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Role of Zinc Supplementation on Diabetes

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Abstract

Diabetes is one of the common diseases in the world caused by high level of sugar in the blood due to abnormal secretion of insulin a hormone secreted by pancreas gland. There are two types of diabetes- Type 1 Diabetes and Type 2 Diabetes which are caused by abnormal functioning of pancreas. Zinc is a trace element which is essential for both humans and plants. In human body zinc is essential for growth, immunity and it helps in storage and processing of insulin in the body.

Keywords: Diabetes; Zinc supplementation; Insulin

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Introduction

Diabetes is a common endocrine disease which is caused by abnormally high levels of sugar in the blood. In blood the level of sugar is controlled by a hormone called insulin which is secreted by pancreas and endocrine gland. If production of insulin is low in the body then it causes diabetes. It is the leading cause of morbidity and mortality worldwide. Approximately 9% of the population worldwide is affected by diabetes [1]. The prevalence of diabetes has risen from 108 million to 422 million in 1980 to 2014 [2]. There are three types of diabetes:

- Type 1 Diabetes: Pancreas fail to secrete enough insulin due to destruction of β cells which secretes insulin. It is also called juvenile diabetes and insulin-dependent diabetes mellitus.
- Type 2 Diabetes: It is also called non-insulin dependent diabetes mellitus. In which the secretion of insulin is less and cells fail to respond to insulin.
- Gestational Diabetes: It occurs in pregnancy due to high sugar level in blood.

Symptoms of diabetes include excessive urination, increased thirst and hunger, weight loss, slow wound healing, skin problems, numbness in feet. It may cause many severe health complications if not treated on time include cardiovascular disease, stroke, severe kidney diseases, eye damage, diabetic ketoacidosis [1,3].

Diabetes and Zinc

Zinc levels in serum are decreased in Type 1 and Type 2 diabetes because of zinc loss due to excessive urination. It has been shown that supplementation of zinc to Type 2 diabetes patients improve the symptoms of diabetes because it decreases the level of cholesterol and HbA1c levels in blood [4-7]. Around 10 to 20 μM of zinc is concentrated in β cells of pancreas within the dense core insulin secreting granules. Zinc is essential for storage of insulin and for processing of insulin in the body. In diabetic patients the content of zinc is greatly decreased in the pancreas [8,9]. Low levels of zinc in the blood plasma affect the islets of langerhans to secrete and produce insulin. Zinc also plays important role in the formation of insulin crystals, release of insulin and transport of insulin [10,11].

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