Appropriate Technology in Health (PATH), united one of the foremost authorities in synthetic biology, Dr. Jay Keasling, and his team along with researchers from biotechnology start-up Amyris, Inc., creating a pharmaceutical product in 2007 by taking the genes from the *Artemisia annua* plant [9]. Currently a French multinational pharmaceutical company, Sanofi, holds the license and has developed an innovative method that uses light instead of chemicals to convert the acid into artemisinin. It is said that Sanofi is committed to selling the semisynthetic artemisinin at cost, helping to improve the overall price volatility of the artemisinin market. Providing an additional source can stabilize cost and provide a steady supply independent of the *Artemisia annua* crop. However, sweet wormwood growers will be able to continue to provide plants for a share of the artemisinin market, creating greater access to poor countries battling malaria.

In addition, the lack of social responsibility by the pharmaceutical industry could also be addressed by the authors. In 2013, pharmaceutical companies generated \$1.28 billion in Nigeria alone: \$141 billion in biotechnology, \$463 billion conventional, and \$161 billion that is unclassified globally. Spending \$17.8 billion in research and development, it is equally important to consider that they spent twice that amount in the marketing of their products [10].

Bitter kola should not be limited to “new pharmaceutical” status for the financial growth of large pharmaceutical companies. Consideration should also be given to the financial growth and sustainability of the local indigenous societies who have used botanicals such as Bitter Kola for centuries, which the authors do not address. Nevertheless “Physico-Chemical; Nutritive Properties; Bitter Kola (*Garcia kola*)” by Mazi et al. [4] is a well presented, informative and thought-provoking read. It brings one’s attention to the magnitude of the valuable health benefits, the array of nutritive constituents, the importance in doing further research in hopes of bring the healing power of Bitter Kola to the public market, and, more importantly, it confirms that the diversity of its use by traditional healers has validity.

However, Mazi et al. [4] might have also addressed the financial benefits that the local communities stand to gain via the power of pharmaceutical reciprocity. The oversight and lack of appreciation by the authors of traditional healers, who contributed so much information in regards to plant preparation, traditional healing protocols, and the practical uses that were handed down through their lineage is priceless and must be addressed in subsequent research.

In addition, the authors focus on properties like flavonoids, antioxidants and phenolic compounds which address the symptoms of diseases that are more profitable to Western pharmaceutical markets, instead of on *quinones* and *kolaviron*, which is a bioflavonoid constituent that can manage malaria. It is well known and clearly documented that malaria is the leading cause of death and disease in many developing countries, with young children and pregnant women being affected in larger numbers. According to the WHO’s World Malaria Report 2013, 3.4 billion people, i.e. approximately one half of the world’s population live in high-risk areas for malaria transmission. In 2012, malaria caused an estimated 207 million clinical episodes, and 627,000 deaths, and an estimated 91% of malaria-related deaths in 2010 were in African regions. These deaths translate into a substantial cost to both individuals and governments.

The report further states, that the direct cost, including illness, treatment and premature deaths is an estimated \$12 billion U.S., and the cost in lost economic growth is even greater [11].

It is recommended that future articles by the authors place more emphasis on the role of traditional healers and their contributions to the field of ethno medicine. Traditional healers can share their concepts of illness and methods of healing. The authors’ knowledge of the fruit enables them to shed light on the multiple uses of bitter kola, and specific details on the preparation and cultivation. On the other hand traditional healers’ knowledge of Ethnopharmacology is also quite relevant to contemporary pharmacological studies. Finally, the uses, effects, and modes of action of naturally-occurring chemical compounds found in bitter kola can save pharmaceutical companies billions in research dollars.

A reciprocal relationship between traditional healers and pharmaceutical companies is the key. In such an exchange of information about traditional remedies, pharmaceutical companies could adopt a tiered approach to reciprocity with immediate, mid-range, and long-term benefits. Safeguarding indigenous intellectual rights is one of the many ways to address an immediate reciprocity in a tiered approach. In “Ethnobotanical Research and Traditional Health Care in Developing Countries,” Balick and Cox state that indigenous peoples are entitled to the same intellectual property rights enjoyed by other investigators, and that the preservation of important habitats are equally urgent [12]. Shaman Botanicals formerly Shaman Pharmaceuticals Inc. and the Healing Forest Conservancy are only two of the many examples that can be considered when exploring appropriate use of intellectual property rights to address the ethical issues facing all pharmaceutical and research investigators working with traditional healers and their communities.

As Mazi et al. [4] point out, bitter kola has great potential due to its physico-chemical and nutritive properties. In addition, bitter kola may be beneficial to the pharmaceutical industries, thus future research regarding higher plants such as bitter kola should include a careful evaluation of the valuable role of the traditional healer. This information held by traditional healers is rapidly vanishing and becoming difficult to locate and access. Equally important is the commitment to provide immediate reciprocity that will enhance the welfare, the biocultural diversity, and the well-being of the West African people.

More importantly, further research and education on ethnobotany and the benefits of *Garcinia kola*, the bitter kola plant is much needed, as the victims of malaria, and their governments can no longer afford to wait another three decades as in the case of *Artemisia annua*, the sweet wormwood plant to reach the Western world and achieve notoriety in the global efforts to manage malaria treatment.

Scientists should be encouraged to not only report their scientific finding, but to also begin a dialogue about greater global health issues and reciprocity for developing communities.

References

1. Alves RR, Rosa IL (2005) “Why study the use of animal products in traditional medicines?” J Ethnobiol Ethnomed 1:5.
2. <http://www.fs.fed.us/wildflowers/ethnobotany>: 2015 September 14
3. <http://botanicaldimensions.org/what-is-ethnobotany>: 2015 November 24
4. Mazi EA, Okoronkwo KA, Ibe UK (2013) Physico-Chemical and Nutritive Properties of Bitter Kola (*Garcinia Kola*). J Nutr Food Sci 3:218.

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5. University of Illinois at Chicago. <http://www.napralert.org> 2015 November 26.
 6. <http://www.rain-tree.com/plantdrugs.htm>: 2015 November 26.
 7. Duke SO, Paul RN (1993) "Development and Fine Structure of the Glandular Trichomes. *Int J Plant Sci* 156: 807.
 8. http://www.who.int/malaria/publications/atoz/position_statement_herbal_remedy_artemisia_annua_/en/
 9. <http://path.org/projects/artemisinin/php> 2015 November 27
 10. <http://www.statista.com/statistics/265100/us-pharmaceutical-industry-spending-on-research-and-development-since-1990/> 2015 September 20
 11. www.who.int/malaria/publication/world_malaria_report_2013/report/en
 12. Balick MJ, Cox PA (1997) "Ethnobotanical Research and Traditional Health Care in Developing Countries" In: Bodeker G, Ghat KKS, Burley J and Vantomme P. (Eds). *Medical Plants for Conservation and Health Care*. Global Initiative for Traditional Systems of Health. Rome, Italy: Food and Agricultural Organization of the United Nations. Non Wood Forest Products pp. 12-24.