

**ELEMENTAL ANALYSES AND  
BIOCHEMICAL STUDIES ON TRADITIONAL  
MEDICINE FORMULATION  
'ZARTILA WINGA HSAY' (TMF-35)**

**PhD (DISSERTATION)**

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## ABSTRACT

Role of elements in Myanmar Traditional Medicine Formulation TMF 35 (Zartila Winga Hsay) had been investigated. This medicine is mainly used for various types of fever, intestinal and respiratory disorders. Investigation of elemental contents in TMF-35 was carried out by various instrumental techniques. Neutron Activation Analysis of TMF-35 was carried out with thermal neutrons of BERII Nuclear Reactor at the Hahn-Meitner Institute, Berlin. The induced activities were monitored with coincidence counting gamma spectrometry. Additional studies with other instrumental techniques such as Atomic Absorption Spectrophotometry and Energy Dispersive X-Ray Fluorescence Spectrometry were also carried out. From these studies 27 elements, such as, Na, Mg, P, S, Cl, K, Ca, Sc, Ti, Cr, Mn, Fe, Co, Cu, Zn, As, Se, Br, Rb, Sr, Zr, Sb, Cs, Ba, La, Eu, and Ac were detected. It was found out that, K (0.78%), Ca (0.51%), Fe (0.19%), Na (0.11%), P (0.129%), Mg (0.043%), Ti (0.011%), Cl (0.09%), Mn (0.022%) and S (0.054%) were present as minor elements and Sc ( $3 \times 10^{-5}\%$ ), Cr (0.0016%), Co ( $8 \times 10^{-4}\%$ ), Cu (0.002%), Zn (0.04%), As (0.002%), Se ( $9.9 \times 10^{-6}\%$ ), Br (0.003%), Rb (0.0019%), Sr (0.009%), Zr (0.0008%), Sb (0.0003%), Cs ( $2.45 \times 10^{-5}\%$ ), Ba (0.003%), La (0.0002%), Eu ( $4.86 \times 10^{-6}\%$ ) and Ac (0.003%) were present as trace elements. Among these elements, K, Na, Mg, Ca, Fe, Mn, P, Cl and Zn are related to ailments associated with TMF 35.

Some ingredients of TMF-35 as suggested by Traditional Medical Practitioner, such as, Zardeikpho, Hsaung maygah, Katpho, Kantgyokni, Hsaypale, Peikchinn, Eikmwyat thee, Laynyinn, Sularnaphar, Nathani, Kutkarar were investigated by using AAS and EDXRF methods.

From literature study, it was found out that metal organic compounds are useful for curing diseases. With this objective, partition experiments on TMF-35 were performed by using various solvents such as petroleum ether, ethyl acetate and n-butanol. From this study, it was found that elements such as P, S, Cl, K, Ca, Sc, Mn, Fe, Cu, Zn, Rb, and Sr were present in organic fractions which suggest that they might exist as metal organic compounds. Further studies with phytochemical test, GC-MS, FT-IR and TLC suggest that the types of compounds present might be terpenoids, glycosides, flavonoids, phenolic compounds and alkaloids. In addition, anti-bacterial activity of each fraction was carried out. From this, it was noted that, n-butanol extract shows significant inhibition zones with test organisms such as *Bacillus subtilis*, *Bacillus pumalis*, *Candida albicans*, *Mycobacterium species*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Salmonella typhi*, *Shigella sonnei*, *Salmonella paratyphi* and *Escherichia coli*.