

**ELEMENTAL ANALYSES AND  
SOME BIOCHEMICAL STUDIES ON  
TRADITIONAL MEDICINE  
FORMULATION  
“MA-DEMYINMO-GON-HSAY” ( TMF-25 )**

**PhD DISSERTATION**

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**NOVEMBER, 2005**

## ABSTRACT

Myanmar Traditional Medicine has long been well-known for its therapeutic properties. However, systematic and comprehensive investigation on role of the elements is found to be lacking. Studies on elemental content and some biochemical properties of Traditional Medicine Formulation "MA-DEMYINMO-GON-HSAY"\* (TMF -25) were conducted. TMF -25 is mainly used for the treatment of diarrhoea and indigestion and administered at the Traditional Medicine Hospital, Yangon. Elemental content of TMF -25 and its ingredients were investigated by various instrumental technique such as Neutron Activation Analysis (NAA), Atomic Absorption Spectrophotometry (AAS) and Energy Dispersive X-ray Fluorescence (EDXRF) Spectrometry. Biochemical investigations were carried out such as phytochemical and FT-IR studies, thin layer chromatography, antimicrobial activities test and gas chromatographic mass spectrometry, elemental determination involving partition experiments with various organic solvents were carried out. A total of twenty three elements (Na, Mg, Si, S, P, Cl, K, Ca, Sc, Cr, Mn, Fe, Co, Cu, Zn, As, Se, Rb, Sb, Cs, Ba, La and Eu) were identified in this work. This involves identification of sixteen elements (Cl, Sc, Cr, Mn, Fe, Co, Cu, Zn, As, Se, Rb, Sb, Cs, Ba, La and Eu) by Neutron Activation Analysis. Determination of seven elements (K, Na, Ca, Fe, Mg, Cu and Zn) were carried out by Atomic Absorption Spectrophotometry (AAS). In addition, elemental analysis in these samples was conducted by using Energy Dispersive X-ray Fluorescence (EDXRF) spectrophotometry. Nine elements (Cl, Na, K, Ca, S, Si, Fe, P and Mg) were detected.

From the comparative study of elemental contents using different techniques, it was found out that two elements, chlorine (15.79%) and sodium (10.45%) were

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present as a major element. K( 0.698% ), Ca (0.586% ), S( 0.32% ), Si(0.196%), and Mg ( 0.15% ) were found as minor elements. P( 0.0075% ), Fe(0.0525%), Mn(0.0041%), As(0.0025%), Zn(0.0013%) and additional ten elements were present as trace elements in TMF-25. Some important ingredients of TMF -25 such as, Layhnyinn, Pannoot, Zar-deik-pho, Sular-na-phar and some other ingredients were analysed by AAS and EDXRF spectrometry. Almost all ingredients present in TMF-25 were found to be rich in potassium content. Majority of ingredients contained iron and calcium. Some elements related to the treatment of diarrhoea and indigestion such as Cl, K, Na, Ca, Fe, Mg, Zn and S were found to be present in TMF-25.

Partition experiments revealed that some elements (Fe, K, Cl, Ca, Zn and S) might be associated with organic compounds. According to the literature, these elements (Fe, Cl, K, Ca, Zn and S) are regarded as essential elements for the treatment of diseases related to TMF-25. Additional studies on TMF-25 with phytochemical examination and FT-IR Study suggests that the type of compounds might be alkaloids, terpenoids, steroids, glycosides, phenolic compounds, saponins,  $\alpha$ -amino acids and tannins. Auxiliary studies with GC-MS and Thin Layer Chromatography also suggest the presence of compounds such as fatty acid ester and amides and terpenoids in petroleum ether extract and a phenolic compound or flavonoid in ethyl acetate extract. According to literature, terpenoids and amides have antimicrobial activity and fatty acids facilitate the function of vital elements. Antimicrobial activity tests of TMF-25 exhibit distinct inhibition zones against some microorganisms such as *Candida albican*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Mycobacterium tuberculosis*.