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Establishment of a Digital Database for Traditional Herbal Medicines in Kenya

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Abstract:

Traditional complementary and alternative medicine (TCAM) is widely used and accepted worldwide. In Africa, the use of TCAM is increasing, with a few countries having developed digital databases for their traditional medicines. Lack of such databases has led to the tendency of researchers and herbalists to return to nature in search of new drugs. However, going back to nature searching for TCAM is a challenge because most herbalists are less educated and are advanced in age to continuously and accurately provide information on medicinal plants. These pose a risk of forever losing the rich ethnomedical knowledge, hence, the need to develop a freely accessible, national digital database with medicinal plants. Creating such a comprehensive digital database will involve collecting necessary data through theses, online research articles, and published books. The database will contain vital information on botanical and vernacular names of medicinal plants in Kenya, parts of plants used to treat diseases, therapeutic uses, the phytochemical compounds, toxicity, and the target proteins/genes. Kenya, therefore, needs to develop a national, freely accessible digital database for its medicinal plants. The database will provide vital information on TCAM for health workers, scientists, herbalists, policy-makers, and educators in Kenya and worldwide to hasten drug discovery and development.

Keywords: Traditional medicine, digital, database, Kenyan plants, treatment, phytochemical, drug, and discovery

1. Introduction

According to the world health organization (WHO), traditional medicine is used by 80% of people in the developing world. In recent decades, the absorption of complementary and alternative medicine (CAM), mainly herbal medication, has increased in the developed world (Chintamunnee and Mahomoodally 2012). Herbal medicine, often known as a vegetable, botanical, or phytomedicines, consists of herbs, herb components or preparations, and completed herbal products (Josephine Ozioma and Antoinette Nwamaka Chinwe 2019). African traditional medicine is a global and an old form of medicine used in most cultures. Approximately 80% of the world's population uses traditional medicine to treat diseases of various kinds (Zhang and WHO 2002; Bandaranayake 2006; Tugume and Nyakoojo 2019), with at least 80% of Africans relying on medicinal plants for their wellness (Harrington 2018).

Various medicines originate from the plant kingdom (Aleksic Sabo and Knezevic 2019). The naturally existing thousands of plant species have been studied and found to have medicinal and nutritional values. Plants contain active compounds that have been adopted in western medicines (Jamshidi-Kia et al. 2018), or they contain bioactive molecules with potential for application in clinical industries and research, e.g. in developing nutraceuticals (Hussain et al. 2021), insecticides, flavoring agents, biofuel technology, coloring agents, nutritional products, fragrance, etc. (Birari and Bhutani 2007; Wang et al. 2016) and in development of new medicinal therapies for new diseases (Rakib et al. 2020).

Herbal medicines are prepared from whole plants, parts of plants, or other plant materials, including bark, leaves, flowers, berries, roots, and/or extracts as active ingredients for medical use (Phua et al. 2009). The presence of phytochemical constituents in herbs or local medicinal plants makes them cure diseases in humans (Paray et al. 2018). Some bioactive substances that help cure diseases may be alkaloids, flavonoids, tannins, and phenolic compounds (Omara et al. 2020). Significantly, the use of herbal medicines is attributed to their availability, low cost, affordability, acceptability, and low toxicity (Bajwa and Panda 2012; Batra, Yatindra Kumar, Rajeev 2007), with no side effects (Cowan 1999).

Several studies show the importance of traditional medicine. To a large extent, such information is provided by older people in local communities. The people must be competent, experienced, versatile, and trusted (Farnsworth 1985). They rely on experience and observations handed to them from generation to generation (Zuma et al. 2016). They give information on the following: plant type, dosage, compounding, efficacy, and toxicity of the plant components (Josephine Ozioma and Antoinette Nwamaka Chinwe 2019).

Knowledge and practices on medicinal plants were transferred from old to young people by word of mouth. However, this practice is almost non-existent in most communities. It may disappear if it is not recorded as narrated by the old herbalists and confirmed by the associated patients. On the other hand, the non-herbal practitioners within local communities also know medicinal plants to manage common diseases. However, this knowledge is only applied to family members. Herbal medicines are freely accessible by everyone (Wachtel-Galor and Benzie 2011).

Several plants have been used in traditional medicine without scientific data to back up their efficacy (Josephine Ozioma and Antoinette Nwamaka Chinwe 2019). Most herbalists are less educated and are advanced in age to continuously and accurately provide such vital information, while over-exploitation of most wild plant species has also been reported. These pose a risk of forever losing the rich ethnomedical knowledge (Jamshidi-Kia et al. 2018).

The opinion in this paper is the need to develop a structured online database for traditional medicines used to treat various diseases in Kenya. Such a database will enable herbal medicine users and research institutions to quickly discover new drugs based on stored indigenous knowledge. The database will include literature on medicinal and nutritional values, alongside folk therapies or theories on Kenyan medicinal plants. The database will comprise scientific names, local names, family names, used parts, medically relevant biochemical components, physicochemical features, toxicological and pharmacological facts. This may be a source for developing new antimicrobial drugs for combating the pan- and multi-drug resistant microorganisms since most pharmaceuticals are in use and the microorganisms causing infections have become resistant due to continuous use of the antibiotics (Aleksic Sabo and Knezevic 2019).

2. References

- i. Aleksic Sabo, V., and P. Knezevic. 2019. 'Antimicrobial activity of Eucalyptus camaldulensis Dehn. Plant extracts and essential oils: A review.' *Industrial Crops and Products* 132 (June): 413–29, <https://doi.org/10.1016/j.indcrop.2019.02.051>.
- ii. Bajwa, S. J., and A. Panda. 2012. 'Alternative medicine and anesthesia: Implications and considerations in daily practice.' *AYU (An International Quarterly Journal of Research in Ayurveda)* 33 (4): 475, <https://doi.org/10.4103/0974-8520.110515>.
- iii. Bandaranayake, W. M. 2006. 'Quality Control, Screening, Toxicity, and Regulation of Herbal Drugs.' In *Modern Phytomedicine*, 25–57. Weinheim, Germany: Wiley-VCH Verlag GmbH & Co. KGaA, <https://doi.org/10.1002/9783527609987.ch2>.
- iv. Batra, Yatindra Kumar; Rajeev, S. 2007. 'Effect of common herbal medicines on patients undergoing ana.' *Indian Journal of Anaesthesia*, 2007: https://journals.lww.com/ijaweb/Fulltext/2007/51030/EFFECT_OF_COMMON_HERBAL_MEDICINES_ON_PATIENTS.4.aspx.
- v. Birari, R. B., and K. K. Bhutani. 2007. 'Pancreatic lipase inhibitors from natural sources: unexplored potential.' *Drug Discovery Today* 12 (19–20): 879–89, <https://doi.org/10.1016/j.drudis.2007.07.024>.
- vi. Chintamunnee, V., and M. F. Mahomoodally. 2012. 'Herbal medicine commonly used against non-communicable diseases in the tropical island of Mauritius.' *Journal of Herbal Medicine* 2 (4): 113–25, <https://doi.org/10.1016/j.hermed.2012.06.001>.
- vii. Cowan, M. M. 1999. 'Plant Products as Antimicrobial Agents.' *Clinical Microbiology Reviews* 12 (4): 564–82, <https://doi.org/10.1128/CMR.12.4.564>.
- viii. Farnsworth, N. R. 1985. 'Medicinal plants and traditional medicine in Africa. By Abayomi Soowora. John Wiley & Sons, Inc., One Wiley Dr., Somerset, NJ 08873. 1982. 256 pp. 15.5 × 23.5 cm. \$31.95.' *Journal of Pharmaceutical Sciences* 74 (3): 364, <https://doi.org/10.1002/jps.2600740339>.
- ix. Harrington, J. 2018. 'Governing traditional medicine in Kenya: Problematization and the role of the constitution.' *African Studies* 77 (2): 223–39, <https://doi.org/10.1080/00020184.2018.1452856>.
- x. Hussain, N., R. Chanda, R. A. Abir, M. A. Mou, M. K. Hasan, and M. A. Ashraf. 2021. 'MPDB 2.0: a large scale and integrated medicinal plant database of Bangladesh.' *BMC Research Notes* 14 (1): 301, <https://doi.org/10.1186/s13104-021-05721-6>.
- xi. Jamshidi-Kia, F., Z. Lorigooini, and H. Amini-Khoei. 2018. 'Medicinal plants: Past history and future perspective.' *Journal of Herbmmed Pharmacology* 7 (1): 1–7, <https://doi.org/10.15171/jhp.2018.01>.
- xii. Josephine Ozioma, E.-O., and O. Antoinette Nwamaka Chinwe. 2019. 'Herbal Medicines in African Traditional Medicine.' In *Herbal Medicine*. IntechOpen, <https://doi.org/10.5772/intechopen.80348>.
- xiii. Omara, T., A. K. Kiprop, R. C. Ramkat, J. Cherutoi, S. Kagoya, D. Moraa Nyangena, T. Azeze Tebo, et al. 2020. 'Medicinal Plants Used in Traditional Management of Cancer in Uganda: A Review of Ethnobotanical Surveys, Phytochemistry, and Anticancer Studies.' *Evidence-Based Complementary and Alternative Medicine* 2020 (March): 1–26, <https://doi.org/10.1155/2020/3529081>.
- xiv. Paray, A. R., T. M. M Bhakat, P Behare, S. Lone, U. Parry, R. Kumar, R. Sinha, et al. 2018. 'Antimicrobial activity of crude aqueous extracts of Moringa oleifera, Azadirachta indica, Carica papaya, Tinospora cordifolia and Curcuma longa against certain bacterial pathogens.' *Journal of Pharmacognosy and Phytochemistry* 7 (4): 984–94.
- xv. Phua, D. H., A. Zosel, and K. Heard. 2009. 'Dietary supplements and herbal medicine toxicities—when to anticipate them and how to manage them.' *International Journal of Emergency Medicine* 2 (2): 69–76, <https://doi.org/10.1007/s12245-009-0105-z>.
- xvi. Rakib, A., A. Paul, M. N. U. Chy, S. A. Sami, S. K. Baral, M. Majumder, A. M. Tareq, et al. 2020. 'Biochemical and Computational Approach of Selected Phytocompounds from Tinospora crispa in the Management of COVID-19.' *Molecules* 25 (17): 3936, <https://doi.org/10.3390/molecules25173936>.

- xvii. Tugume, P., and C. Nyakoojo. 2019. 'Ethno-pharmacological survey of herbal remedies used in the treatment of paediatric diseases in Buhunga parish, Rukungiri District, Uganda.' *BMC Complementary and Alternative Medicine* 19 (1): 353, <https://doi.org/10.1186/s12906-019-2763-6>.
- xviii. Wachtel-Galor, S., and I. F. F. Benzie. 2011. 'Herbal Medicine.' *Herbal Medicine: Biomolecular and Clinical Aspects: Second Edition*, March, 1–10, <https://www.ncbi.nlm.nih.gov/books/NBK92773/>.
- xix. Wang, Y., C. Fan, H. Hu, Y. Li, D. Sun, Y. Wang, and L. Peng. 2016. 'Genetic modification of plant cell walls to enhance biomass yield and biofuel production in bioenergy crops.' *Biotechnology Advances* 34 (5): 997–1017, <https://doi.org/10.1016/j.biotechadv.2016.06.001>.
- xx. Zhang, X., and W. H. O. - WHO. 2002. 'Traditional medicine strategy 2002–2005,' http://whqlibdoc.who.int/hq/2002/WHO_EDM_TRM_2002.1.pdf.
- xxi. Zuma, T., D. Wight, T. Rochat, and M. Moshabela. 2016. 'The role of traditional health practitioners in Rural KwaZulu-Natal, South Africa: Generic or mode specific?' *BMC Complementary and Alternative Medicine* 16 (1), <https://doi.org/10.1186/s12906-016-1293-8>.