THE TOXICITY OF HEAVY METALS AND CHELATION SAFEGUARD OF HERBAL MEDICINAL PRODUCTS

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Abstract: Heavy metal toxicity can result in damaged or reduced mental and central nervous function, lower energy levels, and damage to blood composition, lungs, kidneys, liver, and other vital organs. Long-term exposure may result in slowly progressing physical, muscular, and neurological degenerative processes that mimic Alzheimer's disease, Parkinson's disease, muscular dystrophy, and multiple sclerosis. Allergies are not uncommon and repeated long-term contact with some metals or their compounds may even cause cancer. It is important for us to inform ourselves about the heavy metals and to take protective measures against excessive exposure. Heavy metal toxicity is an uncommon medical condition; however, it is a clinically significant condition when it does occur. Phytoremediation is clearly a new field, and one which has great potential. Certain plants have the ability to accumulate heavy metals which have no known biological function. It is of great interest that plant species which have no exclusion mechanism in the roots absorb and translocate large concentrations of metals and accumulate them in their growing parts, especially in their leaves, without showing any toxicity symptoms, via a sort of internal resistance or accumulation mechanism. Several mechanisms may contribute to the decrease of the heavy metals toxicity depending on the type of metal and plant species, among them: Induction of Metal Chelating Proteins - Phytochelatins and Metallothioneins. Phytochelatins are synthesized enzymatically from glutathione (GSH) in response to many metals. Metallothioneins (MT) are the other low molecular weight proteins which bind heavy metals and are found throughout the animal and plant kingdoms. Certain natural chelators can also be powerful antioxidants, but there is no single chelator that can meet all the needs of various tissues to bind different metals with different valences under different conditions of oxygen availability and differing pH levels. There is no single chelator that is ideal to detox all of the different tissues in our body, as some need fat-soluble and some need water-soluble metal chelators, and some are more alkaline or acid, etc. Thus truly effective detoxification requires the use of newly developing combinations of highly effective detoxifying nutrients and or drugs. These may include many of the substances: taurine, triterpenes: oleanolic acid, ursolic acid, glycyrhrizin, betulin, stabilized fiber, stabilized ascorbic acid, rutosid, silybin, curcumin. We need to establish some standards for the responsible use of chelating agents. While chelation can sequester toxic heavy metals, it is not necessarily true that these sequestered cations are rendered completely innocuous.

Key words: Heavy metals, plants, phytochelatins, metallothioneins.