

# Recent Development in extractive spectrophotometric determination of Zinc (II) in Biological and Pharmaceutical Samples

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**Abstract:** Being a type of trace element both in toxic and essential nature of zinc in biological systems, there has considerable interest in the determination of its content in different types of samples. Among the several analytical methods for the determination of zinc, extractive spectrophotometric methods are widely used due to their simplicity and low cost instrumentation and highlighting those which can be used for determination of zinc in biological and pharmaceutical samples.

**Key words:** Zinc (II), Spectrophotometric determination, Biological & Pharmaceutical samples.

## Introduction

Zinc is essential element for all animals including human beings plays an important physiological role in human blood distributed 75-85% in erythrocytes 12-22% in plasma and 3% in leukocytes. One third zinc in plasma is loosely bound to serum albumins, the reminder being more firmly attached to  $\alpha$ -globulins with minor fractions complexed in histidino and cysteine (1-3). Zinc is associated with many enzymes systems both as metallo-enzymes and enzyme activator, as well as filling asmutural role. Zinc deficiency leads to impaired DNA synthesis, delayed wound healing and decrease in collagen synthesis deficiency of zinc leads to retarded growth lower feed efficiency, causes ulcer sealing of the skin, besides affecting the bones and joints less severe zinc deficiency has been linked to a low

sperm count and infertility. Zinc deficiency during pregnancy may process serious defect and fetal loss(4). For the growth of both plant and animals life, in presence of small quantities of zinc is essential (5). Zinc exist beneficial effect on cardio circulatory function and it's important for the prevention of black food disease (6). It is used for the protection of steel against corrosion in dry batteries, photoengraving and lithography (5). Therefore sensitive, selective and rapid methods for the determination of zinc are in great demand (7-8). It is clear that zinc is an essential element and has significant important both biological and industrially when the when the quantity is more than what is required, zinc produces toxic effects, Hence , separation and determination of zinc (II) from its associated metal ions is indispensable(9).

Thus highly and selective methods are still required for trace determination Zn (II) in different biological and pharma samples. Spectrophotometry is a common technique used for the determination of zinc using to its simplicity and low cost instrumentation. Among these, some of the extractive spectrophotometric methods allow the determination of zinc (II) in biological and pharmaceutical samples. The aim of this paper is to describe recently developed extractive spectrophotometric method for zinc determination in biological and pharmaceutical samples. The methods can be formation of colored complexes between the zinc and suitable organic chelating agent.

#### **Method based on complex formation with thiosemicarbazone and its derivatives**

Several spectrophotometric methods for the determination of zinc (II) have been reported including few thiosemicarbazones (10-12) 2-Acetyl pyridine-4-methyl-3-thiosemicarbazone (APMT) (11), 5-methyl furan-2-carboxaldehyde thiosemicarbazones(5-MFAT) (13), 2-benzoyl pyridine thiosemicarbazone (BPT)(14) 2,6 pyridinedicarboxaldehyde phenyl -enediamine. These reagents formed colored, water soluble chelate with zinc (II) (15) seems very sensitive and can be used for investigation of trace amounts of zinc in biological samples. Recently new organic reagents for spectrophotometric determination of zinc (II) were proposed. These includes Benzildithiosemicarbazone(12), methyl -glyoxal bis(4-phenyl-3-thiosemicarbazone(16), [Bis-(2-6-(2'-hydroxy-4'sulphonaphthylazo)]pyridine sodium salt(17), 3,5dimethoxy-4-hydroxy benzaldehyde isonicotinoyl hydrazones (PMHBIH) (18) Among these methods the procedure based on formation of colored between zinc (II) and hydrazones derivatives. Seems very simple and can be used for investigation of trace amount of zinc in leafy, chili, milk, blood serum of diabetic patients, biological and pharmaceuticals samples.

#### **Conclusion:**

Spectrophotometric method for zinc are excellent in terms of simplicity and low cost instrumentation and several methods have been used to the determination of zinc(II) from biological and pharmaceuticals

samples. The procedure which is used to individual determination of zinc only and less interference are present due to the simple and accurate.

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