



**ATSAF Academy**  
Academy for International Agricultural Research for Development

# Junior Scientists Tandems

## Final Report

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**Start and end date of career exploration stay: 01 Feb 2023 – 31 Jul 2023**

**Title: GC-MS Evaluation of Phytochemical Constituents in Medicinal Plants Selected by Traditional Healers in Dinsho District, Southeastern Ethiopia**

Funded by the German Federal Ministry for Economic Cooperation and Development (BMZ)





## **Final Report**

I am honored to report my career exploration stay at Martin Luther University Halle-Wittenberg to accomplish my master thesis lab work supported by GIZ, the Council for Tropical and Subtropical Agricultural Research ATSAF Academy as a Junior Scientists Tandems (JST) award. I have been studying master in Agroforestry and Soil Management at Hawassa University Wondo Genet College of Forestry and Natural Resources. I have conducted my thesis project entitled on “*GC-MS Evaluation of Phytochemical Constituents in Medicinal Plants Selected by Traditional Healers in Dinsho District, South eastern Ethiopia*”.

Originally, I am from one of the OECD-DAC partner countries Ethiopia, I faced lack of laboratory equipment particularly Gas chromatography-Mass spectrometry (GC-MS) and research grants to conduct my thesis lab work in the national university. Luckily, ATSAF Academy offered me a MSc career exploration scholarship as Junior Scientists Tandems to accomplish my thesis lab work in Martin Luther University linking with the CGIAR centre World Agroforestry (ICRAF) which is bilaterally supervised by Prof. Dr. Bruno Glaser from Martin Luther University and Dr. Aster Gebrekirstos from ICRAF.

During my career exploration stay at Martin Luther University Halle-Wittenberg, I have obtained an opportunity to participate on various seminars which linked me with other researchers, senior scientists from multidisciplinary backgrounds in the international research networks and cooperated with international student fellowships to exchange research experience, language and cultural diversity. Thus, I have advanced my teamwork, technical expertise of E-resources, data analysis software, communication, presentation and writing skills.

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Furthermore, I have gathered a lot of invaluable research experiences especially on lab work chiefly using coupled best latest chromatographic techniques analytical method Gas Chromatography-Mass spectrometry (GC-MS) to identify and measure the content of phytochemical constituents in the selected medicinal plants.

Consequently, I have successfully mastered my work on the research questions, based on the preference ranking of traditional healers, claiming five best medicinal plants of high therapeutic potential such as *Clutia abyssinica* Jaub. & Spach, *Hypericum revolutum* Vahl, *Vernonia amygdalina* Del, *Foeniculum vulgare* Miller, *Leonotis ocymifolia* (Burm. f.) Iwarsson, which were selected respectively for comprehensive evaluation of ethnobotanical study and identification of phytochemical constituents.

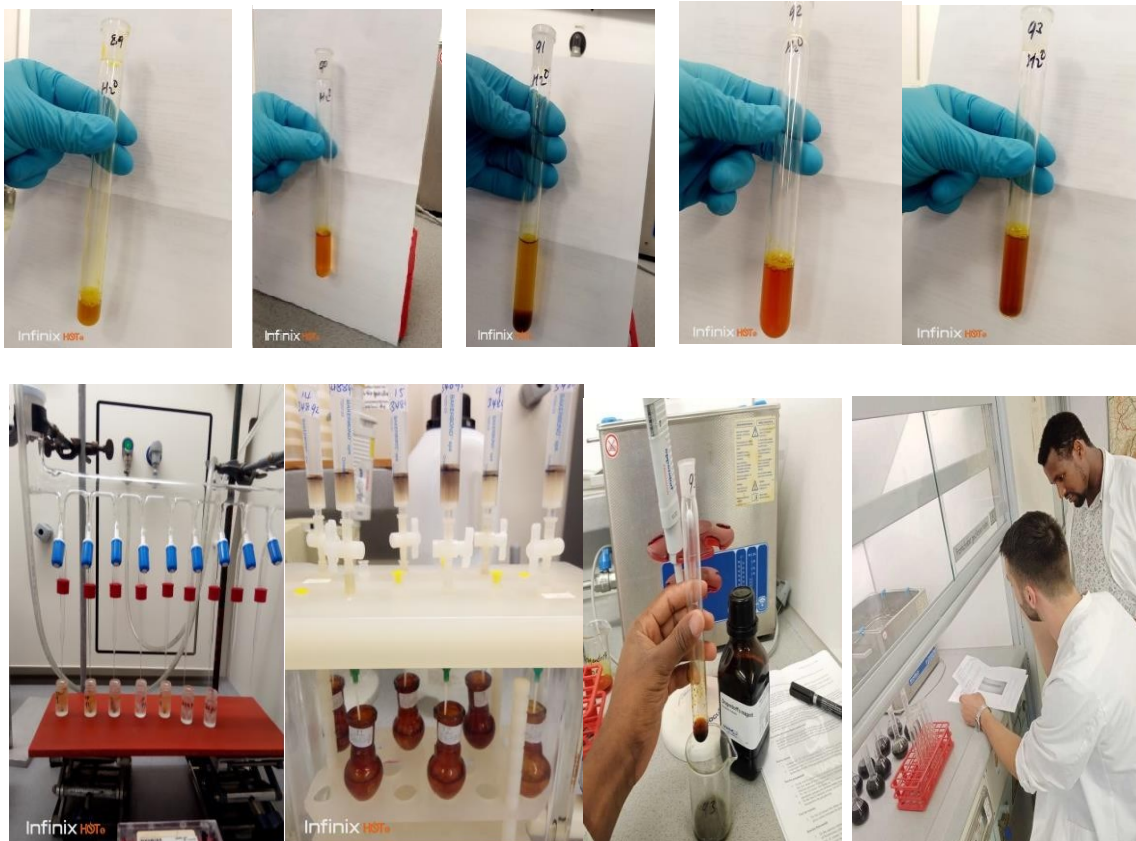


Pictures of selected medicinal plants for evaluation of phytochemicals

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Subsequently, I collected plant specimen from Ethiopia, numbered, pressed and dried them under shade and identified them following the ethnobotanical procedure. Then the samples were extracted and prepared for lab test in Germany. To test the presence of alkaloids in the sample three solvents water, ethanol and chloroform were used and 5ml of extract of sample added into 2ml of HCl and 1ml of dragendroff's reagent. The experimental result reveal alkaloids were detected in all selected plant samples in all used solvents treatments, predominantly the highest precipitation were detected in water solvents of *V.amgydalina* sample.



Pictures during alkaloids test

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Moreover, I have learnt new skills on Gas chromatography-Mass spectrometry (GC-MS) utilization, Master file analysis and Agilent Masshunter qualitative analysis version 10.0 MS.m software, during my career exploration stay that I have used for my data analysis and interpretation of achievements. Thus, GC-MS evaluation revealed 17 simple phenolic compounds that were identified in different quantities in each of the selected medicinal plants. Those identified simple phenolic compounds with  $C_6C_1$  carbon skeleton known as hydroxybenzoic acid and compounds with  $C_3C_6$  known as hydroxycinnamic acids were detected in the selected samples and correlated to traditional healers claim and indigenous knowledge. Further recommendation and a publication of a paper is ongoing. It would be my pleasure if I continue my further PhD study with ATSAF Academy.

I would like to pass my deepest gratitude to GIZ for financial support, all staff of the ATSAF Academy, especially to Sabine Baumgartner (Coordinator of ATSAF -CGIAR++ Junior Scientists Tandems) for dedicated facilitation and coordination. As well as my supervisors and all supporting staff of Soil Biogeochemistry and Biosynthesis of Active Substances Departments at Martin Luther University for their great contribution for my achievements.

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