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Efficacy of spirulina in improving iron status for diabetics

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Abstract

Spirulina is a microscopic and filamentous cyanobacterium that contains essential amino acids, vitamins, minerals and anti-oxidative components. Ninety subjects with type 2 diabetes mellitus were randomly assigned to evaluate the iron status of the diabetics. The efficacy of spirulina supplementation was determined using the pre and post intervention of iron and total binding capacity (TIBC) of the diabetic subjects. 12 week supplementation of spirulina resulted in an appreciable highering levels. These results suggest that spirulina is a promising agent as a nutritional, therapeutic and functional food in diabetes management.

Keywords: spirulina, diabetes, iron status and therapeutic and functional food

Introduction

Diabetes mellitus is growing worldwide epidemic and represents one of the greatest threats to modern global health. Its incidence is rising rapidly and affecting human population with a significant impact on the health, nutritional status, as well as their life style system. Research studies reflect this concern that diabetes will become the most common cause of death. Diabetes prevalence doubled in the recent two previous decades and unfortunately it is predicted that this prevalence will be doubled in two future decades, too. The number of people with diabetes in the World is expected to double between the year 2000 and 2030. Diabetes is one of the forth primary causes of chronic related disorders. Altering lifestyle, physical activity levels and dietary patterns in Asian countries cause that the prevalence of diabetic patients reach to 10.6 persons per one thousand persons. Diabetes mellitus, a complex metabolic disorder, has been associated with diet for centuries. Diet plays a key role in the treatment of diabetes and proper nutrition is vital to prevent diabetes complications. Adequate metabolic control is best achieved with appropriate dietary intervention.

Methodology

In the development of the product, spirulina nutritive bar, four experimental trails were carried out using spirulina with varied proportions. Flax seeds, gingely seeds, ragiflour, greens and vegetables were used as remaining ingredients in development of nutri rich diabetic bar. The trail which was scored the maximum was considered as the standard formula. In the experimental trails, the spirulina nutritive bar was prepared by using 1gm, 2gm, 3gm and 4gm of spirulina respectively.

After the preparation of the bar, it was subjected to sensory evaluation. The product obtained using 1gm (T1), 2gm (T2), 3gm (T3) of spirulina was not accepted by the panel. Hence another trail was carried out with 4gm (T4) to overcome the limitations. In this trail (T4) spirulina nutritive bar was prepared with incorporation of 4gm of spirulina. It was subjected again to sensory evaluation. The product obtained in this trail (T4) was well accepted by the panel and got maximum score for all sensory attributes. Hence the experimental trail (T4) with 4gm of spirulina was standardized. The product was prepared and supplemented for diabetics for a period of 12 weeks.

Ninety subjects including male and female aged 30-60 years, free from serious complications were selected for the present study. Collection of data pertaining to general and diabetic information was done through a questionnaire.

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Dietary intake of the subjects was recorded through 24 hours recall method. The average intakes were calculated through nutritive value book. Biochemical analysis like thyroid, diabetic, lipid, liver, renal and haematological parameters were analyzed before and after the study for the subjects. Spirulina in the form of food (2gm) and capsule (500 mg) were supplemented to the experimental group (n 60 subjects),

whereas subjects of control group (n 30) was not supplemented. The supplementation was done for a period of 12 weeks. The subjects were advised to consume food and capsules as prescribed by the physician during the study period. Statistical analysis were analyzed by using SPSS version.



Results and discussions

In the present study the results on iron and TIBC of the three groups was observed and presented through graphical representation. There is a significant mean difference on food supplements and capsule group but not found with control

group for iron status simultaneously same mean difference was found with the food and capsule supplement group not seen much difference with the control group. The intake of iron increased significantly in all three groups after the study but the intakes should be still recommended for the subjects.

Table 1: Pre and Post intervention of Haematological profile of the subjects

Group	Profile	Pre		Post		t-value	p-value
		Mean	SD	Mean	SD		
Food Supplements	Iron	100.58	29.971	103.03	30.333	8.795	0.000
	TIBC	345.53	55.355	347.84	54.927	9.393	0.000
Capsules	Iron	81.10	19.665	85.82	20.928	7.527	0.000
	TIBC	311.90	59.379	323.53	61.207	7.084	0.000
Control	Iron	81.75	20.941	81.04	21.358	2.863	0.008
	TIBC	310.12	51.600	308.67	51.508	3.823	0.001

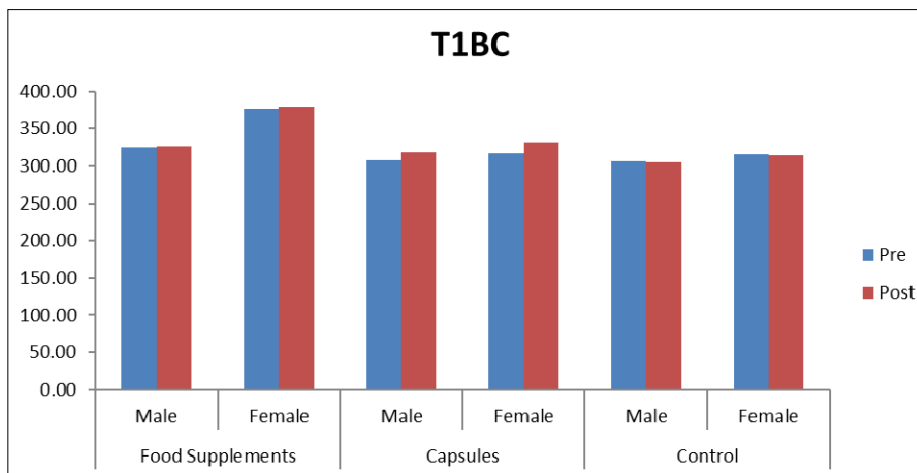


Fig 1: TIBC status of the diabetic subjects

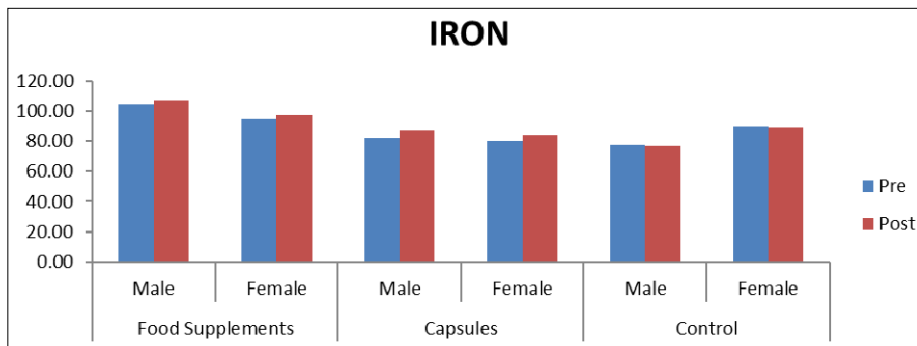


Fig 2: Iron status of the diabetic subjects

Conclusion

Due to the rapid industrialization, lifestyle and drugs, diabetes rating is increasing globally. To overcome or get rid from such limitations food has been designing by incorporating spirulina at various levels to get maximum consumer acceptance. In this context a “nutr-rich diabetic snack bar” was designed and developed with spirulina to satisfy the diabetics needs and wants. Spirulina underwent extensive safety studies with animals and humans that showed no toxic side effects. Many toxicological studies had proven spirulina’s safety. So, spirulina has been promoted as “the food of the future” with “exceptional constituents” that contribute high energy levels without any significant side effects.

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