



# **A Study of the consideration of bio monitoring of trace Elements in the human nail for the Biometric Authentication**

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## **Abstract**

The studies of trace element composition in the human nail is called as human bio monitoring. the composition of the chemicals and trace elements and concentration of the chemicals and trace elements in the human body fluids and human body tissues are observed. The concentration of trace elements for a healthy human being is stable for a particular period of time their nail and also the composition of chemical elements in the nail differs to each individual. So the human nails can be used as the bio marker for monitoring or quantifying the composition of chemicals (major and trace elements) in the human body. So trace element's composition and concentrations in the nail can be considered for Bio-metrics authentication in future. Because the chemical composition of nail and chemical concentration in the human nail differ from one person to another person and so this can be used to identify the individual in future.

**Index terms—elements, trace elements, human bio monitoring, human body, nail**

## **I. INTRODUCTION**

Human bio monitoring based on the assessments of the concentration and role of the chemical elements in the human body, e.g., relationships between the health status and nutrition or dietary intake or environmental exposure. The analysis of trace elements can be done by collecting and measuring the trace element in biological fluids such as blood, urine, sweat, earwax, exhaled breath condensate, saliva, body milk and tears, as well as in adipose tissue and meconium, biological tissues such as hair and nail (1).

There are many analytical techniques at present available for checking the element composition and element concentrations in nails such as inductively coupled plasma mass spectrometry and atomic absorption spectrometry. (2)



## **II.NAIL AS A BIO MARKER**

Biological tissues like nails are utilised as bio metrics for evaluating the environmental pollution level by learning chemical element composition in nail. The people exposed to environmental pollution can be known through the abnormality of chemical element concentrations in nail samples. the explanation for victimisation fingernails as diagnostic material is that trace components accumulated within the nails will replicate the future exposure to environmental pollution. excluding that nails may be simply collected and hold on at traditional temperature before analysis and tiny amounts of samples (about ten mg) area unit needed for analysis.(3)

The chemical compositions of nails might depend on gender, nutrition, occupation, age, unwellness and season(4). each fingernails and toenails are used as biomarkers, every has explicit benefits and drawbacks. nail grows quicker than toenails therefore oft sampling is simple. However, the nail is usually additional exposed to exogenous chemical components, And such a contamination therefore results in an overestimation of the amounts of the endogenous chemical components. On different hand, such AN exposure also can be converted into a chance for watching the impact of handling deadly chemicals. Toenails is also additional protected against exogenous exposure, and therefore is also an improved choice for measure of the relevant chemical elements(4).

## **III. Human bio monitoring**

Bio monitoring is the measurement of the concentrations of chemical substances in human body fluids and tissues. It has been widely applied in industry and public health.The increasing availability of analytical methodologies with a constant decrease in detection limits make bio monitoring both more accessible and more sensitive.

This lead to an increase in the available knowledge on the extent of human exposure to chemical substances. It may generate number of opportunities for improving human health risk assessment because it triggers new research investigating the links between low-level exposures, adverse health effects, and potentially vulnerable population groups.

This is of explicit interest in sight of the enhanced attention for individualised exposure data from the final public once adverse health effects area unit just suspected from environmental exposure to chemicals. It conjointly stresses the importance of scientifically sound and reliable interpretation of bio observance.

## **IV.TRACE ELEMENT IN TOENAILS**

Determination of a trace element in toenails can be used as a tool in bio monitoring the exposure history or assessing the deficiency of a particular element in a study population, which can lead to a better under-standing of environmental and disease risk .it can be used in medical diagnosis also.



The connected studies square measure Hair and nail clippings have the extra potential of providing a time-window: it's assumed that after the weather square measure immobilized within the nail ceratin, so that the amount measured in a certain layer is a marker for that elements at the moment of its formation in the past. The materials may therefore act as a source of information on the long-term variations in the health status, on the impact of nutrition and on occupational exposure [5-10], as well as in forensic sciences. Nail clippings and hair can be easily obtained, even in post-mortem circumstances. The potential religious or cultural objection against providing hair samples can be overcome by collecting nail clippings. The popularity of nail clippings started to grow towards the end of the 1970. A protein named keratin is the main component of the human nail. The nail take 2 to 3 months to grow to reach the fingertip so that it can be clipped easily from there. The process of formation of the hair is too slow and the length of formation is .5 to 1mm per week.

The fingernails and toenails are used as indicator of aging. The properties of nail such as, thinning, discoloration, , grooves, splitting ,concave, thickening and convex shape also to be considered. The flatness of a nail can be used as to indicate disease in the body, nutrient deficiencies, drug reaction and poisoning or nail injury.

The thickness of nail change or loosened and infected with bacteria indicates the illness sign of certain disease in the human body The human nail is permeable than skin and the composition of human nail consists of 7% to 12% of water, so that it is a solid part in body. The nails are affected by pain and also the nails are affected with stretched, tight and cosmetics. Nails once growth still stay isolated from alternative metabolic activities within the physique, that is taken into account as an honest reflection of semipermanent exposure. the benefits of nails in components analysis area unit desirable biomarker as a result of easy assortment, storage convenience, easy handling and reliableness of later analysis results. The nails from numerous fingers in feet and hands grow in many weeks of your time between formation and clipping which indicates exposure to elevated concentration contamination integrated over a a pair of - twelve month amount . The level of element in nails area unit subject of interest within the medical specialty and environmental sciences since recent years. The activity of nail remains the topic of interest as indices for assessing biological process standing, diagnosis diseases, characteristic general intoxication and environmental exposures. The thought of components contents within the nails will be thought-about as associate degree indicator of level in alternative tissues which mirror mineral metabolism within the body . The connected studies area unit Hair and nail clippings have the extra potential of providing a time-window: it's assumed that after the weather area unit immobilized within the nail ceratin, so the number measured during a bound layer could be a marker for that components at the instant of its formation within the past. The materials could so act as a supply of knowledge on the semipermanent variations within the health standing, on the impact of nutrition and on activity exposure [5-10], additionally as in rhetorical sciences. Nail clippings and hair will be simply obtained, even in post-mortem circumstances. The potential spiritual or cultural objection against providing hair samples will be overcome by assembling nail clippings. the recognition of nail clippings began to grow towards the top of the 1970



## V. Variation of trace element

tear and sweat offer data over a brief time-window. These tissues and body fluids will be necessary for selections on procedures to be taken just in case of deficiency disease, contamination, or simply check the organic process standing at the time. Samples like nail and hair are studied as a further thanks to appraise organic process aspects throughout a large time-window. Nail and hair square measure fashioned by a brief amount within the body, and receive many nutrients and trace parts that square measure gift within the body in this moment. when formation by the body, the nail and hair from traditional folks much stay with constant structure and composition till be sampled Human nails, which are formed by layers of keratinized cells, grow from a matrix as new cells replace the old ones. Unlike height, human nails grow during the entire lifetime. The growth of nails, as well as their matrix components, is influenced by several physiological, pathological, and environmental factors. It has been reported that the average growth rate of nails is 0.1 mm every day, depending on age and race To our best knowledge, little is known about the growth rate of nails in the Chinese population. Because of the relatively low growth rate, nail clippings have been used as an important biomarker to reflect relatively long-term exposure As a biomarker, nails have the unique advantage of application in population monitoring studies due to non-invasive sample collection and easy storage However, nails have not been used as blood and urine in research and health diagnosis. Besides polluting metals, nails also contain essential elements including macro elements and microelements, whose determination may provide a way for assessing nutritional status]. Element research in nails has received less attention for essential elements than toxic elements.

## Conclusion

The elements on the market within the physique square measure very important for the assorted physiological activities of the physique and it may also be used as a drug within the hindrance of diseases and management of the many diseases. The importance of the part within the physique has taken longer for its recognition. currently solely it achieved the standing. Nearly half the world's population is at the chance of not taking the part in a very correct method and in difficiency. the weather within the physique square measure currently being investigated that it's utilised in a very wide selection from therapeutic activity, biometric identification, drug and sequence delivery, to nano technology with promising outcomes within the future. Thus, it may be complete that the role of components gift within the physique and their significance and thought for biometric identification are going to be a vital analysis space within the future.

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