



## EDITORIAL

### Contributions of Natural Products to Healthcare

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The importance of natural products for medicine and health has been enormous. Since our earliest ancestors chewed on certain herbs to relieve pain, or wrapped leaves around wounds to improve healing, natural products have often been the sole means to treat diseases. The Ebers Papyrus (2900 B.C.) is an Egyptian pharmaceutical record, which documents over 700 plant-based drugs ranging from gargles, pills, infusions, to ointments. The Chinese Materia Medica (1100 B.C.) contains 52 prescriptions and documented records of the uses of natural products. The Greek physician, Dioscorides, (100 A.D.), recorded the collection, storage and the uses of medicinal herbs, whilst the Greek philosopher and natural scientist, Theophrastus (300 B.C.) dealt with medicinal herbs.<sup>1</sup> During the middle ages the monasteries in England, Ireland, France and Germany preserved this knowledge whilst the Arabs preserved the Greco-Roman knowledge and expanded the uses of their own resources, together with Chinese and Indian herbs unfamiliar to the Greco-Roman world. It was the Arabs who were the first to privately own pharmacies (8th century) with Avicenna, a Persian pharmacist, physician, philosopher and poet, contributing much to the sciences of pharmacy and medicine.<sup>2</sup>

#### State of Natural Products Usage

The use of natural products as medicines has been described throughout history in the form of traditional medicines, remedies, potions and oils with many of these bioactive natural products still not identified. The dominant source of knowledge of natural product uses from medicinal plants is a result of man experimenting by trial and error for hundreds of centuries through palatability trials or untimely deaths, searching for available foods for the treatment of diseases.<sup>3</sup> The use of alcohol and opium to ease pain, of cinchona bark (the source of quinine) to treat malaria and of Ipecac for amebic dysentery can be cited as examples of early man's therapeutic successes despite his ignorance of the causes of these ailments.

The past few years, however, have seen a renewed interest in the use of natural compounds and, more importantly, their role as a basis for drug development. Traditional medicines (TMs) make use of natural products and are of great importance. Such forms of medicine as traditional Chinese medicine (TCM), Ayurveda, Kampo, traditional Korean medicine (TKM), and Unani employ natural products and have been practiced all over the world for hundreds or even thousands of years, and they have blossomed into orderly-regulated systems of medicine. In their various forms, they may have certain defects, but they are still a valuable repository of human knowledge.<sup>4</sup>

In the case of China, Western medicine was introduced in the sixteenth century, but it did not undergo any development until the nineteenth century. Before that, TCM was the dominant form of medical care in the country. Now TCM still plays an important role in China, and it is constantly being developed. TCM is based on practice and experience and is rich in data from clinical experiments which guarantee its effectiveness and efficacy. It has developed techniques with respect to such areas as correct dosage, methods of preparing and processing materials, and the appropriate time to collect the various medicinal parts of plants. It is acknowledged that there is increasing convergence between TCM and modern medicine. With the development of modern technology, it has become possible to determine the pharmacology and mechanisms of action of many Chinese herbs, and TCM has become comprehensible in terms of modern medicine.<sup>5</sup>

At the beginning of the nineteenth century, the era of modern drugs began. In 1805, the first pharmacologically-active compound morphine was isolated by a young German pharmacist, Friedrich Serturner, from the opium plant. Subsequently, many active compounds have been isolated from natural products. Among them, some follow their traditional uses and the others do not. However, natural products are important for the development of new drugs, and these products have been in constant use. Drugs such as anticancer, antihypertensive, and antimigraine medication, have benefited greatly from natural products.<sup>6</sup>

#### Natural Products in Therapy

Natural products have successfully been used in the discovery of new drugs. Among the anticancer drugs approved in the time frame of about 1940–2002, approximately 54% were derived natural products. For example, the Vinca alkaloids from *Catharanthus roseus*, and terpene paclitaxel from *Taxus baccata*, are among successful anticancer drugs originally derived from plants. During the period between 1981 and 2002, the application of natural products in the development of new drugs—especially in the search for novel chemical structures—showed conspicuous success. In that twenty-two year time frame, drugs derived from natural products were significant.<sup>6</sup>

A thorough investigation of the pharmacopoeias of developed and developing nations and the associated world scientific literature was conducted as part of the WHO's TM Program. The aim of that study was to determine whether TM really had inspired modern drug discoveries and whether there was any correlation between the current use of various compounds and their application in TM. The study focused on various

compounds used in drugs derived from plants in different countries, and it established that TM had indeed played a significant role in developing effective new drugs. That study focused on 122 compounds, 80% of which were found to be related to pharmacological effects in folk medicine, and it was determined that these compounds originated from 94 plant species. The acceptability, convenience, and accessibility of TMs have been and will be, helpful for new drug research. As noted above, artemisinin and other antimalarial drugs are examples of modern drugs based on discovery from natural products. Artemisinin has made significant progress, including the synthesis of new artemisinin analogs and derivatives, and research efforts into the biological activities and related mechanisms. As a result, artemisinin, as well as its derivatives are extensively applied throughout the world as new-type anti-malarial drugs.

Kampo is the TM of Japan. Between the fifth and sixth centuries, TCM was introduced to Japan from China; since then, TCM has been significantly altered and adapted by Japanese practitioners to meet their particular circumstances and gradually evolved into Kampo. Some physicians in Japan use Kampo medicines in their daily practice—sometimes as the preferred medication. Together with radiotherapy or chemotherapy, some Japanese physicians frequently utilize Kampo medicines in treating cancer patients. This indicates how modern/Western medicine can be well integrated with TM. As the use of Kampo continues to rise in conjunction with Western medicine, there is growing realization of the urgent need to study the interactions between these two types of medicine.<sup>6</sup>

Unani is an ancient Greek holistic medical system with a history that can be traced back 2500 years. Unani has also attracted considerable attention all over the world, especially in India, where it has been integrated into the national health care system.<sup>6</sup>

African scientists are also aggressively conducting research on medicinal plants. These culminated in the production of the African Pharmacopeia in 1985 through the OAU/STRC Organization of African Unity Scientific Technical Research Committee.

Nigeria also has an herbal Pharmacopeia. African governments through the AU African Union came up with resolutions and declared decade of traditional medicine with activities and strategies to implement the maximum use of natural products through TM and declared August 31<sup>st</sup> as the Traditional Medicine Day. However, most of the research on natural products in Nigeria are yet to reach the patient's bedside as pharmaceuticals rather they are taken as Phytomedicines in a Tolerance system of organizational relationship between Orthodox/Western medicine and traditional medicine.

Therefore, in order to expedite the process towards the integration, the Federal Ministry of Health established the Nigerian Traditional Medicine Policy in 2007. The policy addresses relevant issues such as legislation and regulation; strategy; system management; management information system; human resources development; technology; financing; conservation of the environment; biodiversity; knowledge; skills and culture; protection of intellectual property rights (IPRs) and indigenous knowledge; and fostering partnerships between traditional and

conventional medicine practitioners. The policy would serve and promote the interests of the various stakeholders in the realm of traditional medicine including traditional medicine practitioners (TMPs), researchers, regulatory agencies, policy makers, culture practitioners, law enforcement agents, business entrepreneurs etc. It is envisaged that through the policy, a conducive environment for Nigerians to derive optimal benefits from natural products and generally facilitate the integration of traditional medicine into the national health system would be provided.

## Conclusion

The contributions of natural products to health care cannot be over emphasized. The developed and non-industrialized societies of the world rely heavily on natural products supplementation and for primary healthcare, with an annual global export estimated to be US\$2.2 billion in 2012, with potential global market for botanical extracts projections of several hundred billion dollars in 2017.

With the riches of modern technology, such as in synthesis, fermentation, pharmacology, pharmacodynamics, together with biological diversity, chemo-diversity and great breakthroughs in evolutionary techniques or concepts combined with a wealth of knowledge about natural products, it will be possible to establish a large compound library for drug screening. This will enhance the possibilities for individual treatment and prevention of disease.

## References & Notes

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