



The Ethiopian Public Health Institute



Proceeding of the Workshop on “Ethiopian Traditional Medicine: Past, Current and Future”

Editors:

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Adama, Ethiopia, December 14 -16th, 2015

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“Ethiopian Traditional Medicine: Past, Current and Future”



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Traditional & Modern Medicine Research Directorate,
Ethiopian Public Health Institute

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Acknowledgment

We express our deep gratitude for the Federal Ministry of Finance and Economic Development for financial support of this consultative workshop. We also grateful for Ethiopian Public Health Institute (EPHI) for logistics and all other necessary supports. Our gratitude also goes to all participants of the consultative meeting for their active participations and successful completion of the meeting.

FORWARD

Ethiopia is a home of many ethnic groups, cultures and beliefs which in turn have contributed to the high diversity of traditional or indigenous health care knowledge and practices. The people heavily relied for centuries on traditional medicine for various physical and mental disorders. About 80% of the population in the country still depends on traditional medicine as their major primary healthcare system. Traditional medicine practice by traditional healers constitute use of natural substances composed of plants, animals and minerals as traditional remedies besides spiritual healing and bone setting.

The potential significance of traditional medicine has been given due considerations by the government as reflected in the national policies and legal frame works for the research and development, regulation and conservation. EPHI has the mission to develop validated traditional medicine products package and delivering evidence based information through research thereby contribute to protect and promote the health of people. The strategic directions set for the promotion and development of traditional medicine also facilitate the utilization of its beneficial aspects in the health care service.

The production of validated traditional medicines at industry level is at infancy stage. This could be further managed in the coming years through partnership and collaboration of stakeholders by strengthening research institutes-industry-universities linkage for developing and production of plant based products. In addition to this registration, licensing, regulation and monitoring of traditional medicines and traditional healers health care services to safe guard the Ethiopian indigenous or traditional system of medicine from fraud practices and illegal activities, thereby contributing as a source of primary health care. This could pave a way for research and development of indigenous medicine to effectively make use of the beneficial aspects of the Ethiopian traditional medicine and facilitate its integration with the existing conventional health care system.

The themes presented for discussion are wide in scope and their implementation will undoubtedly involve the institutions, organizations and individuals that are represented by the participants of the workshop. Therefore, the EPHI took the initiative to organize the meeting; the issue involved is of direct concern to the country and to all of us gathered here today.

It is my sincere hope, for the establishment of the Ethiopian Traditional Medicine Advisory Committee, therefore, that you will look into the subject matter responsively and squarely and that you will give all the seriousness it deserves during your collaboration effort.

I assure that the Ethiopian Public Health Institute in general and TMMRD in particular are committed for the implementations of the recommendations of the workshop by working together with all institutions and individuals involved in research, development and production of Ethiopian Traditional medicine.

Amha Kebede (PhD), DG of Ethiopian Public Health Institute

I. Executive Summary

1. Background

Ethiopia is one of the oldest nations of the world and has a rich history of traditional medicine and indigenous practices. Various literatures indicated the significant role of medicinal plant in the primary health care delivery in Ethiopia where 80% of human and 90% of livestock population depend on traditional medicine. In the Ethiopian context, there seems to be no village, town or city where traditional medicine is not involved in the provision of health care, since it is an integral part of the local culture and accessible to the majority of the population, even when there is demonstrably efficient and less costly alternative care. Hence, efforts need to strengthen in various ways to maximize the benefits of the untapped resources of traditional medicine in the health care delivery. In addition to this, medicinal plants are obviously an alternate candidate commodities or products as income source and improving the livelihood for the community and for export in rendering foreign currency through improved policy, research and development efforts. In view of understanding the significant contribution that traditional medicine plays for the health care of the public and to initiate the production of traditional medicines validated through research industries, strengthen the collaborations and networking among research institutes, academic institutions, traditional healers and industries, a consultative workshop organized under the thematic topic "Ethiopian Traditional Medicine: Past, Present & Future ". The objective of the consultative workshop is to give a general overview on Traditional Medicine Research & product development efforts conducted in the TMMRD-EPHI to the stakeholders, create a platform for Research-Industry-Academic linkage for developing plant based products and plan the way forward.

The consultative workshop was held from December 14 to 16, 2015 in Adama city, at Kereyo Hill Resort Hotel conference hall. The meeting provides an excellent opportunity and venue for the exchange of ideas among government officials, interdisciplinary group of researchers and academicians, various experts, traditional healers, pharmaceutical industry association delegate and parliament representative, regulation authority representatives, etc.

A total of 95 workshop participants represented over 25 organizations. The participants were from Ethiopian Public Health Institute (EPHI) various directorate delegates and members of the directorate of traditional and modern medicine; Addis Ababa University, College of Health Sciences, School of Medicine, School of Pharmacy and College of Veterinary medicine & agriculture, School of veterinary medicine, Mizan-Tepi University, Haromeya University, Ethiopian Food, Medicine & Health Administration and Control Authority (EFMHACA), Veterinary Drugs, animal feeds & Health Administration and Control Authority (VDHACA), Hawassa University, Traditional healers representatives, Federal Parliament representative, Moringa Task force members, Ethiopian Biodiversity Institute (EBI), Wondo Genet Agricultural Research Centre, Yabello Pastoral and Dry land Research Centre, Oromia Agricultural Research Institute, Ministry of culture and Tourism, Ethiopian Agriculture research institute, Armauer Hansen Research Institute (AHRI), St Paul's Hospital Millennium Medical College, mass media etc.

Ato Ashenif Tadele, A/Director of TMMRD-EPHI well-come all the workshop participants and gave a highlight background on the efforts and some of the achievements of traditional medicine research by the directorate and invited Dr. Yibeltal Assefa, Deputy director of EPHI to make opening speech

and officially open the workshop. Dr. Yibeltal noted in his opening speech the importance of validated traditional medicine in strengthening the health care system, the economical significance in job creation even generating foreign exchange. He further stressed the timely organization of the forum for strengthening collaboration and networking among all stakeholders and concerned authorities to maximize the beneficial aspects of traditional medicine more focusing to develop products and products package through research and development on priority basis. He then officially opened the consultative workshop.

Presentations were then made to give a general back ground on the traditional medicine product developmental efforts by TMMRD-EPHI, conservation and sustainable use of medicinal plants, industry in the production of traditional medicines and view reflections by traditional healers representative, strategy for traditional medicine manufacturing, collaboration/twinning of research, academic institutes and pharmaceutical manufacturing industries for the development of traditional medicine during the 1st day and the 2nd day until lunch. The background presentations serve as a better input for the subsequent working groups discussions in order to set directions on the way forward by the meeting participants. The topics presented during the workshop are shown in the annex. Discussion sessions allowed for questions and comments raised by the participants following the presentations. During the afternoon session of the second day a brief account was given on the SPM of EPHI and TMMRD by Ato Ashenif before assigning the participants into working group. Discussion was made by each group on the selected topics focusing on opportunities, challenges, action points and the way forward for the research & development of Ethiopian traditional medicine and practice. This was followed by working groups secretary and chairperson report on discussed consensus points.

Working Group Discussion:-

The participants were grouped into three to make the discussion on the following Topics:

1. Local pharmaceutical contributions for the production of validated traditional medicines
2. Coordination and Regulators aspects of traditional medicines and practices in Ethiopia
3. Collaboration work for the integration of traditional medicines

General discussion was then made on the points presented by the secretaries of each group to set directions and scrutinize action points. Dr. Yibeletal Assefa gave a closing remark following the general discussion of group reports session appreciating the participants for the productive days and successful completion of the workshop.

This summary highlights the major points of emphasis on the consultative meeting to guide for the next steps of actions. A comprehensive report that will fully supplement the information presented in this summary will be distributed to all participants as soon as the compilation of the proceeding is completed by the workshop reporter.

2. The way forward and action points

A general understanding is obtained on collaboration and networking among research, and academic institutions, traditional healers and industries for the development of product packages of traditional medicine. Furthermore, consensus was also reached in the formation of steering committee following working group's reports and discussion to materialize collaborations among stakeholders and act as a

liaison between industries and research & academic institutes. The steering committee may also have advisory role pertaining to the development of traditional medicine. Collaboration of interdisciplinary academicians and researchers has paramount importance and need to be further strengthened in avoiding research duplication efforts, strengthening conservation, propagation and cultivation for sustainable use through development of affordable and validated medicinal plants.

The major points of emphasis from the workshop recommendations to guide the next steps of actions are concisely summarized as follows:

- 1) The workshop participants appreciated the importance of organizing the forum to maximize the benefits of medicinal plants.
- 2) Opportunities, challenges and action points outlined during working groups discussion are the following.

Opportunities:-

Government political commitment pertaining to policy, Availability of evidence-based information is rising, regulation and institutional commitment, enormous diversity of natural resources (fauna and flora), diversified & culture contributing for untapped traditional or indigenous knowledge and practices, demand of the public for validated traditional medicines, rising interest for traditional medicines research and collaboration, industries willingness for local resources productions & research collaboration, Demand of the public for TM is high.

Challenges:-

Complex nature of traditional medicine, poor attitude towards traditional medicines, lack of reliable data on efficacy & safety, lack of clear domain between private & public knowledge domain, finance/resource limitations, lack of reasonable payments & incentives, less skilled manpower, secrecy nature of traditional medicines contributing for charlatan healers, lack of coordination between federal and regions, dosage & toxicity issue of traditional medicines provided by healers, lack of clear research directions that is crude extract *visa vis* purified compounds, weak collaborations between academic & research institutes, industries desire for high profit, issue of capacity building, mistrust and lack of team spirit among professionals, availability of information/completed data on research undertakings of traditional medicine to avoid duplication, lack of awareness on traditional medicines,.

Way forward:-

Setting public health research priorities, research ethics & data integrity, bench marking of best practices from developed and developing countries, Establishing an owner for the development of TM in Ethiopia, training opportunities to capacitate healers, focus on validated crude & semi crude traditional medicines packing, formulation recipe development, establishing framework of collaboration, conducting in-depth safety studies, organize annual events to bring all stakeholders (researchers, academics, healers, industries, etc) to forecast and evaluate achievements, government strong support for industries engaged on traditional medicines productions, facilities with dual approach *i.e.*, traditional and modern medicine using phase approach, multidisciplinary approach

(health, agriculture, environmental approach and industries) etc. The planning of activities could be based on priorities and available capacity in phases (short term, medium term and longterm).

- Proposed preliminary draft planning phases for steering committee
 - **Shorttermphase:**-Dealingwiththeproductionofsafe&effectivecrudeandsemi- purified or fractionated extracts of traditional medicines and value addition and preparation in different doses in the form of ointment, syrups, powder and capsule by the industries. Priority should be given for traditional medicines used as food & medicines by the community for long period of time, traditional medicines having sufficient validation documents, traditional medicines that have sustainable & continuous quality. Lobbying/inviting candidate traditional medicines products, Awareness creation on marketing. Organizing annual events to bring all stakeholders to evaluate achievements.
 - **Medium term phase:** - Dealing with the more formulated products of semi-purified validated traditional medicine to be delivered to the industry for mass productions. Capacity building (human, facilities, equipments and technology), Collaboration of industries and research institute in the development of bench/lab scale formulation to industry scale formulation, clinical trials. Organizing annual events to bring all stakeholders to evaluate achievements.
 - **Long term phase:** - Dealing with the purified compounds showing safety and efficacy from traditional medicine to be delivered to the industry for mass productions. Capacity building (human, facilities, equipments and technology), Collaboration of industries and research institute in the development of bench/lab scale formulation to industry scale formulation, clinical trials. Organizing annual events to bring all stakeholders to evaluate achievements.

3. **Establishing National Traditional Medicine Advisory Forum for coordination of research and liaison the production of validated traditional medicine between research institutes/academics and industries.**

Proposed Institutional members of the National Traditional Medicine Advisory Forum

1. **Research Institute**

- i. Ethiopian Public Health Institute (EPHI), **Chairman**
- ii. Wondo Genet Agricultural Research centre (WGARC)
- iii. Ethiopian Biodiversity Institute (EBI)
- iv. Food, Beverage and Pharmaceuticals Development Institute (FBPDI)
- v. Armauer Hansen Research Institute (AHRI)

2. **Regulatory Authority**

- i. Ethiopian Food, Medicine & Health Administration and Control Authority
- ii. Veterinary Drug and Animal Feed Administration and Control Authority

3. **Universities**

- i. AAU, School of Pharmacy,
- ii. AAU College of Natural Sciences (Biology and Chemistry Department)
- iii. AAU College of Health Science- School of Medicine,
- iv. University of Gondar,
- v. Jimma University,
- vi. Harmaya University,
- vii. Mekele University,

4. **Regional Bioequivalence Center**

5. **Ministry of Science & Technology (MoST)**

6. **Ministry of Industry**

7. **Associations**

- i. Ethiopian Healers, representative
- ii. Ethiopian Pharmaceutical & Medical supplies manufacturers association (EPMSMA) **Secretary**
- iii. Ethiopian Medical Association (EMA)
- iv. Ethiopian Pharmaceutical Association (EPA)

8. **United Nations Population Fund (UNFPA)**

9. **World Health Organization (WHO)**

10. **United Nations Industrial Development Organization (UNIDO)**

- The advisory forum is expected to prepare Term of reference (ToR) and plan of action categorized in three phases on basis of priority and available products, etc as short, intermediate and long term plans.
- **Critical points:** Trust, integration and harmonization among stakeholders, strong linkage between research institutions & industries, sustainable supply of resources for production, awareness creation for sustainable utilization & marketing of quality traditional medicines, the involvement of physicians in the research of traditional medicines, registration of traditional medicines, and inclusions in the national drug list.

Introduction of the Workshop

The majority of the population utilizes traditional medicine as a primary health care. There are a large number of research activities have been conducted on traditional medicine by various institutions and/or researchers. However, no products from traditional medicine were registered for public use. Cognizant the factor mentioned above, the government of Ethiopia has given large attention to the traditional medicine development and eventually it was included in HSTP, SPM of EPHI, Ethiopian Pharmaceutical Manufacturing Development Plan and National Biotechnology Road Map to develop the sector.

Workshop objectives

- To give general overview on Traditional Medicine Research & product development efforts conducted in the TMMRD-EPHI to the stakeholders,
- To create a platform for Research-Industry-Academic Linkage for developing plant based products,
- To evaluate accomplishments and plan the way forward.

Methods

- Day 1: - Presentations and plenary sessions.
- Day 2: - Working group discussion on selected topics, working group report, and General discussions and directions on the way forward.
- Day 3 (until lunch): - Discussion with collaborating institutions.

Dates and Venue

December 13-16, 2016, Kereyu Hill Resort and Hotel, Adam, Oromia, Ethiopia

Outcomes of the Workshop

- experimental data of the on-going studies were evaluated
- Different Experiences were shared among participants,
- Consensus was reached to Strengthen and create linkage with research/ academic institutions and industries in the development of standardized herbal remedies,
- Future directions have been setting for the research and development of Ethiopian Traditional Medicine,
- Consensus was reached and Established the National Advisory forum of Ethiopian Traditional Medicine
- Publication of summary of deliveries as well as recommendations forwarded in the form of Action plan & proceedings.

Official Openings and Presentations

The workshop was officially opened with the key note and welcoming address speeches that was followed by various presentations, plenary sessions and group discussions.

Welcome Address

- Dear Her excellences, Ms Almaz Mekonnen; House of Peoples' Representative, Social Affairs Permanent Committee
- Dear Dr Yibeltal Assefa, DDG of Ethiopian Public Health Institute
- Honorable invited guests, partners and participants,

First of all, I would like to welcome you all in this consultative workshop on the main theme of "Ethiopian Traditional Medicine: Past, Current and Future". It is indeed a great honor and pleasure for me to see the presence of honorable invited guests and contributors of from various institutions considering the importance of this occasion from their busy time.

As all we know Medicinal plants have been identified and used throughout human history. In our country, about 80% used traditional medicine. Recognizing this fact, the Ethiopian Health Policy, in 1993 Traditional medicine is placed as one of the eight priority areas. It stated that due attention shall be given to the development of the beneficial aspects of traditional medicine including related research and its gradual integration into Modern Medicine.

Following the policy, the Proclamation No. 301/2013 Ethiopian public health institute (EPHI) as states that research should be coordinated and conducted on locally used traditional medicine in general and plant derived medicine in particular and proposed the integration to the allopathic health care system.

The Directorate of Traditional and Modern Medicine within EPHI has the mission, development of validated traditional medicine products package and delivering evidence based information through research thereby contribute to protect and promote the health of people.

A lot of work in the directorate had been accomplished on

- The integration of traditional and modern medicine in Ethiopia: National survey
- Market vender survey of traditional medicine
- The Phytochemical analysis, Efficacy, Safety study of medicinal plants used for malaria, helmethics, antibacterial and antifungal, hypertension, diabetics, asthma, leshmaniasis, and larvicidal.
- Formulation study:
 - o Tablets were prepared for Larvicidal, one tablet has been formulated for dirt water clarification
 - o Ointments prepared for skin diseases, and insect repellants
 - o Emulsions were prepared for Ectoparasite,
 - o One elixir was formulated for Helmentics
 - o More than 10 plants of Pharmacopoeal products
- In the coming 5 years' transformation plan of EPHI 5 products will be ready for public use.

It is also my great pleasure in this opportunity to express my appreciation and gratitude on behalf of the organizing committee to the workshop participants for sharing the information on indigenous use and research based data on the plant leading to ideas exchange for setting

directions and Action plans among all stake holders and collaborators and looking the manufacturers for research activities for the development of Ethiopian Traditional medicine.

Coming to the coming two days deliberation, participants are expected to review what has been accomplished so far and set clear direction and action plan for the coming years activities with the involvement of all parties involved healers, researchers, academic institutions, policy makers, manufacturing industries for promotion of Ethiopian traditional medicine in order to scrutinize the ongoing planned activities as a means to search for safe and effective potential plant based drugs against diseases of public health importance through multidisciplinary approach.

May I now take this opportunity to invite Dr. Yebeltal Assefa, Deputy Director General of Ethiopian Public Health Institute to the stage to make keynote addresses and officially open the workshop.

Thank you!

Ashenif Tadele (B Pharm, MSc), Directorate of Traditional and Modern Medicine, Ethiopian Public Health Institute

Key Note Address

- Dear Her Excellences W/o Almaz Mekonnen, House of Peoples' Representative, Social Affairs Permanent Committee
- Honorable invited guests, partners and participants!

First of all, I would like to welcome you all to this workshop. It is indeed a great honor and pleasure to be present in this workshop on the main theme of "Ethiopian Traditional Medicine: Past, Current and Future".

Dear Colleagues and Participants,

As all we know, in our country 80% of human beings and 90% of animal are reported to be used traditional medicines and most of modern medicines are fabricated from these plants. Formal recognition to traditional medicines in Ethiopia was given in 1942 (Proc. 27) where the legality of the practice is acknowledged as long as it does not have negative impact on health. The current Health policy 1993, of course it is under revision, Traditional medicine is placed as one of the eight priorities. It was reported that due attention shall be given to the development of the beneficial aspects of traditional medicine including related research and its gradual integration into Modern Medicine. The general strategies adopted include

- Identifying and encouraging the utilization of its beneficial components,
- Coordinating and encouraging research including its linkage with modern medicine and
- Developing appropriate regulation and registration of practitioners.

As you know, we are at starting the GPT- II implementation. The main agenda in the health sector is transformation of quality and equity of health services throughout Ethiopia. In the HSTP, SPM of EPHI, regulatory agency as well as National strategy and plan of action for pharmaceutical manufacturing development in Ethiopia (2015–2025), underlines the developments of Ethiopian traditional medicine. In this implementation period, around 10 herbal based products will be produced and registered and more than 1000 practitioners will be registered.

To achieve these remarkable targets, you all representing different Institutions having mandate on the research, development, production, quality control and conservation of medicinal plants, require your collaboration work for the promotion of Ethiopian Traditional medicine.

Dear All, in the coming two days deliberation, participants are expected to review what has been accomplished so far and set clear direction and action plan for the coming year's activities on **Development of Traditional medicine, future directions, Collaboration work, Local Pharmaceutical manufacturing capacity** with the involvement of all parties involved her: such as **healers, researchers, academic institutions, policy makers, manufacturing industries** for promotion of Ethiopian traditional medicine in order to scrutinize the ongoing planned activities

as a means to search for safe and effective potential plant based drugs against diseases of public health importance through multidisciplinary approach.

I would like to acknowledge the efforts of your contribution in the investigational efforts to scientifically validate traditional remedies and develop plant based medicines and I assured that the Ethiopian Public Health Institute is looking your deliveries. Wishing you a fruitful deliberation!

I thank you all.

Yibeltal Assefa (MD, MSc, PhD), DDG of Ethiopian Public Health Institute

II. Traditional and Modern Medicine Research Directorate

Plants have been used as a source of medicine in Ethiopia from time immemorial to treat different ailments. This is often linked to ethnic and cultural diversity coupled with an array of unique flora and fauna that are employed as the prime-tools in the fight against numerous health problems. Even with the advent of modern medicine, this indigenous health care delivery system is the major source of care for an estimated 80% of the population. More than 95% of traditional medical preparations are of plant origin. The Ethiopian flora is estimated to contain between 6500 and 7000 species of higher plants of which about 12% are endemic. The Directorate of Traditional and Modern Medicine (TMMRD) within EPHI conducting operational and basic research on the quality, efficacy and safety of traditional and modern medicine including the factors affecting the rational utilization and factors determine drug resist stance for the major health problems of the country.

Vision, Mission and Core Values

Vision: To be centers of excellence in Traditional and Modern Medicine research in Africa.

Mission: Developing validated traditional medicine products and providing evidence based information on diseases of public health importance through research on traditional medicine as well as modern medicine to promote the health of the public.

Values: The values of the TMMRD, and the keywords relating to each value, are:

- **Communication:** Transparency, Freedom to Challenge.
- **Accountability:** Responsibility, Teamwork, Leadership, Participation.
- **Respect:** Dignity, Honesty, Fairness, Integrity.
- **Excellence and Innovation.**
- **Capacity development:** Reward and Recognition.
- **Efficiency:** Human, Facility, and Financial Resources
- **Collaboration:** Strong link with University, Industry and Traditional Healer
- **Equity**
- **Relevance**
- **Rule of law**

Strategic Themes of the Directorate

1. Enhance innovation and production of standardized plantbasedmedicineproducts,
2. Generate evidence based research on traditional and modernmedicine
3. Raise awareness of the community through appropriatemechanisms

Strategic results

1. Validated traditional medicine production packages for public use;
2. Evidence on safety, efficacy and quality of traditional and Modern medicine for policy and programsimplementers;
3. Community awareness, guidelines, manuals, pharmacopoeias and database;

Research Areas of the Directorate

The Traditional and Modern Medicine Research Directorate has been conduct research on TM thereby develop plant based medicinal products for human and veterinary use as well as on Modern Medicine. The major scopes of the Directorateare:

- Document ethno-medical information of medicinalplants/practice,
- Evaluating the Efficacy, Safety and Quality of commonly utilized medicinal plants for
 - Antimicrobial activity (Antibacterial, Antifungal, Antiviral, Antimycobacterial, wound healing, ...), Antiparasitic (Malaria, Helmenthic leshmaniasis, trypanosomiasis, Hypertension, Diabetics, Mental Health, Cancer, Insect control, Larvicidal activity, Repellant activity, veterinary health, Ectoparasite
- Preparation of production package for scientifically standardized traditional medicine products
- Conducting Clinical Trial
- Conducting Quality versus efficacy and rational utilization of modern medicine
- Disseminate research outputs to the scientific community, policy makers and Community through technical report, publication, policy briefing, workshops and media forums.
- Survey surveillance of modern and Traditional Medicine
- Pharmacokinetic, pharmacodynamic and pharmacovigillane study on Modern and Traditional medicine
- To collaborate with drug development and production companies in the promotion and production of established effective traditional medicines.

Teams of the Directorate

1. Natural product Research Team
2. Biomedical Research Team
3. Formulation Research Team
4. Modern Medicine Research Team

Deliverables of the Directorate

1. Evidence to scientific community through publication, mass media or workshops
2. Ethno-botanical information
3. Safety, efficacy, and phytochemical
4. Production packages of herbal medicines.
5. Education –communication to the community on the safety, efficacy and rational utilization of traditional and modern medicine
6. Conserved medicinal plants.
7. Pharmacopoea and Medicinal Data base ~ through documented ethno-medical use and scientific reports.
8. Herbarium and botanical garden.
9. Data about the therapeutic efficacy, quality and other aspects of pharmaceuticals.
10. Data on health seeking behavior of the community for traditional healers and Modern medicine professional services

Monitoring and evaluation mechanisms

1. Strategic planning for Five years based
2. Periodically research review meetings to discuss the implementation of planned activities.
3. Annual activity plan output base evaluation
4. Individual BSC performance reviews.
5. Building strong Drug research army
6. Review of projects periodically and at the end of project life in terms of timelines, outcome, impact, sustainability and effectiveness

Collaborating Institutes, organizations

- Research directorates within EPHI
- Addis Ababa University,
 - College of Health Sciences: Department of Anatomy and Histology, Department of Pharmacology, Department of Biochemistry and Department of Physiology
 - School of Pharmacy, Department of Pharmaceutical technology and social pharmacy, Department of pharmacognosy and pharmaceutical chemistry
 - College of Veterinary medicine & agriculture,
 - College of Natural and computational Sciences
- Agriculture Research Center
 - Wondo Genet Agricultural Research Centre,
 - Yabelo pastoralist research Centre
 - Holeta Bee research center
- All African Leprosy Rehabilitation Training Center(ALERT)
- Institute of Biodiversity and Conservation
- Adametulu Pesticide Processing S.C
- Ethiopian Pharmaceutical Manufacturing S.C(EPHARM)
- Haramaya University
- Mizan-Tepi University

Topics Discussed

- Development of Traditional medicine future directions
- Collaboration work
- Local Pharmaceutical manufacturing capacity
- Scientific research findings on the medicinal plants
- Regulatory aspects of medicinal plants
- Ethnobotany, Conservation, sustainable use medicinal plants
- Challenges and opportunities in maximizing the potential use of the medicinal plant
- The way forward and recommendation points

GPT – II Traditional Medicine Targets

EPHI SPM on TM

Se	Initiative	Major Activities	Unit	ImplementationYear				
				15/1	16/17	17/1	18/1	19/20
C1: Improve the utilization of health research outcomes								
1	Synthesizing evidence	1.Pharmacopeia	no					1
		Data base /Information						1
2	Develop products	2. Technology briefs on traditional medicine products	no	1	1	1		2
3.	ClinicalTrial	3. Clinicaltrial	No.					3
4	Safety & Efficacy	4. Safety, efficacy and quality of traditional medicine	No.	40 – 50 medicinal plants				
5	Survey	4. Study on endangered medicinal plant for conservation	No.				1	
		5. Ethno-medical survey of medicinal plants	No.					1
		6. National survey on TM	No.			1		
P3. Improve technology evaluation and transfer								
6	Develop production packages	7. Human Skin Diseases	No.					1
		8 .Insect replant	No.					1
		9. Water clarifying agent	No.			1		
		10. Animal Ectoparasite	No.	1	1			

HSTP on TM

			Current	2020
1	Number of traditional medicines registered	N	-	10
2	Number of traditional practitioners registered	N	-	> 1,000

National strategy and plan of action for pharmaceutical manufacturing development in Ethiopia(2015–2025)

			Current	2020	2025
1	Locally developed traditional medicines on the market	-		5	20
2	Natural products with identified active ingredients	-		80	160
3	Clinical trials conducted on traditional medicines	-		3	20

Rationale for Development of Herbal Remedies

Over the past 100 years, the development and mass production of chemically synthesized drugs have revolutionized health care in most parts of the world. However, large sections of the population in developing countries still rely on traditional practitioners and herbal medicines for their primary care.

- In Africa up to 90% and in Ethiopia 80% of the population depend on traditional medicine to help meet their health care needs.
- It is widely accepted that more than 80% of drug substances are either directly derived from natural products or developed from a natural compound. And, in fact, around 50% of pharmaceuticals are derived from compounds first identified or isolated from herbs/plants, including organisms, animals, and insects, as active ingredients
- The evolving public health threat of antimicrobial resistance (AMR)

To handle the national plan on the development of Traditional medicine, appropriate structure shall be formulated and implemented. In the Ethiopian Public Health Institute, TMMRD should contain appropriate structure and further supported to build his capacity to improve the performance of the research activities. The Directorate should perform scientific evaluation of herbal medicines, assessing the quality of herbal medicines and developing appropriate dosage forms for production of production packages.

Research is needed for screen out bioactive compounds, assuring the quality, safety, molecular effects, and clinical efficacy and development new products of the numerous herbs in common usage, providing training on traditional medicine and providing information and education of the community for improving their healthcare.

III. Overview on the status of Traditional Medicine in Ethiopia and Prospects for its Development

Asfaw Debella, PhD, Ethiopian Public Health Institute,

Ethiopia is one of the oldest nations of the world and has a rich history of traditional medicine and indigenous knowledge practices. Ethiopian traditional remedies are originated from locally grown plants, animal products and minerals. Other traditional treatments also include a variety of medical practices such as purging, bleeding and cupping, steam baths and immersion in hot, often thermal, water, and counter-irritation. The knowledge on traditional medicine were mainly orally based, the information on healing practice were passed down by practicing healers from generation to generation, often with considerable secrecy. Hence, the antiquity of Ethiopian Indigenous or traditional medicine could not be established with any certainty due to the lack of adequate written documents. The earliest known Ethiopian medico-religious texts were written in Ge'ez: "*Meshafa Faws*" of mid-17th century and "*Mashafa Medhanit*" of the early 18th century.

The cultural and indigenous knowledge of medicinal plants in Ethiopia is unevenly distributed among each community members. Peoples in different geographical location with different religious, linguistic and cultural backgrounds have their own specific knowledge which in part has gradually entered wide circulation in the country. In Ethiopian traditional health care system, traditional health practitioners are categorized as herbalist-healers (Kitelbetash), spiritual or faith based healers, bone settlers (*waggasha*). In addition to this, other group of healers is those that perform surgical operations such as cauterization, bleeding, cupping, circumcision, cutting the uvula, scarification, opening abscesses, removing tumors and bullets, and extracting carious tooth. The various literature available show the significant role of medicinal plant in primary health care delivery in Ethiopia where 80% of human and 90% of livestock population depend on traditional medicine similar to many developing countries particularly that of Sub-Saharan African countries.

Ethiopia has policies and strategies that support the development and utilization of medicinal and other useful plant resources in a sustainable manner. The policies are reflected under various sectors including environmental protection, development of the natural resources and diversification of the domestic and export commodities. The policy encourages and promotes appropriate use and protections of traditional medicine knowledge taking into account the need of the traditional medicinal knowledge holders and the communities who benefit from the use of the knowledge. Organizational measure with respect to the development of traditional medicine on a scientific basis, regulatory aspects, protection of intellectual property right (IPR), conservation and sustainable utilization of medicinal plants, etc has also been taken through organizing various institutions. All the above efforts showed the recognition and potential significance of traditional medicine to meet the primary health care needs there by facilitating in the mitigation of some of the public health problems. Although much effort has been undertaken in the development and promotion of traditional medicine, there are still some difficulties and challenges for maximizing the utilization of traditional medicine to play its role in health care delivery to address public health problems. Some of the challenges include:-

- a. The presence of hostility between traditional medicine healers and those of conventional medicine led to no knowledge sharing or transfer between them. This has created negative impact in the development and promotion of traditional medicine through collaborative efforts to validate scientifically the remedies. The traditional medicines utilized by healers have insufficient scientific evidence on their efficacy, safety and quality.
- b. There are also very weak partnerships among the research communities, public and private entrepreneurs/industries in the research and development as well as production of traditional medicine products.
- c. There is lack of guideline by the regulatory authority to establish standards of premises, code of conduct for the practices of traditional medicine and the control of quacks, fraud practices and illegal activities. Traditional medicines are sold or delivered by healers indiscriminately with any type of claim without appropriate diagnostic techniques of the disease. The uncontrolled action of quacks and fraud practices will create a negative image on the credibility of traditional medicine.
- d. Limited protection and preservation of indigenous knowledge as a result of which healers cannot have trust and are not willing for research collaboration with scientists on scientific validation of traditional remedies.

Tremendous effort has been so far undertaken over the years on the promotion of traditional medicine. This has to be strengthening in the coming years through research and development of traditional medicine to validate the safety, efficacy and quality for the production of standardized traditional medicine. In line with this the following strategic directions may address some of the challenges in order to facilitate the integration of traditional medicine into their national health system and contribute in the health care delivery. This includes:

- a) Allocation of financial resources and capacity building in terms of human resource and research facility to promote traditional medicine through research and development.
- b) Enhance partnerships, collaboration and networking among traditional medicine healers, researchers, conventional health practitioners, academic & research institutions and manufacturers for the development and production of traditional medicine.
- c) Strengthen inter-sectoral collaborations (Health, Education, Agriculture, Environment, Industry, Culture & heritage, etc). to exploit the rich source and untapped knowledge of traditional medicine,
- d) Promote and protection of Intellectual Property Right (IPR) and Indigenous Knowledge (IK) through developing legal framework,
- e) Enhance collaboration among multi-sectoral stakeholders to promote the cultivation and conservation of researched medicinal plants for sustainable production of medicinal plants based on scientific methods of research and development.
- f) The knowledge of traditional medicines, treatments and practices should be respected, preserved and promoted. In addition to this strengthening the regulation of traditional medicine products, practitioners and practices

IV. Overview on the evaluation of medicinal plants for animal ectoparasites.

Dr. GetachewAddis, Ethiopian Public Health Institute

HERBAL BASED ANTIECTOPARASITES OF RUMINANTS: ANOVERVIEW



Investigators

- Forty one investigators from four institutions

Institutions

- EPHI
- AAUCVMA
- WGARC
- APPSCO

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Why livestock?

[Cultural value of livestock animals](#)

Economical

- Ethiopia has the largest livestock population in Africa
- Estimated to have 54 million cattle, 25.5 million sheep and 24.1 million goats (CSA, 2013)
- The subsector has significant contribution to national economy and livelihoods of millions of Ethiopians

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Effect of ectoparasites on ruminants

- Live animals, skin and meat are **among the few major export commodities** of Ethiopia and contribute to
 - 16.5% of the national gross domestic product (GDP),
 - 35.6% of the agricultural GDP
 - 15% of export earnings and
 - 30% of agricultural employment
 - Supports and sustains livelihood of 80% of the rural population
 - The GDP of livestock related activities is valued as 59 billion birr

- Small ruminants are important contributors to food production and export in Ethiopia
 - Providing **35% of meat** and **14% of milk** consumption
 - **Hides and skins account for 12-16% of the total value of Ethiopian exports with 85% of the share contributed by goat and sheepskin**
 - **Wool and manure** are also important products of small ruminants
 - Productivity remains little due to complex and inter-wined factors including widespread diseases.

Prevalence of ectoparasites of different species is estimated to be **50.5% in sheep** and **56.4% in goats**

Sheepked





Lice



Negative consequences

- Reduction in production & productivity
 - Direct
 - Sucking and chewing, and under extreme cases fatality
 - Indirect
 - Disease transmission: Bacterial, fungal, rickettsial, viral and protozoan diseases
 - Exposing to opportunistic infections
- Economic loss
 - Drop in quality or complete rejection of tannery products

- Economic loss due to ectoparasites
 - Lower meat production
 - Downgrading and rejection of skins, poor growth, decreased production and reproduction performances and higher mortality

65% of the pre-slaughter skin defects come from ectoparasites and associated problems

 - **Mange mites, Lice and Sheep ked** are among the major ectoparasitic diseases that cause enormous economic losses to **smallholder farmers, the tanning industry and the country as a whole.**

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Zoonotic importance



Ectoparasite control efforts in Ethiopia

- Use of conventional drugs: **diazinon**, **ivermectin**, fenvalerate, deltamethrin
- There is lack of conventional drugs **accessibility** to the resource poor farmers
- **Reports** on death of animals due to use of the conventional antiectoparasites
- Reports on **resistance** of the parasites against existing conventional antiectoparasites
- **Secrecy** over ingredients of Diazinon: Extreme need for self-reliance

Main Objective

Why alternative medicine against ectoparasites of ruminants?

- Higher prevalence of major ectoparasites
- Inaccessibility & toxicity of modern drugs
- Self-reliance
- Entry point to development of other plant based drugs
- The conventional drugs lay under "very highly toxic" or "highly toxic" category" on human health and the environment



- The need for formulation of antiectoparasites from natural resources
- - About **80 to 90% of indigenous communities rely on traditional medicine** to keep the health of their livestock
 - Indigenous medical practices mainly use **medicinal plants**
 - Development and use of effective, safe, quality and affordable antiectoparasites of small ruminants is the best bet both for **domestic use and export**

Development of effective and safe plant based acaricide(s) against four ectoparasites (**mange mites, lice, sheep ked and lice**) of ruminants

How?

Research from agriculture to industrial production and marketing of herbal based drugs

Agriculture

- Veterinary medicine
- Phytochemistry
- Pharmacy and the branching sciences
- Biomedical sciences
- Toxicology
- Economics
- Engineering

Selection of medicinal plants

- Ethnobotany (IK)
- Literature review
- Amenability to sustainable harvest and higher production

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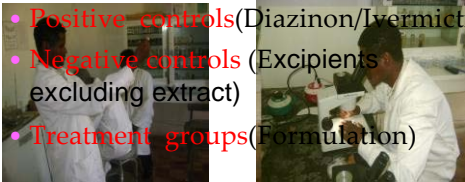
Formulation

- Extraction based on existing information (IK and literature)
- Formulation



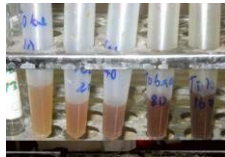
Efficacy experimental design

- Positive controls (Diazinon/Ivermectin)
- Negative controls (Excipients excluding extract)
- Treatment groups (Formulation)



In vitro antibacterial efficacy study

In vitro efficacy study on 14 plant species



In vivo and community based simulation study





In vivo efficacy study using the most effective formulations (C. citratus & E. globulus)

against three ectoparasites of ruminants

+

Toxicity study

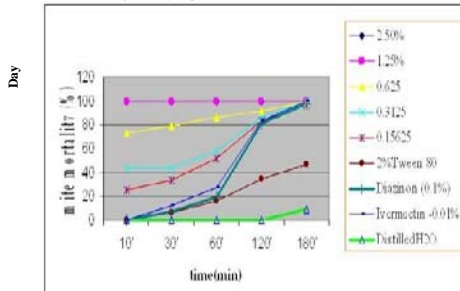
- Acute toxicity
- Sub-chronic toxicity
- Skin sensitivity studies

Cost minimization

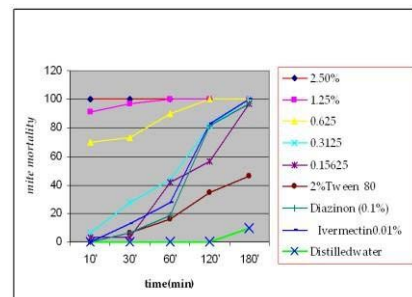
- Use of residual plant materials for other uses
- Use of less expensive ingredients

Major findings (Few cases)

In vitro: Cymbopogon citratus (sarcoptiforme)



In vitro: Eucalyptus globulus (sarcoptiforme)



- Agriculture (India + [WGARC](#)) – processing – industrial production – marketing ([Indian experience](#))



- Skin lesion conditions of mangle infested goat before and after treatment with *C. citratus* formulation



Before treatment

After treatment

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Experiences

Cost minimization: Lice and sheep ked

- **Toxicity studies** (skin sensitivity, acute toxicity and sub-chronic toxicity studies): **Safe formulation**
- Cost effectiveness analyses indicated multifaceted benefits of the formulations. Cost of products at industrial scale requires further evaluation

In vivo acaricidal effect against *Sarcoptes scabiei*

	<i>Eucalyptus</i>		<i>Cymbopogon</i>		Diazinon	Nontreated
0	3.0	3.0	2.8	3.0	2.3	2.3
1	2.2	2.6	1.8	2.8	1.3	3.0
2	1.2	2.0	1.3	2.0	1.0	3.5
2	0.8	1.4	0.8	1.2	0.3	4.0
5	0.2	0.6	0	0.6	0	3/4
6						deat



Acknowledgements

Financial support MOFED

Collaborating institutions EHNRI AAU WGARC APPSCO

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Way forward

- Product package development
- Continue with optimizing formulation (cost effectiveness)
- Study for multiple uses of plant byproducts
- Continue with cost effectiveness analyses
- Continue with study on industrial production
- Transfer technology to industry



V. Anti-diabetic activity of *Moringa stenopetala*,

Ato AlemayehuTomma, Hawassa University.

Antidiabetic Potential of *Moringa stenopetala* leaves

Outline

- Introduction
- Objective
- Reviews on published articles
 - Hypoglycemic activity
 - Antihyperglycemic activity
 - Mechanisms of action
- Conclusion
- Future directions

Introduction

- Diabetes mellitus is associated with reduced insulin secretion, insulin action or both
- Management of diabetes without any adverse effect is still a challenge for the medical system.
- This leads to an increasing search for improved antidiabetic drugs
- There is a growing interest in plant medicines in the Treatment of diabetes

Intro.....

- **More than 1000 plant species are being used as folk medicine for diabetes**
- Up to 30% of patients with DM use complementary medicine
- There are various medicinal plants in the world, which are the potential sources of drugs

Example; metformin from *Galega officinalis*

Moringastenopetala/Hallako/

- is a deciduous plant which is widely distributed throughout Southern Ethiopia.
- The family comprises different species, such as *Moringaoleifera*, *Moringaconcanensis*, *Moringapetrygosperma* and *Moringastenopetala*
- Most investigations so far have focused on the species *Moringaoleifera* and its varieties
- The fresh leaves of *Moringa stenopetala* are cooked and eaten as a vegetable in Southern Ethiopia

A decoction of the leaves is used to treat

- Malaria,
- Hypertension,
- **Diabetes,**
- Asthma,
- Stomach problems and
- To expel retained placenta,



while the decoction of the root is used to treat malaria

Objective

- To summarize the existing data for its antidiabetic activity and create awareness among stakeholders

Reviews on published articles

- Hypoglycemic activity
- Antihyperglycemic activity
- Mechanisms of action

Hypoglycemic activity of *M.stenopetala*

- Makonnen and coworkers (1997) showed that aqueous extract of *Moringastenopetala* has hypoglycemic activity in nondiabetic rabbits.
- Less potent than the standard glibenclimide
 - The activity is increasing with time
 - Increasing dose to lower blood glucose level

Hypoglycemic activity.....

- Musa and coworkers (2008) showed effect of the crude aqueous extract and isolated fractions of the leaves of *M.stenopetalain* non-diabetic mice.
- The result is in consistency with previous study (Makonnen et al,1997)
 - The activity is comparable with standard
 - significantly lowers blood glucose level
 - Butanol and aqueous fractions also showed significant reduction in blood glucose

Musa et al,2008

Time	Blood Glucose Concentration (mg/dl)				
	0 hr	1.5 hr	3 hr	4.5 hr	6 hr
Control	133.2±6.3	132.3±6.2	131.8±6.4	131.8±6.7	132.8±6.4
Standard	129.0±4.1	116.3±2.2 ^a	82.5±3.3 ^b	78.0±4.8 ^b	75.5±4.8 ^b
Extract	131.2±1.5	114.0±2.7 ^b	108.8±4.2 ^b	119.8±5.0 ^d	120.2±7.9
Chlor. Frac.	160.8±4.2	123.6±5.4 ^b	124.0±5.6 ^b	131.2±6.5 ^a	116.8±4.3 ^b
But. Frac.	144.2±1.2	81.0±7.3 ^b	83.2±5.7 ^b	90.0±5.4 ^b	91.4±8.4 ^b
Aq. Res. Frac.	169.4±4.6	116±4.9 ^b	101.6±4.1 ^b	106.2±4.5 ^b	95.0±3.5 ^b

a= p<0.005, b= p<0.0005, d= p<0.05 compared with initial level of blood glucose (0 hr) in the respective group. Chlor. Frac. = chloroform fraction; But. Frac. = n-butanol fraction; Aq. Res. Frac. = aqueous residue fraction. n=5 for the extract and isolated fractions, n=6 for the control and standard (glibenclamide)

Hypoglycemic activity.....

- Nardos and coworkers (2011) showed effect of the crude ethanol extract and isolated fractions of the leaves of *M.stenopetalain* non-diabetic mice.
- The result is inconsistent with previous study (Makonnetal,1997 and Musa et al. 2008)
 - The activity is increasing with time
 - Increasing dose to lower blood glucose level
- Butanol and chloroform fractions also showed significant reduction in blood glucose

Table 1. Hypoglycemic effects produced by single dose intraperitoneal administration of crude extracts and fractions of *M. stenopetalain* in normoglycemic mice.

Group	Treatment	Serum glucose (mg/dl) (min)				
		0 min	60 min	120 min	180 min	240 min
I	Ethanol extract	90.6±3.7	74.6±1.4**	64.8±2.4***	59.4±1.9**	62.8±5.2**
II	Aqueous extract	88±3.6	79.6±1.8	68.8±2.6**	63.8±6.0*	64.4±2.5*
III	Petroleum fraction	94.8±7.9	89.6±1.5	88±2.2	82.4±5.4	85.4±2.4
IV	Chloroform fraction	84.4±3.7	83±4.2	68.4±4.0**	63.8±3.6*	67±3.1*
V	Butanol fraction	91.6±5.5	88.2±4.3	82.2±2.5	64.8±3.4*	63.2±3.2*
VI	Aqueous residue	87.2±2.7	78.6±1.2	77.4±2.5	78±3.9	74.4±3.3
VII	Standard	87±3.9	71.2±2.9***	59.4±3.2***	53±4.2***	49.6±4.9***
VIII	Control	90.8±2.5	90.6±1.8	88±5.6	86±3.8	87.6±7.1

* P < 0.05, ** P < 0.01 and *** P < 0.001 as compared to the control. Results are means ± S.E.M. of n = 5. Dose of extracts and fractions = 300 mg/kg. Dose of glibenclamide = 0.66 mg/kg; Distilled water = 10 ml/kg.

Antihyperglycemic activity of *M.stenopetalain* in diabetic animals

- Musa and coworkers (2008) showed effect of the crude aqueous extract and isolated fractions of the leaves of *M.stenopetalain* in alloxan induced diabetic mice.
 - The activity is increasing with time
 - Significantly lower blood glucose level
- Butanol and aqueous fractions also showed significant reduction in blood glucose

Antihyperglycemic activity.....

- Nardos and coworkers (2011) showed effect of the crude ethanol extract and isolated fractions of the leaves of *M.stenopetalain* in alloxan induced diabetic mice.
- The result is in consistency with previous study (Musa et al.2008)
 - The activity is increasing with time
 - Significantly lower blood glucose level
 - Butanol and chloroform fractions also showed significant reduction in blood glucose

Nardos et al,2011

Table 2. Effects of a single dose intraperitoneal administration of crude extracts and fractions of *M. stenopetalain* in alloxan induced diabetic mice.

Group	Treatment	Serum glucose (mg/dl) (min)				
		0	60	120	180	240
I	Ethanol extract	165.8±5.0	127.8±2.2*	101.4±5.3***	100.6±2.4***	85.6±5.4***
II	Aqueous extract	146.4±2.9	133.8±2.8	115±3.9**	94±3.1***	89±3.5***
III	Petroleum fraction	152±2.8	150.6±4.9	153.4±4.4	138.8±4.6	134.6±2.0
IV	Chloroform fraction	141.8±4.8	127.8±4.0*	108.6±5.6***	90.4±7.2***	80.6±5.6***
V	Butanol fraction	146.6±6.7	129±4.8*	109±2.2***	79.2±3.7***	84.6±3.0***
VI	Aqueous Residue	134±4.6	128.4±3.2*	122.6±3.1*	123.8±2.6*	121±1.8*
VII	Standard	146.6±4.7	123.6±3.4**	82±6.7***	63.8±3.7***	61.6±2.5***
VIII	Distilled water	147±2.8	146.6±2.5	146±2.6	148.2±6.6	139.8±2.8

* P < 0.05, ** P < 0.01, *** P < 0.001 as compared to the control. Results are means ± S.E.M. of n = 5. Dose of extracts and fractions = 300 mg/kg; Dose of glibenclamide = 0.66 mg/kg; Distilled water = 10 ml/kg.

Table 3: Effect of the crude aqueous extract and isolated fractions of the leaves of *M. stenopetalla* in alloxan-induced diabetic mice

Time	Blood Glucose Concentration (mg/dl)				
	0 hr	1.5 hr	3 hr	4.5 hr	6 hr
Control	133.2±6.3	132.3±6.2	131.8±6.4	131.8±6.7	132.8±6.4
Standard	129.0±4.1	116.3±2.2 ^a	82.5±3.3 ^b	78.0±4.8 ^b	75.5±4.8 ^b
Extract	131.2±1.5	114.0±2.7 ^b	108.8±4.2 ^b	119.8±5.0 ^d	120.2±7.9
Chlor. Frac.	160.8±4.2	123.6±5.4 ^b	124.0±5.6 ^b	131.2±6.5 ^a	116.8±4.3 ^b
But. Frac.	144.2±1.2	81.0±7.3 ^b	83.2±5.7 ^b	90.0±5.4 ^b	91.4±8.4 ^b
Aq. Res. Frac.	169.4±4.6	116.4±4.9 ^b	101.6±4.1 ^b	106.2±4.5 ^b	95.0±3.5 ^b

a= p<0.005, b= p<0.0005, d= p<0.05 compared with initial level of blood glucose (0 hr) in the respective group. Chlor. Frac. = chloroform fraction; But. Frac. = n=butanol fraction; Aq. Res. Frac. = aqueous residue fraction, n=5 for the extract and isolated fractions, n=6 for the control and standard (glibenclamide)

Antihyperglycemic activity.....

- Toma and coworkers (2012) studied antihyperglycemic effect on chronic administration of butanol fraction of ethanol extract of *Moringa stenopetala* leaves in alloxan-induced diabetic mice
- The result is in consistency with previous studies (Musa et al. 2008 and Nardos et al. 2011)
- - The activity is increasing with treatment weeks
 - Comparable decrement with standard drug
 - Showed diabetic associated hyperlipidemic level reduction

Toma et al, 2012
Antihyperglycemic effect of butanol fraction of *Moringa stenopetala* leaves and its percent reduction in alloxan induced mice

Groups	Glucose level (mg/dl)				
	Day 0	Day 7	Day 14	Day 21	Day 28
Normal controls (without alloxan)	136.0±6.29	151.1±6.91	136.1±6.35	125.7±7.54	125.0±5.66
Diabetic controls (negative control)	256.2±13.34	286.9±12.10	293.0±45.61	268.2±25.33	285.3±17.43
Glibenclamide (0.66mg/Kg) (positive control)	243.6±10.48	211.0±23.80*	178.6±32.60*	176.1±9.75**	178.7±8.93***
Butanol fraction (Test group) (500mg/Kg)	265.1±11.36	238.4±19.29	225.4±29.60	191.6±17.66*	180.7±16.66***

P= * <0.05, P= ** <0.01, P= *** <0.001 versus Diabetic controls
Mean ± Standard error of deviation, n=8

Toma et al, 2012
effect of butanol fraction of *Moringa stenopetala* in TG and TC after chronic administration in alloxan induced diabetic mice.

Treatment groups	Total cholesterol (mg/dl)	Triglyceride (mg/dl)
Normal control	184±7.48***	172.0±4.90***
Diabetic control	228.0±4.93	220.0±6.33
Glibenclamide	212.0±4.88	188.0±4.89**
Butanol fraction	192.0±4.94**	184.0±4.90***

P= ** <0.01, P= *** <0.001 versus Diabetic controls
Mean ± Standard error of deviation

Antihyperglycemic activity.....

- Sileshi and coworkers (2014) studied Antihyperglycemic and subchronic toxicity study of Moringastenopetala leaves in alloxan induced diabetic mice
- The result is in consistence with previous studies (Musa et al. 2008 ,Nardosetal. 2011 and Tomaet al, 2012)
- The activity is increasing withtime

Sileshi et al,2014

Percent blood glucose reduction after administration of solvent fraction of *M. stenopetala* leaves in alloxan induced diabetic mice.

Treatment group	% Blood glucose level reduction at t (h)			
	0 h	2 h	4 h	6 h
Diabetic control	0	-15.66±5.7	-2.88±3.9	7.24±5.8
Standard (0.066 mg/kg)	0	8.44±2.4	53.28±6.6***	56.30±6.80***
Ethanol extract (500 mg/kg)	0	20.10±7.2**	10.90±3.2	21.53±3.25
Hexane fraction (500 mg/kg)	0	29.10±8.0**	39.86±4.0**	32.74±2.50
Dichloromethane fraction (500 mg/kg)	0	27.73±4.9**	27.70±5.5**	43.80±5.30**
Butanol fraction (500 mg/kg)	0	53.44±2.4***	46.40±7.8***	30.00±10.70
Aqueous residue (500 mg/kg)	0	19.44±4.3**	26.66±5.5*	31.00 ±5.24

: P<0.05, **: P<0.01, ***: P<0.001.

Antihyperglycemic activity.....

- Tomaand coworkers (2015) studied Antidiabetic activities of aqueous ethanol and n-butanol fraction of Moringastenopetala leaves in streptozotocin-induced diabeticrats
- The result is in consistence with previous studies (Musa et al. 2008, Nardos et al. 2011, Tomaet al, 2012 and Sileshet al,2014)
- Significantly reduced blood glucoselevel
- Improved lipidprofiles
- Improved liver and renalfunctions

Tomaet al,2015

Table 2 Effects of aqueous ethanol and n-butanol fraction of *Moringa stenopetala* leaves on blood glucose level in diabetic rats

Treatment Groups	fasting blood glucose level (mg/dl)			
	Before Induction	Day 0	Day 7	Day 14
Normal control	114.00±2.11	109.67±3.39 ^a	104.67±2.79 ^a	104.00±3.45 ^a
Diabetic Control	115.10±1.75	145.17±1.05 ^b	140.50±2.29 ^b	136.10±2.52 ^b
DC + 500 mg/Kg ethanol extract of MS	111.67±1.19	141.56±1.50 ^b	123.83±1.99 ^{ab}	120.33±2.23 ^{ab}
DC + 500 mg/Kg butanol fraction of MS	115.17±2.15	141.56±1.45 ^b	129.67±2.40 ^{ab}	123.00±1.94 ^{ab}
DC + 150 mg/Kg Metformin	112.33±2.09	142.17±1.92 ^b	124.67±2.81 ^{ab}	117.83±3.05 ^{ab}

Results are expressed in Mean ± S.E.M, n=6
When p < 0.05 verses Diabetic control
When p < 0.05 verses normal control

Tomaet al,2015

Table 4 Effects of aqueous ethanol and n-butanol fraction of *Moringa stenopetala* leaves on lipid profiles in diabetic rats

Groups	TC (mg/dL)	TG (mg/dL)	HDL-C (mg/dL)	LDL-C (mg/dL)
Normal control	84.0±1.7	81.5±1.7	29.3±1.8	43.7±2.7
Diabetic control/DC	189.5±2.3 ^a	158.50±3.1 ^a	19.8±0.2 ^a	141.63±2.1 ^a
DC + 500 mg/Kg ethanol extract of MS	127.5±1.1 ^{ab}	93.25±3.7 ^{ab}	25.54±1.4 ^{ab}	83.11±1.5 ^{ab}
DC + 500 mg/Kg butanol fraction of MS	97.2±1.5 ^b	75.00±1.1 ^b	28.67±1.5 ^b	51.50±2.6 ^b
DC + 150 mg/Kg Metformin	81.7±2.9 ^b	64.67±1.5 ^b	34.5±1.9 ^{ab}	38.03±0.5 ^b

The results are expressed Mean ± S.E.M (n=6)
^ap < 0.05 compared with normal control values
^bp < 0.05 compared with diabetic control

Mechanisms of action of *M.stenopetala*for antidiabeticactivities

1. β-cell regenerative potential (Tomaet al, 2015)

Increment in size and number of islets of langerhans

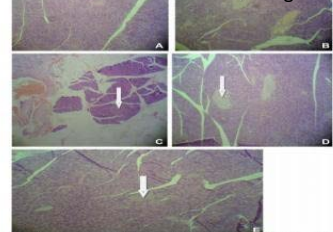


Fig. 3 Histopathology of pancreas after administration of *Moringa stenopetala* in diabetic rats. a. 2% Pancreas of DC animal showing severe degeneration of pancreatic parenchymal cells, infiltration of inflammatory cells and hypoplasia of islets cells. b. 2% Pancreas of diabetic animal treated with ethanol extract showing mild hypoplasia of islets cell and congestion of parenchymal cells. c. 2% Pancreas of diabetic animal treated with butanol fraction showing mild hypoplasia of islets cell and congestion of parenchymal cells. d. 2% Pancreas of DC animal showing

Mechanisms of action.....

2. Intestinal α -glucosidase and some pancreatic enzymes inhibitory effects (Tomaet al,2014)

=>Decrease glucose and lipid absorption through inhibiting their metabolism to absorbable form

Table 2 The inhibitory effects of *Moringa stenopetala* leaf extract on pancreatic α -amylase, maltase, sucrase, pancreatic lipase, and pancreatic cholesterol esterase activities

	IC ₅₀ values (mg/ml)				
	Pancreatic α -Amylase	Maltase	Sucrase	Pancreatic lipase	Pancreatic cholesterol esterase
<i>Moringa stenopetala</i>	>5	>5	1.47 \pm 0.19	>5	>5

Results are expressed as means \pm S.E.M, n=3.

Conclusion

- *M. stenopetala* has hypoglycemic, antihyperglycemic and antihyperlipidemic effects with wider safety margins
- Its antihyperglycemic and antihyperlipidemic effects could be associated with inhibition of intestinal and pancreatic enzymes as well as beta cell regenerative potential of the plant material.

Future Directions

- Formulating as standardized herbal medicine for clinical trial
- Formulating as tea preparation with **quality control procedures** for routine use
- Further work on searching for lead compound from *M. stenopetala*

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- Mr. Kelbessa Urga
- Different institutions and individuals who contributed for these papers I reviewed for this presentations

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VI. Overview on the studies of some traditionally used medicinal plants against hypertension.

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Abstract:

Background:Plants provided effective sources of traditional medicines against many ailments since ancient times. Peoples of all continents, especially in Africa and Asia, with its diverse culture and rich plant flora, used folklore medicine for their health needs.Medicinal plants contain various pharmacologically active compounds which have useful therapeutic applications and many are utilized in the development of the drug industry.About thirty percent of the drugs sold world-wide contain compounds derived from plants.Determination of efficacy and safety of herbal remedies is necessary as many people use them for self-medication. For majority of herbal products in use, very little is knownabouttheiractiveand/or toxic constituents.The provision of safe and effective herbal therapies could, thus, become a critical tool to increase access to health care. *Moringa stenopetala*(Shiferaw), *Thymus serrulatus*(Tosign), *Thymus schimperi*(Tosign) and *Syzgium guineense*(Dokma)are among of these medicinal plants widely used for treatment of variety of diseases including hypertension.

Objective: Development of antihypertensive medicinal products from plants.

Methods:Diuretic, *in vivo* antihypertensive and *in vitro* vasodilatory activity study is the models commonly employed for efficacy study. In diuretic activity study animals were divided into groups and were placed in standard metabolic cages. Food/pellet and water was withdrawn 18 hours prior to the experiment session. The different doses of the extract, normal saline and standard drug were orally administered on the basis of the weight of the animals. The urine output and electrolyte concentration of Na⁺, K⁺ and Cl⁻ were determined. In *in vivo* antihypertensive study animals were randomly divided into groups where treatment groups were given daily extracts orally with hypertension inducing chemicals. Whereas, positive, negative and normal control received standard drug with hypertension inducing chemicals, only hypertension inducing chemicals and water *ad libitum*, respectively. The blood pressure was measured using tail cuff blood pressure analyzer. In *in vitro* vasodilatory study animals were sacrificed and the thoracic aorta ring was removed, cut spirally and mounted in an organ bath containing 37^oC maintained Krebs's Henseleit physiological solution aerated with carbogen (95% O₂ and 5% CO₂) for

experiment using Polygraph. Acute, subacute and chronic toxicity studies were employed for safety study. In acute toxicity study, the animals were randomly divided into control and treatment groups that received distilled water and oral administration of extract, respectively and followed for 14 days. The sub-acute and sub-chronic toxicity was evaluated through daily oral administration of extracts for 28 and 90 days, respectively. At the end of experiment, blood samples were collected for hematological and biochemical analysis. Liver and kidney were harvested for histopathological examination by tissue section preparation and microscopic examination.

Results and Discussion: The leaf of *M. stenopetala*, *T. serrulatus* and *T. schimperii* has shown a significant ($P < 0.05$) urine output and electrolyte excretion compared to control. *M. stenopetala*, *T. schimperii* and *S. guineense* has shown significantly ($P < 0.05$) prevented blood pressure increment in a dose dependent manner comparable to that of the standard drug. *M. stenopetala*, *T. serrulatus* and *S. guineense* has shown a relaxant effect in pre-contracted isolated whole spirally-cut strips thoracic aorta of guinea pigs in a dose dependent manner. The acute toxicity study of *M. stenopetala*, *T. serrulatus* and *T. schimperii* leaves found no signs of toxicity; hence LD50 was greater than 5000 mg/kg. The effect of *T. serrulatus* and *T. schimperii* leaves on biochemical and histopathological of liver and kidney has shown no marked effect except localized mononuclear lymphocytic infiltration and focal perivascular lymphocytic infiltration. The biochemical test of *M. stenopetala* revealed that extracts produced a rise in liver in a dose dependent manner but no effect on kidney function indicators. Whereas, histopathological examination of has shown no marked change compared to normal control.

Conclusion: The leaf of *M. stenopetala*, *T. serrulatus* and *T. schimperii* has shown a promising efficacy and safety. Further studies, however, need to be done to confirm the efficacy of these plants other models. Moreover, there are some safety concerns that need to be confirmed with further toxicity studies, especially using chronic toxicity

VII. Overview on the studies of some traditionally used medicinal plants against helminths infections.

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Abstract

Background: Medicinal plants such as *Embelia schimperi* have been used for treatment of intestinal parasites especially tapeworm infestations for ages in Ethiopia. However, there is lack of scientific based evidences regarding the efficacy, safety and phytochemical analysis of such plants despite their frequent use as anthelmintics. This study is therefore generated to evaluate the efficacy, acute toxicity and phytochemical analysis of *E. schimperi* thereby generating relevant preclinical information.

Materials and methods: The fruits of *E. schimperi* were collected from Gonder area, Northwest Ethiopia. Voucher specimen were collected, identified and deposited in the herbarium of TMMRD of EPHI. Hydroalcoholic crude extract and different fractionates were prepared and phytochemical screening via chemical tests and TLC and chemical characterization using UV-spectroscopy, HPLC and NMR were conducted. LD₅₀ of the crude hydroalcoholic extract was determined using Swiss albino mice following the OECD guidelines. The anthelmintic activity was conducted using *in vivo* and *in vitro* models against the dwarf tapeworm, *Hymenolepis nana*, and the larvae of hookworm and strongyloid, respectively.

Result: The result obtained from the preliminary phytochemical screening of major secondary metabolites of the fruit powder of *E. schimperi* revealed the presence of some class of compounds such as Anthranides, Chromophores, Polyphenols, free-quinones, Alkaloids, Anthraquinone Glycosides and Tannins. In acute toxicity study no prominent sign of toxicity and mortality was recorded among experimental animals at all administered dose levels and hence the LD₅₀ of the plant was found to be higher than 5000mg/kg. *In vivo* cestocidal activity of the crude hydroalcoholic extract of *E. schimperi* showed 100% of parasite clearance at 1000mg/kg, while the diammonium salt of embelin showed 85.3% parasite clearance at 750mg/kg. The LC₅₀ value of the crude extract and albendazole were 228.7 and 51.33 µg/mL, respectively. The crude extract of *E. schimperi* at 400mg/ml showed 90 and 93 % mortality against hookworm and strongyloid larvae, respectively. The dichloromethane fraction showed the highest percent mortality (86.6%) against the larvae of hookworm as compared to the other fractions.

Conclusion: The results clearly indicated that the crude extract and different fractionates of *E. schimperi* and the diammonium salt of the isolated compound embelin had indeed anthelmintic activity against hookworm and strongyloid larvae *in vitro* and *H. nana in vivo*. Hence the findings of this study confirm the traditional usage of the plant to combat taeniasis in Ethiopian folk medicine.

VIII. Development of Broad Spectrum Dermatological from some Herbal Remedies.

Ashenif Tadele, Negero Gameda, Hirut Lemma, Biruktawit Girma, Berhanu Tesfaye, Christina Haile, AsfawDebella, Getachew Addis, YehualashetBelete, AbiyAbebe, BekeshoGeleta; Worku Gemechu Ethiopian Public Health Institute

ABSTRACT

Background: Skin disease is very common in both developing and developed countries. One-quarter to one-third of the population are suffering from a skin problem. Skin diseases have been of major concern recently due to their association with HIV AIDS. More than 90% of HIV infected individuals develop skin and mucosal complications at some stage during the disease. In Ethiopia, it is among the most frequent causes of morbidity, the sixth most frequent cause of outpatient visits. The prevalence rate of skin infection is 49.2 %, of which fungal and bacterial infection are the most common. Fungal infections account 18.5 - 33%. Treatment of dermatophytosis: azoles and allylamines. Side-effects including hepatotoxicity, neurotoxicity, nephrotoxicity, Skin problems like Stevens-Johnson syndrome; Drug interactions; Increasing resistance -result in treatment failure; The treatment of these infections is prolonged and expensive. Essential oils are rich sources of biologically active compounds and constitute a major source of natural organic compounds: possessing antibacterial, antifungal, antiviral, insecticidal and antioxidant properties, and are used in food preservation, aromatherapy and fragrance industries. Thus the discoveries of essential oil preparations have been the subject of many investigations. Plant species used in the treatment of various skin diseases among the indigenous communities of Ethiopia. In this ethnobotanical review, a total of 229 plant species which belong to 67 families were compiled. Of the total 67 families, Euphorbiaceae, Fabaceae, Solanaceae, Asteraceae and Lamiaceae were found to be represented by the highest number of species. Other families were represented by more than ten species included, Polygonaceae, Cucurbitaceae, Boraginaceae, Moraceae, Lamiaceae, Sapidaceae, Rhamnaceae, Acanthaceae and Malvaceae. In terms of family distribution, Euphorbiaceae stood first contributing 48(12%) species, followed by Fabaceae and Solianaceae 30 (7.4%), Astraceae 22(5.4%)andpolygonaceae18(4.5%)

Objective: To develop Safe and Effective Topical Formulations against some fungal strains from medicinal plants. Methods: the plant materials were collected and their essential oils were collected by using distillation. The Chemical Composition of the oils was analyzed by using GC-MS, GC, and TLC. Antimycotic activity was determined by using both the standard and clinical isolate fungal strains. Acute and Sub chronic toxicity was conducted on mice and rat. Different topical formulations were prepared and evaluated for their organoleptic and physicochemical properties. On the Formulated Products Antifungal activity will be determined by agar well diffusion technique. Skin irritation test - using rabbits, (OECD, 2002, Skin sensitization - using albino guinea-pigs, Acute dermal toxicity test - using mice, Repeated dermal toxicity test - using Albino rats and Shelf Life Determination will be conducted.

Results: The most frequently mentioned 32 species found in more than 3 local areas. *Croton macrostachyus*, *Datura stramonium*, *Dodonia angustifolia*L.f., *Brusea antidysenterica* J.F.Mill, *Vernonia amygdalina* Del. and *Rhamnu sprinoides* L'Herit were mentioned at 19,

17, 13, 11, 10 sites, respectively for the treatment of different dermatological disorders. Regarding the habit diversity, herbs were the most common and stood first with 94 species (41.05%), followed by tree 73 species (32.0%), shrub 47 species (20.5%) and climbers 15 species (6.55%). The most widely used plant part for the preparations of remedy were leaves, which accounted for 53 %. The results showed that herbal remedies are prepared using fresh material 252 (55%), while 112(32%) were used in the case of dried plant material and 34 (13%) either fresh or dried. Some of the remedies are taken with different additive and solvents, the solvent used is water. The additives include butter, honey, coca-nut milk, oil and Citrus juice.

Regarding the preparation of medicinal plants for skin diseases, various methods of preparation are utilized. The plant remedy preparation are solutions, mixture of powders, creams, pastes, infusions, steam, and powdering, chopping, decoction, burning, roasting and chewing. The prepared traditional medicines are applied in a number of methods; directly apply on the affected area (either through the fresh leaf, latex, powder or oil); rubbing (with fresh leaf, powder, latex or ash of the burned part), squeezing on the affected area, creamed, painting, washing, Dressing, tied, paste and creams or painting applied on the affected area from the herbal preparations Identification of the Chemical constituents of the essential oils were carried out by GC, GC.MS and TLC experiments were generated. No lethality at administered dose range up to 2.5 ml/kg and 3.0 ml/kg for *C Citratus* oil and *T ammi*; respectively. The oils were not produce as toxic effects deferent from the control group on Hematology of and Blood chemistry parameters. The essential oils; *T ammi* and *C citratus* showed antimycotic activity at a concentration of 1% and 0.125%, respectively on *Trychphyton mentagraphytes*, *Trychophyton vercusolium*, *Mycosporium Cannis*, and *Aspirigilus niger*. On the formulation 1% 1% *C citratus* , and 1% *T. ammi* Macrogol blend ointment shows a higher inhibition zone than the standard clotrimazol and miconazole cream. Pilot study of skin sensitization by using 5% preparation of this ointment, does not produce any skin irritation according to the Magnusson and Kligman Grading Scale.

Conclusion and Recommendation: Both essential oils show a promising antifungal activity. Two formulations show a comparable activity on the common pathogenic fungi. The oils do not produce series mortality up to 4 ml/kg except minor change on liver and kidney. The formulated product does not skin sensitization potential skin up to 5%. Substitution of the synthetic dermatological bases with natural origin such as Shea butter, Aloe vera, Castor oil, *Jatrophacurcas* is an ongoing process. There is a need for standardization of the extracts/plant materials and feasibility study of the project.

XI. A look into collaboration/twinning of research, academic institutes and pharmaceutical manufacturing industries for the development of Ethiopian traditional medicine.


Professor Tsige Gebre-Mariam, Addis Ababa University

Research Institutes-University-Industry 

Partnership: An Imperative Alliance for the Development of TM in Ethiopia


Workshop on Traditional Medicine: Past, Current, Future....

Tsige Gebre-Mariam
Adama, 14 December 2015

Contents 


Traditional Medicine-Scope

- Policies and Strategies
 - WHO Traditional Medicine Strategy 2014–2023
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 - Ethiopian Pharma Industry SP 2015-2024
- Partnership in TM Research
- The state of TM Research in Ethiopia
 - Gaps, challenges, Missing links?
- Addressing the challenges

Scope of Traditional Medicine-WHO 

Traditional medicine is the sum total of the knowledge, skill, and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness.

(<http://www.who.int/medicines/areas/traditional/definitions/en/>)

Strategic Objectives to reach the Goals 

- 1) Building the knowledge base and formulating national policies;
- 2) Strengthening safety, quality and effectiveness through regulating products, practices and practitioners through TM education and training, skills development, services and therapies.
- 3) Promoting universal health coverage by integrating TM services and self-health care into national Health systems.

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The WHO Traditional Medicine Strategy 2014-2023



Two key goals:

- 1) Harnessing the potential contribution of TM to health, wellness and people-centered health care;
- 2) Promoting the safe and effective use of TM through researching and integrating TM products, practitioners and practice into health systems, where appropriate.

Key Objectives



- **Policy**-integrate TM within national health care systems;
- Promote the **safety, efficacy and quality** of TM by expanding the knowledge base, and providing guidance on regulatory and quality assurance standards;
- Increase the availability and affordability of TM, with an emphasis on **access**;
- Promote **rational use** of appropriate TM by practitioners and consumers.

Continental-PMPA



Area of work:

- Accelerate research and development into TM

Key activities:

- Identify partners already engaged in the area and offer support
- Work with identified partners, codify the knowledge base and create a library of plants with medicinal properties

TM in Ethiopia



TM is concerned with:

- Curing diseases- human and veterinary
- Protection of human physical, spiritual, social, mental and material wellbeing

Practices include:

- Spiritual healing, prevention, curative, surgical practices
 - Bone setters (*wogasha*), birth attendants (*yelimdawalaj*), tooth extractors, *spiritual healers, herbalists, etc*
 - Holy water (*tsebel*)

Health Policy (1993)



TM is one of the priorities-

- *“Due attention shall be given to the development of the beneficial aspects of Traditional Medicine including related research and its gradual integration into Modern Medicine.”*

General strategies-

- Identifying and encouraging utilization of its beneficial aspects;
- Coordinating and encouraging research including its linkage with modern medicine;
- Developing appropriate regulation and registration for its practice.

National Drug Policy (1993)



Objectives of the Policy

- *“To devise ways and means for the utilization of traditional drugs in the regular health services after ensuring their safety and efficacy.”*

General Policy

“Facilitate the gradual integration of traditional drugs with modern medicine by giving due attention to traditional practices and identifying the beneficial and harmful aspects through investigation and research.”

STIPolicy- MOST2012



"Support joint research activities among universities, research institutes and industries"

The Green Paper- STI, MoST2012



- "Universities, GRIs, TVETs and Industries are the major actors involved in the generation, transfer and use of scientific and technological knowledge in the national innovation system of developed countries"
- Universities are expected to generate qualified manpower, knowledge and technological information;
- GRIs are also expected to provide technologies and solutions to address the problems in various socioeconomic sectors;
- The industry is the major source of demand for skilled workers, qualified researchers and technologies
- The four actors have to work together in harmony to bring about synergy and efficiency in the national system of innovation.

Institutions involved in TM Research



- The Ethiopian Public Health Institute (EPHI)
- The Armauer Hanson Research Institute (AHRI)
- Addis Ababa University (ALIP, SoP, FOM, FoS)
- Other universities

The State of TM in Ethiopia- the Status-quo



- Although the larger population of Ethiopia depends on TM; little has been done to integrate it to the PHC system of the country;
- Research institutes and universities in Ethiopia have been investigating the safety and efficacy of herbal extracts; By and large, the research activities as well as documentation of the traditional practices and constituents of the herbal remedies have been fragmented and uncoordinated;
- TM practice in the country is at present largely unregulated;
- Proving the safety and efficacy of TM by research, and integrating it into the healthcare system remain an outstanding issue.

Integrating TM to PHC- is it long overdue?



"I have been impressed with the urgency of doing. Knowing is not enough; we must apply. Being willing is not enough; we must do."

Leonardo da Vinci

The 10-year SP along the Pharmaceutical Value Chain



Partnership- respective roles should be defined

- What can each partner offer?
 - The university
 - The research institute
 - The industry
 - The government
 - Other stakeholders
 - The community
 - The practioners
 - Regional organizations- e.g.AUC
 - Int. organizations- e.g.WHO

Setting-up and Managing Partnership

- Mutual benefits
- Setting-up ground rules
- Support (internal and external)
- Plan
- Management (what to be managed by whom)
- Executing the project

Partnership- The Triple Helix

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Partnership- The Quadruple

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Partnership- the Quadruple

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Thematicapproach

For the development of phytomedicines from local herbs

Leap Way Forward (1/2)



Research on TM should be

- Coordinated and integrated;
- Prioritized based on the health-needs of the country.
- *Priority should be given to those TMs and herbal remedies that have been considered to possess therapeutic activities in several cultures and those that are in wide use in the country and elsewhere.*

Leap Way Forward (2/2)



- Enhance partnerships among academia , research institutions, researchers, TM healers, conventional health practitioners, and manufacturers for the development and production of TM in the local manufacturing industry;
- Establish Technology Transfer Office (MOST)-
 - Fosters interaction of the research institute/ university with the productive sector, especially with industries, and the government
 - Assesses social demands, particularly through research results transfer and licensing of proprietary technologies and knowhow
 - Time to act!



"The results you achieve will be in direct proportion to the effort You apply".

Denis Waitley

Thank You

XII. Role of Traditional healers for the development of traditional medicine in Ethiopia- Challenges and way forward

Ato Estifanis H/Georgis, (ሐኪም እስጢፋኖስ ኃይለጊዮርጊስ) AA

1. መግቢያ

ከቡራትና ከቡራን የጉባዔው ተሳታፊዎች

ከሁሉ አስቀድሜ ለዚህ ጉባዔ ያበቃን እግዚአብሔር ይክበር ይመስገን እላለሁ።

ጉባዔውን ያዘጋጀውን ና እኔንም የባህል መድሃኒትና ሕክምና አዋቂዎችን በመወከል በጉባዔው እንድሳተፍና “የባህል መድሃኒትና ሕክምና ለዘርፉ እያደረገው ያለ አስተዋጽኦ እና በቀጣይነት ከተመራማሪዎችና ጤና ተቋማት ጋር የሚኖረው ሚና” በሚል ርዕስ ገለፃ አንዳደርግ በመጋበዜ በሥራ ባልደረቦቼና በራሴም ስም ለኢትዮጵያ ሕብረተሰብ ጤና ኢንስቲትዩትን እጅግ ከፍ ያለ ምስጋናዬን አቀርባለሁ።

2. መድሃኒትን በተመለከተ

የባህል መድሃኒትና ህክምና ጠቃሚነት አጠያያቂ ባይሆንም ለመንደርደሪያ ያህል ጥቂት መጥቀስ እፈልጋለሁ። ኢትዮጵያ በተፈጥሮ የታደለች ሀገረ እግዚያብሄር የምትባል አገር ነች መልክ አመድርዋ ቆላ፣ወይና ደጋና፣ ደጋ ያላት ያየ ር ጠባይዋም ለሰው ለእንስሳትና ዕፅዋት ዕድገት ተስማሚና ዓመቱን ሙሉ የፀሐይ ኃይልና ወቅታዊ ዝናም የማይለያት አገር ነች። ከዚህም በመነሳት ለመድሃኒትነት የሚፈለጉት ዕፅዋት ከሌሎች አገሮች በተሻለ ሁኔታ ይገኛሉ። የማዳን ሃይላቸውም የዚያኑ ያህል ከፍተኛ ነው።

3. ዕውቀትን በተመለከተ

የኢትዮጵያ መድሃኒትና ሕክምና ዕውቀት ከሰው ፍጥረት ጀምሮ በልማድ ብቻ ሳይሆን በየዘመናቱ በሕገልቦና፣ በአራት በሐዲስና እስካለንበት ጊዜም በልምድና በጽሁፍ እየዳበረ የመጣ ነው። ከአዳም፣ ከሄኖክ፣ ከኖህክ መል ከጻዲቅ፣ ከሙሴና ከአብርሃም ኮዳሸት፣ ወዘተ ጊዜ ጀምሮ እየዳበረ የመጣ ነው። በኢትዮጵያችን እስከ ቅርቡ ዳግማዊና ዓፄ ምኒልክ ዘመነ መንግሥት ድረስ ሕዝባችን ለሰውና ለእንስሳት ጤና የሚጠቀመው 100 % ላይ በባህላዊ ሕክምና እንደሚጠቀሙ ጥናቶች ያሳያሉ። ስለዚህ የባህላዊና መድሃኒቶችና ሕክምና ጠቀሜታው አጠያያቂ አይደለም።

4. ባለሙያን በተመለከተ

በአሁኑ ሰዓትም በኢትዮጵያ በሚሊዮን ወይም በመቶ ሺ የማቆጠር የባህል መድሃኒትና ሕክምና አዋቂዎች ሲኖሩ ከነርሱም ውስጥ በርካቶች ሳይንስ ያልረሰባቸውንና ማዳን ያቃታቸውን በሽታዎችንም በቀላሉ ሙሉ በሙሉ በማዳን ላይ ይገኛሉ። የኢትዮጵያ መድሃኒት ከበሽታ ጋር አይደራደርም ዳግም ሳይመለ ለማዳን እንጂ ሰውነት አንዲለምድና በማሻል ረገድ አይሰማም። ነቀርሳ ወይም በጊዜው አጠራር ካንሰር ከነዘር ማንዘሩ የሥጋ፣ የአጥንት፣ የደም የማህፀን የጡት፣ የጉበት፣ ወዘተ የተባሉትንና አልማዝባለጭራ /ሄርዘዘተር/ አንቀጥቅጥ /ፖራኪንሶን/ ጋንግሪን የመሳሰሉትን በርካታ አስጊ በሽታዎችን በቀላሉ የሚያድኑ መድሃኒቶችንና አዋቂዎችም አሉ። ይህንንም የተረዱ የውጭ አገር ሰዎች ወደ ኢትዮጵያ እየመጡ ፈውስ እያገኙ በአድናቆት እየተመለሱ ናቸው። የኛዎቹ ግን ከሞኝ ደጅ ሞፈር ይቆረጣል እንዲሉ የራሳቸውን በመናቀም ይሁን ያለማመን ወደ ውጭ አገር በመሄድ ለተለያዩ ጉዳዮች ሲዳረጉ ይታያሉ።

5. ምርምሩን በተመለከተ

የህክምና ምርመራውንም በተመለከተ በተደራጀ፣ ላብራቶሪ ምርመራ ኢንዶስትሪ ወዘተ ሳያስፈልጉ ሰውነትን በመንካት ብቻ አንድ ተመርማሪን ያለበትን በሽታ 100 % ዘርዘረው የሚነግሩ አዋቂዎች አሉ። ማየት ማመን ነውና በቀጠሮ ማገናኘት ይቻላል። ራጅ ከመፈለሰፉ በፊት የኢትዮጵያ አዋቂዎች ማለትም አባቶቻችን ዕፅዋትን ቀምመው በመስተዋት

ጀርባ በመቀባትና ከበሽተኛው ፊት በማድረግ የውስጥ አካላቱ ተገልጦ ይታያቸው ነበር። አደራረጉ በልምድ ብቻ ሳይሆን በጽሁፍም ሰፍሮ ይገኛል።

6. መጽሐፍትን በተመለከተ

በኢትዮጵያ ውስጥ በየዘመናቱ በዕለታዊ በእንስሳት ተዋፅኦ፣ በማዕድናትና በፀሎት ለሚደረጉ ፈውሶች በጽሁፍ እያዳበሩ ከመጡ መጽሐፍት ውስጥ ዕፅዱብዳቤ፣ መጽሐፈ ፈውስ፣ መጽሐፈ መድሃኒት፣ መጽሐፈ አድዓኖት፣ ጥበበ ኅልቆ፣ አዕባን፣ መዝሙረ ዳዊት፣ ተግባራትና ገቢር፣ አስማተ ዳዊት፣ መፍት የሥራ ይመርቡበት፣ ስለሞን ጥበበ ስለሞን መጽሐፈቡን፣ መጽሐፈ ዝንሸዋ ወዘተ የመሳሰሉት ይገኛቸዋል። እነዚህ ከዚህ በላይ የተጠቀሱት መጽሐፍት ለአብዛኞቹ የዓለም ሳይንሳዊ ተመራማሪዎችና ተጠቀሚዎች መነሻ ሆነውላቸዋል። ለዚህም ነው የሳይንሳዊ ሕክምና አባቱ ባህላዊ ሕክምና ነው የሚባለው።

7. ግንኙነትን በተመለከተ

ባሁኑ ወቅት የባህል መድሃኒት አቋቋሚዎች ከሚሰጡት ሕክምና በተጨማሪ ከበርካታ መንግሥታዊና መንግሥታዊ ካልሆኑ ድርጅቶችና ግለሰቦች ጋር እንደየረብረብነታቸው የምግብ መድሃኒትና ጤና ክብካቤ አስተዳደርና ቁጥጥር ባለሥልጣን ከሳይንስ ቴክኖሎጂ ሚኒስቴር ኮሚሽኔሽን ጽ/ቤት ከአዕምሮዊ ንብረትና ጥበቃ ጽ/ቤት ከሕይወታዊ ሀብት ጥበቃ ኢንስቲትዩት፣ ከኢትዮጵያ ሕብረተሰብ ጤና ኢንስቲትዩት ከፋርማሲ ት/ቤት፣ ከሪሶርሶርስ፣ ኢኖቪተርስና ኢንቬስተርስ አሶሲየሽንና ከተለያዩ ተመራማሪዎችና አጥኝዎች ጋር ጤናማ ግንኙነት በማድረግ ላይ ይገኛሉ። ይህንንም ግንኙነት ለማሳለጥ የበለጠ ውጤትማ ለማድረግ ያሉንን መጽሐፍት፣ በልምድና በምርምር ያገኙትን ባህላዊ ሕክምና ዓይነቶች በተመራማሪዎች፣ ለአጥኝዎችና፣ ለተጠቃሚዎች በሚያመች መልኩ በጽሁፍ የማዘጋጅቱ ሥራ በሰፊው በመቀጠል ላይ ይገኛል።

8. የመንግሥት እርምጃን በተመለከተ

በአሁኑ ሰዓት ባህላዊ ሕክምናን ለማጠናከር መንግሥት እየወሰደ ያለው እርምጃ የሚደነቅ ነው። ለባህላዊ መድሃኒትና ሕክምና መንግሥት በነጋሪት ጋዜጣ አዋጅ አውጥቷል። አዋጅን ለማስፈፀም በሚኒስትሮች ምክር ቤት ደንብ ፀድቆ ታትሞ ወጥቶአል። ለደንቡም መመሪያ በማስፈለጉ በጤና ጥበቃ ሚኒስቴር የምግብ መድሃኒትና ጤና ክብካቤ አስተዳደርና ቁጥጥር ባለሥልጣን መመሪያ አርቅቆ በሚመለተው አካላት ተገምግሞና ፀድቆ የክልሎችና የሁለቱም ከተሞች አስተዳደሮች በየበኩላቸው መመሪያውን እንዲያካፈላቸውና ከተሞቻቸው ሁኔታ አስተካክለው ተግባራዊ እንዲያደርጉ ለየጤና ቢሮዎቻቸው ተላልፎላቸዋል። አብዛኞቹ ክልሎች ተግባራዊ ሲያደርጉ የአዲስ አበባ ከተማ አስተዳደር የምግብ መድሃኒትና ጤና ክብካቤ አስተዳደርና ቁጥጥር ጽ/ቤት በበኩል የተላኩትን መመሪያ መሰረት በማድረግ ከሚመለከታቸው አካላት ጋር ገለጻና ውይይት ተደርጎና ዳብሮ ፀድቆ ለክንውና አስፈላጊዎች ቅጾች ተዘጋጅው ለተግባራዊነቱ ለየክልል ከተሞች ምግብ መድሃኒትና ጤና ክብካቤ አስተዳደር ቁጥጥር ጽ/ቤት በማስተላለፍ ላይ ናቸው። ለሥራውም ቀልጣፋነትና ውጤታማነት ያመች ዘንድ ቀደም ሲል አገር አቀፍ የባህል መድሃኒትና አዋቂዎች አስተባባሪ ኮሚቴ የተቋቋመ ቢሆንም የአዲስ አበባ ከተማ አስተዳደር የምግብ፣ መድሃኒትና ጤና ክብካቤ አስተዳደር ቁጥጥር ጽ/ቤት በበኩል የከተማውን ባህል መድሃኒትና ሕክምና አዋቂዎችን ሰብስቦ ገለጻና ውይይት ከተደረገ በኋላ የአዲስ አበባ ከተማ አስተዳደር ባህል መድሃኒትና ሕክምና አዋቂዎች አስተባባሪ ኮሚቴ ተመርጦ ዝርዝራቸው ለየክፍለ ከተማው ምግብ፣ መድሃኒትና ጤና ክብካቤ አስተዳደር ቁጥጥር ጽ/ቤት ተላልፎአል። ስለዚህ ለባህል መድሃኒት ሕክምና አዋቂዎች ግልጽና ቀልጣፋ የሥራ-ሁኔታ እየተመቻቸ ይገኛል ከዚህም ባሻገር መንግሥት ለባህል መድሃኒትና ሕክምና በሰጠው ትኩረት ሕክምናው ከሳይንሳዊ ሕክምና ተቋማት በቅንጅት የሚሰራበት ሁኔታ በመጠናት ላይ ይገኛል።

9. ሳይንሳዊ ሕክምናው በተመለከተ

ሳይንሳዊ ሕክምናው እንከን የለሽ ቢሆንም በጥቅሉ ሁለት ነገሮች ተደቅነውበታል። አንደኛው ሳይንሳዊ ምርምር ረጅም ጊዜ የሚፈጅበት ከመሆኑም አንጻር ሁሉንም በሽታዎች ወደ ሚያድንበት ደረጃ አለመድረሱ ሲሆን ሁለተኛው የሕክምና ዶክተሮች እጅ ሰባራ የሚያደርጋቸው ሁኔታዎች መኖራቸው ነው። የክምና ዶክተሩ የተቀመመውን መድሃኒት ያዛል እንጂ ራሱ ቀምሞ አይሰጥም። እንደ ትምህርቱ የሚያዘቸው መድሃኒቶች ስማቸው ትክክለኛ ነው። እውቱን ለመናገር ባሁኑ ወቅት በአቅጣጫው በሕገ ወጥ መንገድ የሚገቡ መድሃኒቶች ስማቸው ልክ ሆኖ ውስጣቸው የውሽት ፎርጅድ በመሆናቸው ከየፋርማሲው ሲገዙና ሲጠቀሙ ማዳን ሳይሆን ሌላ ጠንቅ ፈጣሪዎች እየሆኑ ናቸው። የኢትዮጵያ ምግብ፣ መድሃኒትና ጤና ክብካቤ አስተዳደር ቁጥጥር ባለሥልጣን እነዚህ በርካታ ፎርጅድ መድሃኒቶች ለመቆጣጠር ወደ ማይትሌቦስ ደረጃ እየደረሰ እንደሆነ ይገመታል።

ስዚህለሀገር፣ ለህብረተሰብ፣ ለተገልጋዬዎችና ሕክምና ሰጪዎችም ጥቅም ሲባል ሳይንሰደድ የሕክምና ዶክተሮችና ባህላዊ መድሃኒትና ሕክምና አዋቂዎች መንግሥት እየፈጠረያ ለውን አመቺ ሁኔታ በመጠቀም በቅን ልቦና ተቀራርበው መሥራት ይጠበቅባቸዋል።

10. ከምርምር ጤና ተቋማት ጋር የሚኖረውን ሚና በሚመለከት

ከባህላዊ መድሃኒትና ሕክምና አዋቂዎች ጋር ምርምር ተቋማትም ሆኑ ግለሰቦች አብረውም ሆነ በገል ምርምር የሚያካሄዱበትን ሁኔታ መንግሥት አመቻችቷል። የአዕምሮ ንብረት /እውቀት/ ማስተላለፊያ ቅጽ ተዘጋጅቶና በሚመለከተው አካል ጸድቆ ይገኛል። ይህንን ቀጽ በአዕምሯዊ ንብረት ጽ/ቤት አማካይነት ተፈራርሞ ምርምሩን መቀጠል ይቻላል። ቅጹንም ሳንጠበቅ ከተመራማሪዎች ጋር ምርምሩ እንደቀጠለ ይገኛል። በመሰረቱ የባህላዊ መድሃኒት ለረጅም ዓመታት ለሰውና ለእንስሳት ሲሰጥ የቆየና የተፈተነ ውጤታማ በመሆኑ ጠለቅ ያለ ምርምር አያሻውም።

ባህላዊ መድሃኒት በሁለት ዓይነት ይመረመራል አንደኛው መድሃኒቱ በአዋቂዎች በአዋቂው በሚሰጠው ሁኔታ የመርዛማነቱ ደረጃ የአሰጣጡ ሁኔታ ገንዘብና ዝግጅቱ፣ አቀማመጡና አሸጋሽጉ፣ የማዳን ሃይሉ የጎንዬሽ ጎዳት የሚኖርው ሁኔታ ወዘተ ተመርምሮ የባህል ህክምና አዋቂው በሚሰጠው አኳሃን ወይም ተሻሽሎ ባህላዊነቱን ተፈጥሮአዊነቱን ሳይለቅ ለተጠቃሚው መስጠት ነው። ይህ አሰራር በዓለም ጤና ድርጅቶችም የተደገፈና በዓለም አቀፍ ደረጃ እየተሰራበት ያለ ነው።

ሁለኛው ሳይንሳዊ ምርምር ሲሆን ይህም የረጅም ጊዜና ገንዘብ የሚፈጅ ሲሆን ከባህላዊ መድሃኒቱም ጋር ዋናው የሚያደነው ክፍል ነጥሮ ወጥቶ ሌላ ንጥረ ነገር ወይም ኬሚካል ተጨምሮበት በዓይነቱ፣ ተሞክሮ ውጤታማ ሲሆን በሰው እንዲሞከር ከጤና ጥበቃ ሚኒስቴር ፈቃድ አግኝቶ ተሞክሮ ፈላጊ ሆኖ ከተገኘ መድሃኒቱ ስምና ዕውቅና ተሰጥቶት ከአምራች ድርጅቶች ጋር ተስማምቶ በፋብሪካ ደረጃ በሰፊው ተመርቶ ለገበያ ወይም ለአገልግሎት የሚቀርብበት ሁኔታ ነው። ይህ ሲሆን መድሃኒቱ ባህላዊቱን ለቆ ሳይንሳዊ/ኬሚካል/ መድሃኒት ይሆናል። ይህንን መድሃኒት የያዙት ሳይንሳዊ ህክምና ዶክተሮች ሆኑ ባህላዊ መድሃኒትና ህክምና አዋቂዎች ለህክምና እይጠቀሙም። ከዚህ የተነሳ ባህላዊ መድሃኒትና ሕክምና አዋቂዎች የሚመርጡትን የሚጠቀሙበት ከላይ በአንደኛው ምርመራ ዓይነት የተጠቀሰውን ነው። ስለሆነም በኛበኩል ለሁለቱም ዓይነትና ሌላም ካለ ከተመራማሪዎች ጋር አብሮ ለመሥራት ዝግጅቶች ነን።

11. ከጤና ተቋማት ጋር ስለሚኖረን ሚና

ምስጋና ለኢትዮጵያ ህዳሴ፣ መንግሥት ለባህል መድሃኒትና ሕክምና አረንጓዴ መብራቱን ስለበራና ሁላችንም በትክክለኛው ህዳሴ ጎዳና ላይ ስለምንገኝ የጤና ተቋማትና ሳይንሳዊ ሕክምና ያጠኑ ግለሰቦችም አመለካከትን ቀይረንና አሻሽለን ተቀራርበን ተስማምተን ላገርና ለጋራ ጥቅም መሥት ይኖርብናል። ይህ የወቅቱ አንገብጋቢ ጎዳይ ነው። ጋንግሪን የያዘው አባት ከተገኘ ከመቁረጥ ባህል መድሃኒትና ህክምና አዋቂው በቀላሉ እንዲያድን ማድረግ የአባት እግር እንዴት ይቆረጥ እናት ጡት ካንሰር ካለባት ባህላዊው የተሻለ ችሎታ ካለው እንዲያድን ዕድል መስጠት የእናት ጡት እንዴት ይቆረጥ ሌላም ብዙ መጥቀስ ይቻላል። ከሳይንሳዊ ህክምና ተቋማት ዶክተሮች የምንማራቸው ብዙ ነገር አለ። ሁላችን ያንድ እናት ልጆች ነን ተቀራርበን ተስማምተን እንሥራ ይህ የእናት አገር ጥሪ ነው።

12. ማጠቃለያ

ይዋል ይደር እንጂ አህያ የጅብ ነች ይባላል። ወደድንም ጠላንም አብሮ ተቀራርቦ ተስማምቶ መሥራት አይቀሬ ነው። አገራችን በፈጣን ለውጥ ላይ ነች እንድንራራቅ፣ እንዳንስማማና እንዳናደግ የሸረብብን ዲያብሎስ ና የውጭ ጠላቶችን እንጂ ወዳደቻችን አይደሉም። አሁን ጊዜው የኢትዮጵያ ህዳሴና እድገት ገናናነት ወቅት ስለሆነ በሂደቱ አምነን ሁላችንም ፍጥነት ጨምረን በጋራ እንደሙያችን እንሥራ እግዚያብሔር ይርዳን።

እግዚያብሔር የኢትዮጵያን ህዳሴ የበለጠ እውንና ገህድ ያድርግልን እግዚያብሔር ኢትዮጵያን ይጠብቃት በጥምና ስላዳመጣችሁኝ ከልብ አመሰግናለሁ።

ሐኪም አስጢፋኖስ ኃይለጊዮርጊስ
የኢትዮጵያ የባህል መድሃኒትና ህክምና አዋቂዎች ተወካይ

XIII. Laboratory Evaluation of Mosquito repellent Activity of Essential Oil from *C. nardus*, *E. globules* and *K. squarrosa* against *Anopheles arabiensis* Animal Model

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ABSTRACT

Background: Botanical insecticides and repellents have been long used by people around the world. Today plant based insecticides and repellents are gaining momentum due to the ever increasing insecticide resistance and high cost of synthetic chemicals beyond their undesired side effects on the environment. Plant based repellents are generally considered as safe, though the case may not always true. Plants produce compounds called "Green leaf volatiles" which are released when plants are damaged by herbivore or other mechanical injury to protect themselves from enemies. These could be repellents, feeding deterrents, or toxins. These chemicals are generally called essential oils and categorized in to different chemical groups; hydrocarbons (terpens and sesquiterpenes), Oxygenated compounds (alcohols, esters, ethers, aldehydes, ketones, lactones, phenols and phenoethers). They are frequently responsible for the distinctive odor of plants. Insects detect the odor, when bind with their odor receptors (ORs) which are found on the exposed part of their antanae and proboscis. These specialized Ors are highly conserved among the Dipterans. Plant based repellents are preferred for their convenient application and uses in different forms; as ointment on exposed skin, impregnated on outer clothing, smoke in homes as sticks or burn as candles or spray in and around residence.

Methods: The mosquito repellent activity was done to test the efficacy of three selected essential oils (Eos) from *Cymbopogone narduse*, *Eucaliptus globulus* and *Kleinia squarrosa*. The test was conducted using the WHO procedure for pesticide evaluation scheme (WHOPES, 2009) and other laboratory repellent test procedures on animal models reported in different journals (Maharaj and Gayaram, 2008). Combining the above guidelines and procedure developed ideal laboratory repellent test procedure suitable for our insectary setup at EPHI. 20% DEET and & 70% ethanol was used as a positive and negative control respectively. The percent repellency for each Eos at different concentration for different time has been done and percent repellency for the formulated preparation of *C. narduse* has been conducted. EC₉₉ Was determined for all Eos using probit regression model.

Results: The EO of *C. narduse* showedveryhigherrepellencypercentage,100%at15,10 and 5 percent concentration up to 3hours stay and 83, 75, 61 % repellency at 1, 0.5 and 0.1 percent

concentration respectively for similar time. The EC₉₉ for Eos of *C. narduse* at 3 hour was found to be 3.4%. The formulated preparation of *C. narduse* showed 100% repellency up to 5 hours at 5 and 2 % concentration. EO of *E. globules* showed very high percent repellency, which are 97, 79, 72 and 62 % repellency at 20, 15, 10 and 5% concentration at 3 hour. The EC₉₉ EO at 3 hours was found to be 29.7%. The EO of *Kleinia squarrosa* showed relatively lower repellency (69, 66, 64, 60 and 53% repellency at 30, 25, 20, 15 and 10% concentration at 3 hour) when compared with the positive control 20% DEET which show 100 % repellency at 3 hours; but satisfactory repellency when compared with the negative control which is 70 % ethanol that offered 24% repellency at 3 hours.

Conclusion: EOs from all plants offered high percentage repellency and are highly potential EOs for further development for commercial and public uses by concluding the remaining activities of field trials, test on volunteers of human subject and formulation efforts to make them act longer on application; since they are volatile compounds there is a need to carry and hold them in an appropriate vehicle to assure longevity of action.

XIV. The Traditional Medicines Sold by Vendors in the Merkato, Addis Ababa: Inventory and Aspects of their Utilization and Trend

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ABSTRACT

Background: A considerable number of traditional medicines are sold by vendors in the Merkato, the largest open market in Ethiopia. The vendors sell plant-based medicines and related commodities for various ailments and other purposes.

Objectives: The aim of this study was to obtain information on traditional medicinal plants, incense, and minerals sold by vendors and purchased by clients in the Merkato, including their distribution, origins, trade, uses, and sustainability.

Methods: Two questionnaires and a direct observation guide were used to obtain information from 44 vendors and 47 of their customers.

Results. Plant materials of 45 plant species, 37 of which could be identified, and 4 minerals were found to be sold by the vendors for the treatment and prevention of various infectious and non-infectious diseases and magico-religious illnesses. The most frequently sold medicinal plant products were resins from *Boswellia* spp. and *Commiphora* spp. (*etan*), *Echinuskebericho* (*kabericho*), *Rutachalepensis* (*tenaadem*), *Rosmarinus abyssinicus* (*yesegamehesha*), *Ocimum lamifolium* (*damakase*), *Taverniera abyssinica* (*dingetegna*), and *Silenemacroselen* (*wogert*), in that order. Comparison of the results with those of a 1973 study reveals a decline in the number of vendors and mean number of medicines sold per vendor, particularly the taenicides, continued high use of the major general medicines, and the sale of 13 plant species and one mineral that were not reported in 1973. These changes are due to increasing commercialization of medicines, the movement of some vendors to other markets, greater acceptance of some pharmaceutical drugs, and apparently changes in the epidemiology of diseases. The sanitation and handling of medicines observed among vendors was poor, with possibly undesirable health effects for clients. The utilization and preparation of medicines recommended by vendors and described by clients were fairly consistent, indicating deeply engrained practices and traditions.

Conclusion: Although the numbers of vendors in the Merkato and the medicines they sell have declined during the last four decades, demand for them remains high in the population of Addis Ababa. The handling and dosages of the traditional medicines recommended by the vendors in the absence of hygiene and scientific studies of the efficacy, safety, and quality may constitute health risks for consumers. The public health and socioeconomic implications of market medicines need to be addressed by policy makers to ensure the sustainability, safety, and efficacy of the medicines. Moreover, this study indicates that the massive and uncontrolled harvesting and marketing of wild plants for the rapidly growing urban markets threaten the survival of several plant species.

Key words: Traditional medicine, medicinal plant vendors, utilization, sustainability, temporal changes in uses.

XV. Conservation and sustainable use of Ethiopian traditional medicines: Challenges and the way forward.

Dr. Tesfaye Awas, EBI



**Conservation and sustainable use of
Medicinal plants in Ethiopia**
Tefsaye Awas (PhD)
N. Tesfaye Awas (PhD)

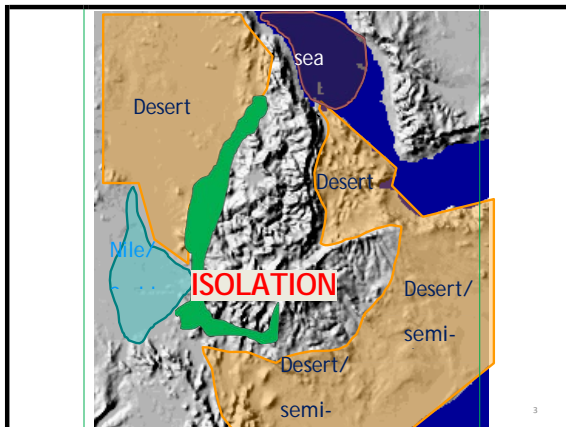
Medicinal Plant Project Management Unit
Ethiopian Biodiversity Institute

1

Role of TM

- Healthcare system
- Source of income at household level
- National economic growth

2

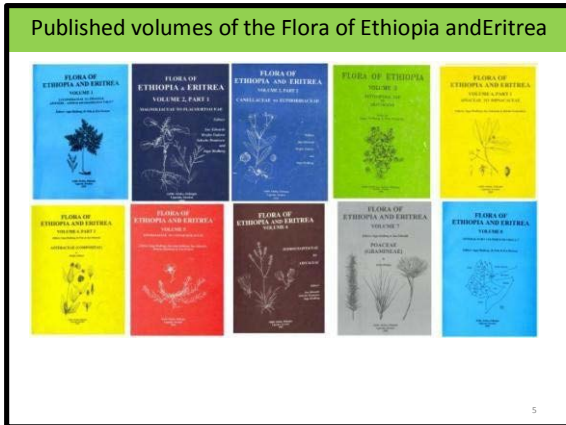


Landscape and ecosystem diversity

– High rate of species diversity and endemism

- 6500-7000 plants species
 - About 20% are estimated to be used as medicinal

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Ethiopian Gene Bank- The first Gene Bank

Total Holding of EBI
• 2744 samples (accessions)
• 51 medicinal plant species

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Threat to medicinal plants

- Sources of threats
 - Manmade
 - Population pressure
 - Agricultural Expansion
 - Development of urban centers
 - Over harvesting
 - Destructive

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Biodiversity and Institutional arrangements in Ethiopia

• PGRC/E	1976
• IBCR	1998
• IBC	2004
• EBI	

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Conservation

- *Ex situ* conservation
 - Cold room storage
 - Establishment of Medicinal Plant Field Gene Bank

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Problems in *ex situ* in conservation of medicinal plants

- Being wild requires special sampling and handling strategy
 - Shattering
 - Recalcitrant

Ex situ Conservation of Medicinal Plants in Medicinal Plants Field GeneBanks

S. No.	Name of Medicinal Plant Field Gene Bank	Number of Species	Number of Samples
1	Bale	199	294
2	Bambassi	62	169
3	Kure	52	114
4	WondoGenet	265	403
5	Zegie	46	80
	Total	624	1060

Ex situ Conservation of Medicinal Plants in Botanical Gardens, Coffee Field Gene Bank and ColdRoom

S. No.	GeneBank	Number of Species	Number of Samples
6	Jima Botanical Garden	8	8
7	Shashemene Botanical Garden	25	40
8	Gulele Botanical Garden	100	100
9	Choche	6	339
10	Addis Ababa ColdRoom	51	274
	Total	190	323

Ex situ Conservation of Medicinal Plants

S.No.	Conservation site	Number of species	Number of samples
1	Medicinal Plants Field GeneBanks	624	1060
2	Others	190	3231
	Total	814*	4291

* Some species are may be conserved over many sites and exaggerate the number of conserved medicinal plants

- ### Other institutions involved in maintaining Medicinal Plant as live collections
1. Ethiopian Public Health Institute
 2. WondoGenet Agricultural Research Center
 3. Tepi Agricultural Research Center
 4. Debrebirhan University (Ankober Medicinal Plant Research)
 5. Hawasa University (WondoGenet College of Forestry and Natural Resource Management-Arboretum)
 6. Haramaya University (Arboretum)
 7. Addis Ababa University (Aklilu Lema Institute of Pathobiology)
 8. Jima University
 9. Private Gardens

Some species are may be conserved over many sites and exaggerate the number of conserved medicinal plants

In situ Conservation

- In situ Conservation and Sustainable Use of Medicinal Plants
 - On-site management and sustainable use
 - Farmer based cultivation
 - Training and mass awareness

19

GEF funded project under Execution by EBI

- Conservation and sustainable use of medicinal plants project (2001-2007)
- **Capacity Building for Access and Benefit Sharing and Conservation and Sustainable Use of Medicinal Plants Project (2012-2016)**

20

Nursery management & Seedling raising

Dinsho Nursery site



Forest restoration around Bale Mountains National Park using medicinal plants



In Bale Zone 206 home gardens were established conserving more than 200 medicinal plant species



Goba Medicinal Plants Field Gene Bank



ZegieForest, Amhararegion



Products of ZegieForest



PreparationofManagementPlanforZegieForest

-Participatory approach



Seedlings nursery(Zegie)



Forest restoration in Zegie using medicinal plants



Medicinal Plants in Zegie Field GeneBank



Medicinal Plants in Zegie Field GeneBank



Kure Forest, SouthOmo

Catchment of MagoNationalPark



Home Garden ofAriPeople



Kure Medicinal Plants Field GeneBank



SouthOmo,SouthAri,KureForest

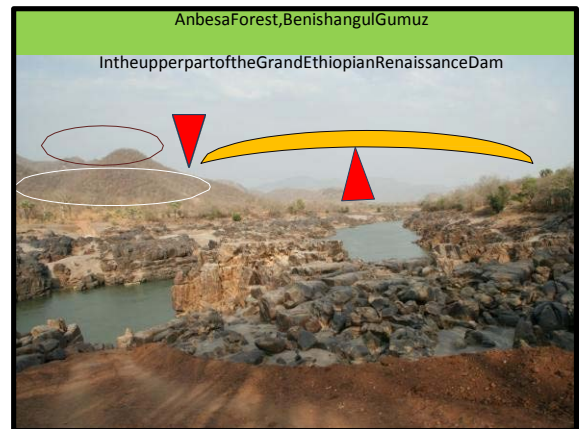
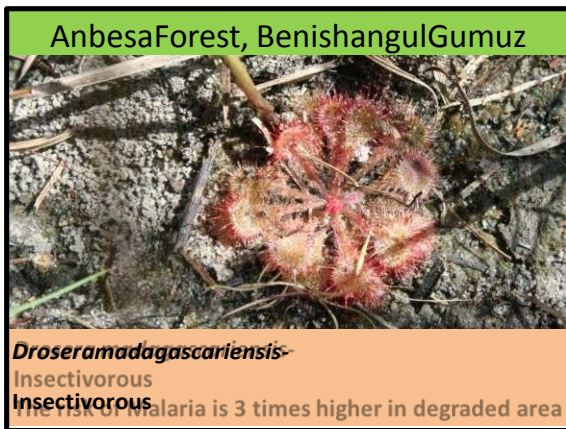
One year old Moringain

Home Garden of AriPeople



AnbesaForest, BenishangulGumuz





Shashemene Botanical Garden



Component 2

- Deals with the **enabling policy and institutional framework** for *in situ* and *ex situ* conservation of medicinal plants biodiversity and will
 - **Carry out review of existing policy, law and legislation for medicinal plants;**
 - **Strengthen ABS capacity and**
 - **Raise awareness about ABS issues.**
 - **Raise awareness about ABS issues.**

Policy/legal issue

- Local bylaws documented and utilized
 - Implementation of Management plan of *in situ* conservation
 - Eg. Field crop and animal production is not allowed in Zegie Forest

45

Discussion on the application of bylaws



Institutional Issue

- There is a need of a plat form to link Medicinal Plant Conservation, Production (Agronomic Research), Marketing and Health Care (Research on dosage, safety, efficacy)
- Promotion of traditional medicine

Component3

- Deals with markets for medicinal plants friendly products by
 - Increasing markets by at least 50% through expansion of value-chains, national and international markets that will
 - Promote farmer uptake of medicinal plants conservation imperatives.

Bale Mountains NationalPark



Market Linkage of MedicinalPlants- Promotion of Moringa



Market Linkage of Medicinal Plants-
Promotion of Moringa



Children selling endemic medicinal plant-
Echinopskeberich gathered from Central Highlands of
Ethiopia



Children and women gathering the young shoots of
Oxytenanthera abyssinica for food (Western Ethiopia)



Component 4

- Deals with building capacity through strengthening institutional frameworks for ABS
- the wider application of ABS measures in Ethiopia and
- for the conservation and sustainable use of medicinal plants

Conservation and sustainable use

- Trainings
 - Wild seed handling techniques
 - Botanical Garden
- Facilities

55

ABS Capacity

- Nagoya protocol, existing ABS national law and regulation were translated into three local languages
- Dissemination of legal documents
- Awareness raising workshops
- **Training on Negotiation Skill**

56



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- *Eragrostistef*/POACEAE(□□)
- *Vernoniagalamensis*/ASTERACEAE(□□□□□□□□)
- *Aloedebrena*/ALOACEAE(□□)
- *Withaniasomnifera*/SOLANACEAE(□□□)
- *Osyrisquadrupartita*/SANTALACEAE(□□□)
- *Dichrostachyiscinerea*/FABACEAE(□□□)
- *Moringastenopetala*/MORINGACEAE(□□□□)

Accessed Genetic Resources in Ethiopia



1. Ethiopia the home of Teff /*Eragrostis tef*/
the ultimate gluten free cereal

Accessed Genetic Resources in Ethiopia



2. *Vernoniagamensis*/ASTERACEAE(□□□)

Accessed Genetic Resources in Ethiopia



3. *Aloe debrana*/ALOEACEAE

Accessed Genetic Resources in Ethiopia



4. *Osyrisquadripartita*/SANTALACEAE(□□□)

Accessed Genetic Resources in Ethiopia



Accessed Genetic Resources in Ethiopia



Accessed Genetic Resources in Ethiopia



Accessed Genetic Resources in Ethiopia



Accessed Genetic Resources in Ethiopia



Accessed Genetic Resources in Ethiopia



XVI. Local Pharmaceutical contributions for the production of validated traditional medicines: Challenges and future prospective

Ato Asmelash Gebre Ethiopian pharmaceutical and medical supply manufactures sector association

ETHIOPIAN PHARMACEUTICAL AND MEDICAL SUPPLY MANUFACTURES SECTOR ASSOCIATION

EPMSMSA

Ato Asmelash Gebre

December2015

Presentation Topics

- Local manufacturing capacity
- wayforward with traditional medicine

2

Background of EPMSMSA

- 1) THEEPMSMA was established in 2005 with 14 members in Addis Ababa with the following objectives as stated in the by-law
- 2) To identify the pharmaceutical manufactures situation and submit to the government for growth and make follow ups
- 3) To create a ROADMAP strategy of the industry & to be competitive to the international standard
- 4) Collect relevant information and submit to the manufactures to strengthen proficiency.

3

Backgroundcount.....

- To create a situation where members can share experience, skill and knowledge they have acquired
- To arrange trainings and workshops with other partners eg.GMP
- To observe that members rights are exercised in a good manner

- To assist the members that the quality of medicine they produce is to be of a good standard
- To create a forum where we can discuss with the government & stakeholders on quality, market.....
- Open discussion forum with regional countries and the continent with member associations

DIS	TA B	CAP	SYRUP	AMP	OINT	INF	POWD	NO LINES	CAPA BUL
APF	√	√	√	√	√	√		6	YES
CADIL	√	√	√					3	YES
EPA	√	√						2	
EPHAR	√	√	√	√	√	√	√	7	YES
FEWS			√					1	
PHAR						√		1	YES
MEDS						√		1	
RX	√	√						2	
JUPHA	√	√	√					3	YES

DIS	GELA CAP	MED DV	SYR	IV BAG	BED NET	EQUIP	NUM LINES	CAPA BUL
SINO	√√						2	YES
ASMI		√√√					3	YES
DANA		√					1	YES
ETAB		√					1	
FANOS			√				1	
WOIN					√		1	
SA-ME				√			1	
ARFAB						√	1	
DESTA		√					1	

- ### CAPACITY
- The production capacity of the majority industries was at an average of 25%
 - As of 2010, due to the support of government capacity it has increased to 40%
 - Number of Pharmaceuticals products has reached over 100 products (34% of the essential druglist)
 - Total sales to PFSA has increased from 300 Million to 900 Million ETB.

- ### EPMSMSA Working Group
- Members were divided into six working groups and tried to locate the problems with solutions to their problems through their matching partners
 - Extensive workshops were held with our partners and drafted guidelines
 - Participated in government policy meetings
 - Pharmaceutical industry is considered as one of the 7 pillars of the Ethiopian economy strategy

- ### National Strategy 2015-2025
- To increase manufacturing pharmaceutical industries from 7 to 12
 - To open 4 new Manufacturing companies of API and excipients and other inputs by 2020
 - To produce 60 % of pharmaceutical products needs locally
 - To export over 30 Million USD by 2020
 - To develop 5 new traditional medicine to the market

Traditional medicine and pharma industry

- Traditional medicine is the base for modern medicine
- Traditional medicine innovation is increasing and Being accepted in the modern world today
- Herbal medicine like aspirin, chloroquine and many are developed into this new age of pharma industry
- Develop, manufacture and reach the population by sharing our traditional medicine experience.

11

Cont....

- Have local companies to manufacture API and excipients to reach our GTP II goals.
- EPHI assist traditional medicine results to be registered by the authorities
- Efficacy based formulation documents should be ready for production by scientists
- Industries should corporate with researchers on manufacturing process by providing their facilities to researchers

12

Way forward

- Since Ethiopia has a well diversified ecology we could find a new molecule a “break through” or noble drug
- Due to the population growth in the region and the economy integration, the opportunity of market growth is high.
- Since the last 20 years research on tropical diseases in the developed countries is less and less we can fill the gap or collaborate
- To collaborate with developed countries who are keen in developing new molecules to prevalent new diseases

13

Way forward

- To make use of the pharmaceutical coordinating or secretariat office which is established at MOI FBPIDI with the help of WHO
- Increase confidence to the knowledge of their additional medicine healers and they should be recognized
- Let traditional healers give one product to each universities and try to work with researchers through Science and Technology Ministry as a starter to encourage the development
- Register or patent products by the appropriate authority and work on royalty fee process

14

Way forward

- FMAHACA to register new developed traditional products as per the registration rules and regulations of raw materials
- Industries to work hand in hand to develop with the countries' traditional medicine objectives
- Industries should be ready to purchase dossiers which are ready to for treatment
- Government should give a strong awareness on locally approved manufactured products to the population through press release
- Research institutes to be recognized and be certified

**Traditional medicine is the base for
Modern Medicine**

**Giving trust, assurance, and value to
healers' their knowledge and**

**Acceptance will develop & the local
medicine manufacturing capacity will
grow**

THANKYOU

XVII. Ethiopian Food, beverage and Pharmaceutical Industry Development Institute

Ato Mesay WG. Food, Beverages & Pharmaceutical development institute (FBPDI).

መግቢያ

የምግብ፣ የመጠጥና የፋርማሲዩቲካል ኢንዱስትሪ የግብርናን ግብዓት በሰፊው የሚጠቀም በመሆኑ ሀገራችን ያላትን እምቅ ሃብት በአግባቡ ወደ ኢንዱስትሪው በመቀየርና ይበልጥ ኢኮኖሚያዊ ተጠቃሚ እንድትሆን በማድረግ ረገድ ያለው ድርሻ ከፍተኛ ነው።

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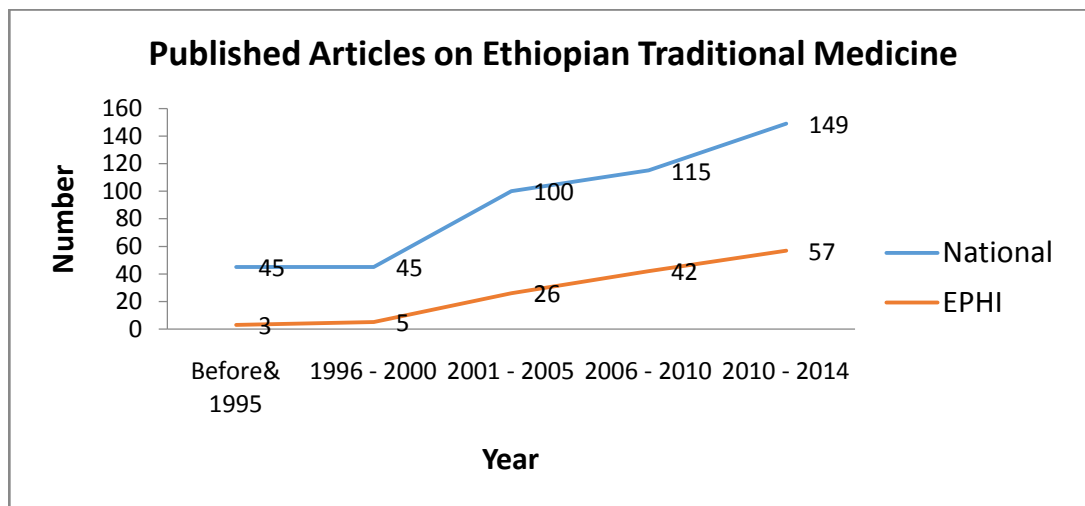
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XVIII. The Trends of Traditional Medicine Research in Ethiopia: Challenge and the Way Forward

Ashenif Tadele, Ethiopian Public Health Institute

The research pattern in medicinal plants and traditional medicine practices in Ethiopia is largely unknown. Hence this study examined such research patterns with a view to determining how the country fared in herbal medicine research and development and also to assess the implication of such findings on the health care system in Ethiopia. Descriptive analytical technique was adopted in analyzing the secondary data obtained from the published articles on Ethiopian traditional medicinal plants for 30 years (1985-2014). Results showed that the most researched areas were in the anti-infective or anti-microbial drugs, Ethno-medicinal study (Human & Veterinary), Phytochemistry and Isolation/ Standardizations, analgesics, antipyretics and anti-inflammatory activity, Anti-malarial activity, toxicity (chronic/sub chronic, dermal) study, Antioxidant and Hepatoprotective, Antiprotozoals, Formulation study (solid, liquid semi solid) study, anti diabetic and anthelmintic activity in that order. Thus, it recommended among other things that herbal medicine research and development should be intensified and should be linked to manufacturing investment if Ethiopia intends to meet the health challenges.



Traditional Medicine Research in Ethiopia: The Way Forward

Strengthen financial support:

Support from government and multinationals through sufficient research grants to support Traditional Medicine Research, development and commercialization is highly needed. The caveat however is that government has to be committed to providing adequate funding for such institutions to be functional.

The funding made available by the government through the Ministry of Science, Technology and Innovation (MOSTI) should focused on:

- Aiming at supporting basic and fundamental research particularly in institutions and universities of higher technologies.
- Aiming for collaboration between researchers in government research institutes or institutions of higher learning with industry partners
- Aiming for assist individuals/ sole proprietors, micro and small enterprises to develop new or improve existing products, processes or services with elements of innovation for commercialization,
- Aiming to assist groups to convert knowledge/ideas into products/processes/services that would improve the quality of life of communities.

Human and resource capacity building

It is a necessity in order to have adequate manpower and stimulate active research on Traditional Medicine plants or products. Efforts have to be geared towards training scientists in research institutes, universities, traditional healers as well as sponsoring individuals with potentially high scholastic abilities for higher degrees and fellowships.

Collaboration with The traditional medicine practitioners

The knowledge of Ethiopian traditional medicines is on the hands of traditional practitioners. There is a need for Registration and licensing of traditional healers and traditional medicines. Assuring the availability of standardized traditional health care services, Improve good working relationship, collaboration and communication between traditional healers, researchers and community members this will prevents quacks and non

standardized practices. The traditional medicine practitioners should be educated on the detriment of indiscriminate sale and distribution of herbal products without due research and development processes. Hence, there is need to collaborate with the traditional practitioners and integrate their practices into modern health care systems. The healers will be supported by the research.

Conservation of medicinal plants

An important issue in the development of herbal medicine industry is the need for conservation of the country's biodiversity. The available medicinal plant resources may be doomed to extinction by overexploitation resulting from excessive commercialization and other artificial destructive influences unless stringent conservation measures are employed. Hence, trainings on Good Agricultural Practices (GAPs) and Good Harvesting Practices (GHPs) should be provided to ensure more sustainable techniques. One important step forward is the establishment of medicinal plant gardens and conservation areas all over the country. Government has to encourage allocation of large scale of lands for ex situ cultivation of medicinal plants.

Addressing Indigenous knowledge right and Intellectual Property Right

Government should also create conducive environments to protect intellectual property rights and indigenous knowledge on traditional medicine products. This will contribute to a fair and equitable sharing of benefits. This will be including strengthen the Guideline & directives and its implementation on the beneficiaries to contributors on the research outcomes which Improve trust and communication among collaborators to maximize the benefits of the untapped indigenous knowledge and traditional remedies.

Collaboration with local pharmaceutical industries

The local pharmaceutical manufacturing industries should be stimulated through incentives and dialogue to invest in traditional medicine research, development and commercialization.

Documentation of traditional remedies:

Strengthen the documentation of indigenous medical knowledge and traditional remedies, compile, analyze and document information on folklore or traditional medicines and the remedies employed by the various ethnic group. This helps for the Documented and

organized information on the indigenous knowledge for scientific validation, Preparation of the monograph or pharmacopeia on Ethiopian Traditional medicines.

International Collaboration

Collaboration with international donor agencies in conducting Traditional Medicine Research and development would also be of utmost significance. Such international collaborations strengthen the existing local institutions and should be vigorously pursued by the Government.

Strengthen the regulation of traditional medicine and practice

The existing regulations and guidelines on the control of herbal medicines by EFMHACA are not being properly enforced looking at the unregulated practices taking place in the country.

Lasting solutions to these challenges can only be found if all stakeholders converge together and work in good faith to bring their specific expertise and experiences towards a common goal and understanding.

CONCLUSION

This study is set out to establish the trend in research into Ethiopian Traditional Medicine. An understanding of this trend is critical for the design of policies guiding research in herbal medicinal plants and traditional medicinal practices. However, there is need for further study especially in vital areas that have recorded less research outputs.

Group discussion Main Points

XIX. Local Pharmaceutical contributions for the production of validated traditional medicines



Outlines

- Group-1 Participants
- Brainstorming
- Establishing Steering Committee for TMs research and Industry linkage
- Prioritizing actions for TMs development and mass production
 - Short term
 - Medium term
 - Long term
- Critical points to be Considered

Brainstorming

After assigning chairperson and secretary we have discussed on:

- Who could liason research and industry to enhance TM development and mass production?
- Prioritizing actions
 - Importers need assessment
 - Packaging and labeling
 - Product manufacturing-formulation
 - API-manufacturing
 - Excipients
 - other inputs productions
- R&D

Prioritizing Actions

- Shouldprepare:
 - > ToR
 - > Action Plan based on 3phases

The group has suggested 3 phases actions for traditional medicines products delivery and mass productions:

1. In Short term Phase
- Effective & safe Crude and/or fractionated TMs selected, approved and handed over to Industry:
 - Those TMs which have been used as food and medicines by the community/people for a long period of time,
 - Have enough validation documents and determined doses,
 - Have sustainable and continues quality supply(rawmaterials),
 - Need some values to be added and prepared in the form of Ointment, syrup, powder and capsule
 - The committee invites to deliver candidate products
 - Packaging,
 - Marketing- Creatingawareness

1	Ethiopian Public Health Institute	ChairPers
2	Ethiopian Pharmaceutical & Medical Supply Manufacturer Sector Association	Secretar
3	Wondogenet Agricultural Research	Member
4	EFMHACA	Member
5	Universities	Member
6	Ethiopian Healers Association	Member
7	Food, Beverage and Pharmaceuticals	Member
8	MOST	Member
9	Veterinary Drug & Feed Administrative	Member
10	Ethiopian Biodiversity Institute	Member
11	Ethiopian Medical Association	Member

2. For Medium Term Phase

- ❑ More formulated products generated and delivered to industry for mass production
 - Those Crude and/or fractionated TMs used in phase-1 and other promising products will be undergo formulation,
 - Bench scale will be optimized in to industrial scale,
 - Clinical trial will be conducted,

3. For Long Term Phase

- ❑ Conduct capacity building
 - Human
 - Equipment/technology
- ❑ Working to develop modern medicines from TMs
 - Identifying active compounds/lead molecules
 - Producing the medicines either from purifying then atural products or synthesizing the medicines from lead molecules

Critical points to be considered

- ❑ Trust, Integration and Harmonization
- ❑ Strong linkage between research and industry
- ❑ Sustainable supply
- ❑ Awareness creation for sustainable utilization/marketing of quality TMs
- Physicians should be involved



XX. Coordination and collaboration for the integration of traditional medicine

Coordination and collaboration for the integration of traditional medicine

Opportunities, challenges and the way forward

Opportunities

- Political commitment
- Diversity of culture, TM practice, and topography
- Interest for collaboration is rising among stakeholders
- Interest on TM research is rising in the universities

Opportunities...

- Willingness of industries to use local resources is rising
- Resource limitation
- Availability of documented traditional knowledge
- Demand for drugs for NTDs

Opportunities....

- Number of skilled man power is rising
- Traditional healers are being capacitated
- Availability of evidence-based information is rising
- Demand of the public for TM is high
- TM practice is untapped resource

Challenges

- Institutional/individual commitment is low
- Absence of joint planning
- Industries' interest on high profit
- Sustainability issues

Challenges...

- Mistrust among professionals (conflict of interest)
- Resource limitation
- Lack of an owner (a coordination body)
- Presence of charlatans

Challenges..

- Absences of modes operandi for collaboration
- Secretive nature of TM practice
- Misunderstanding between healers and researchers (not being on the same page)
- Lack of team spirit

Wayforward

- Establishing an owner for the development of TM in Ethiopia
- Capacity building for healers on TM research
- Signings of MOU among stakeholders
- Involving all actors during signing of agreements from the outset

Way forward...

- Establish a frame work for collaboration
- Preparing intellectual property policies
- Conducting inventory of capacities for research and development
- Bench marking of best practices

Wayforward...

- Conducting annual events which bring the industry, the researchers, the healers and other stakeholders together
- Government support of industries
- Build team spirit among stakeholders

THANK YOU FOR LISTENING

XXI. Research and regulatory aspects of traditional medicine and practices in Ethiopia

Research and regulatory aspects of traditional medicine and practices in Ethiopia

Research

- Challenges
 - Lack of clear research direction
 - ↳ Isolated pure compound
 - Availability of information on researches being undertaken
 - Compiled data (institutional database)
 - Avoids duplication of efforts

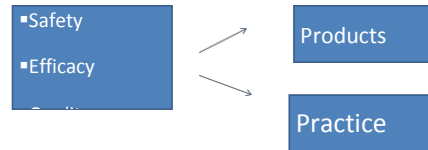
- Gain a wider scope of TM practices
 - Herbalists
 - Medico religious approach
 - Bonesetting
 - Traditional Birth attendants
- Conduct in-depth studies on safety (chronic toxicity studies)
- Setting public health priority diseases

- Standardization of TM plants
- Research ethics and data integrity
 - Quality of output
- Facilities with dual approach both TM and modern
 - Follow up of patients with chronic disease

Future directions

- Multi disciplinary efforts
 - Agriculture
 - Health sector
 - Environmental protection experts
- Conservation of natural resources
 - Avoid use of endangered sppinbulk
 - Avoid use of critical plant parts such as roots
 - Take conservative measures

Regulatory aspects



- Complex nature of TMP
- Regulation is difficult for implementation

Challenges

- Lack of reliable data on safety and efficacy
 - Absence of accredited laboratory facilities
- Attitude towards TMP among employees of the registering authorities
- No clear boundary between public and private domain
 - Personal knowledge should be given credit (intellectual property right)
- Private sector involvement(window of opportunities)
- Lack of appropriate payment and incentives
- Lack of coordination between regional and national level authorities

Regulation aspect

- Fragmentation of documents regarding should be compiled (EFMHACA, MOH , Ministry of trade and industry....)
- Lack of awareness on regulation regarding TM among professionals
- Capacity of EFMHACA (man power, organizational structure)

- Foods with medicinal value should be exempted from stringent regulations
- Regulation of packed food stuff as part of disease prevention program (quality, preservatives....)
- Relevance and justice (regulations only serve 20% of population that use modern medicine)
- Regulation of cosmetic and foods/ drinks with medicinal activity (soaps, alcohol, teabags)
- Absence of inter organizational consortium

Future directions

- Cooperation between EFMHACA, universities and research institutes to revise regulatory documents
- Capacity building efforts for laboratories to test product safety and efficacy
- Outsourcing studies to accredited laboratories
- Appropriate payment and incentives

Annex 1: Program

- i. Overview on the status of Traditional Medicine in Ethiopia and Prospects for its Development. Dr. Asfaw Debella, EPHI.
- ii. Overview on the evaluation of medicinal plants for animal ectoparasites, Dr. Getachew Addis, EPHI.
- iii. Anti-diabetic activity of *Moringa stenopetala*, Ato Alemayehu Tomma, Hawassa University.
- iv. Overview on the studies of some traditionally used medicinal plants against hypertension. Ato Bekesho Gelleta, EPHI.
- v. Overview on the studies of some traditionally used medicinal plants against helminths infections. Ato Yared Debebe, EPHI.

- vi. Overview on the studies of dermatological formulation of herbal remedies for dermatological disorder, Ato Ashenif Tadele, EPHI.
- vii. A look into collaboration/twinning of research, academic institutes and pharmaceutical manufacturing industries for the development of Ethiopian traditional medicine. Prof. Tsige Gebremariam, School of Pharmacy, College of Health Science, AAU
- viii. Role of Traditional healers for the development of traditional medicine in Ethiopia- Challenges and way forward. Ato Estifanos H/Geiorgis, AA
- ix. Laboratory Evaluation of Mosquito Repellent Efficacy of some Essential Oils, Ato Temsgen Menberu, EPHI
- x. The dynamics of traditional medicines sold by vendors in Merkato, Addis Ababa: Inventory and aspects of utilization and trade. Dr. Asfaw Debella, EPHI.
- xi. Conservation and sustainable use of Ethiopian traditional medicines: Challenges and the way forward. Dr. Tesfaye Awas, EBI.
- xii. Local Pharmaceutical contributions for the production of validated traditional medicines: Challenges and future prospective. Ato Asmelash Gebre, Ethiopian Pharmaceutical & Medical supplies manufacturers association (EPMSMA).
- xiii. Strategy for traditional medicine manufacturing in Ethiopia: Implementation, challenges and future prospective. Ato Mesay WG. Food, Beverages & Pharmaceutical development institute(FBPDI).
- xiv. An overview of traditional medicine research and development in Ethiopia. Ato Ashenif Tadele, EPHI.

xv. Closing Remarks

H. E. Honored MsA Imaz Mekonnon, House of Peoples' Representative, Social Affairs Permanent Committee made closing remarks of the workshop.

Finally DrYibeltalAsefa, DDG of Ethiopian Public Health Institute made the closing remarks.

xvi. **Annex 2: List of Workshop Participant**

DrYibeltalAsefa	DD/ General,EPHI
MershaKabtyehun	DD/ General,EPHI
DrMamuyeHadis	EPHI
AtoKissiMudie	EPHI
Dr. EshetuLemma	EPHI
AtoKelbessaUrga	EPHI
Dr. GetachewAddis	EPHI
MollaDerbe	EPHI
TaguZergaw	EPHI
Abdo Kedir	EPHI
Fantaye Gebre Michael	EPHI
Dr. AsfawDebella	TMMRD,EPHI
BiruktawitGirma	TMMRD,EPHI
Ato BirhanuTsfaye	TMMRD,EPHI
AtoNegeroGemeda	TMMRD,EPHI
AtoBerhanuAssaye	TMMRD,EPHI
AtoYaredDebebe	TMMRD,EPHI
AtoBekeshoGeleta	TMMRD,EPHI
W/t HirutLemma	TMMRD,EPHI
AtoTemsgenMenberu	TMMRD,EPHI
W/t Netsanet Fekadu	TMMRD,EPHI
RekikAshebir	TMMRD,EPHI
SeleshiDegu	TMMRD,EPHI
HirutBesha	TMMRD,EPHI
W/roFrehiwotTeka	TMMRD,EPHI
AtoWorkuGemechu	TMMRD,EPHI
AtoMulugetaGuta	TMMRD,EPHI
HiwotMoges	TMMRD,EPHI
TemesgenDingamo	TMMRD,EPHI
AsfawMeresa	TMMRD,EPHI
Gebre M/ GebreMichael	TMMRD,EPHI
AtoAshenifTadele	TMMRD,EPHI
W/o AbebaworkMengstu	TMMRD,EPHI
Rahel	TMMRD,EPHI
HonorableMsAlmazMekonnen	House of peoples' Representatives
<u>AtoTadesseAdane</u>	Ministry of culture&Tourism
Dr. ArayaHaymte	School of Pharmacy, AAU
DrMariyamawitYonatan	School of Pharmacy, AAU
<u>DrEfremEngdawork</u>	School of Pharmacy, AAU
<u>Prof TsigeG/Mariam</u>	School of Pharmacy, AAU
DrTsfayeAwas	IBC
<u>Messay G/W</u>	<u>FBPIDI</u>
Prof. EyassuMekonnen	MoringaTaskForce

AtoWondwosenGirmay	Moringa taskforce
Prof. YalemtehayMekonnen	Moringa taskforce
NegestMekonene	Moringa taskforce
AtoAsamnewAbiyu	Moringa taskforce
Amen Hulstrom	Moringa taskforce
DrZelalem	VMFACA
AtoYidnekachewSahlu	VMFACA
<u>AtoAsmelashGebre</u>	<u>ManufAssociation</u>
Hakim Danieldesalegn	Healer
Hakim BelayAdamu	Healer
Hakim EstifanoseH/Giorgis	Healer
Hakim MohamedFetiya	Healer
Hakim AyalewMilkessa	Healer
WoAynalemGebre	WGARC,EIAR
DejeneTadesse	WGARC,EIAR
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