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Recent Trends in Applied Zoology

Dr.D.S.Rathod
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Chapter 18

Potential use of *Spirulina platensis* in combating Malnutrition in India

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Abstract

Spirulina platensis is one of the free-floating nutrient rich microalgae. It is been as used as food in central Africa for centuries. In recent years it is emerged as Nutraceutical food of the century. The introduction and scope is immensely helpful in developing countries like India. In India States like Jharkhand, Bihar, Rajasthan has high rates of malnutrition and mortality rate due to malnutrition. So, use of Spirulina as food as well as medicine is must have step tackle this kind of problem. The commercial production of spirulina in India will help to implement Government Programmes to fight Malnutrition.Spirulina has anticancer properties, antioxidant properties, antiaging properties, therapeutic properties as well as it acts as trace supplement. Spirulina will be immensely helpful to country like India and will open door of opportunities in terms of Business and employment and to develop socioeconomic status

Keywords: *Spirulina platensis*, Nutraceutical, Malnutrition

INTRODUCTION

Spirulina can make a significant contribution to human and animal nutrition, environmental protection via wastewater recycling, and energy conservation. The features of Spirulina platensis were the focal point of the present review. Spirulina is Rich in proteins (60-70%), vitamins, and minerals, and is utilised as a protein supplement for malnourished children in impoverished nations[1]. The nutritional benefits of Spirulina are genuinely unique. Spirulina is the one of the richest natural source of protein yet identified, with its structure consisting of around 71 percent complete protein. Its protein content is five times that of meat and nearly three times that of the ubiquitous soybean. In addition to its unique amino acid profile, spirulina has an abundance of other valuable minerals, like as carotenoids, essential fatty acids, B complex vitamins, vitamin E, copper, manganese, magnesium, iron, selenium, and zinc[1]. Minerals and growth nutrients are only surpassed by milk and evening primrose oil in spirulina. Spirulina preparations are also utilised for their pharmacological activities in the treating a variety of disorders, such as hypercholesterolemia and atherosclerosis and to reduce body weight in obese persons[1]. Compounds having antioxidant activities, including polyunsaturated fatty acids, phycocyanin, and phenolics, are suggested to be the Spirulina components responsible for these potential health benefits[1]. Based on a chemical examination of the microalgae Spirulina, it is a great provider of macro- and micronutrients. This abundance of protein, vitamins, vital amino acids, dietary minerals, and necessary fatty acids gives

Spirulina numerous health advantages[2]Malnutrition has been universally acknowledged as a significant challenge to the development of underdeveloped and developing nations. In order to reduce the risk of Maternal, postnatal,neonatal nutritional immunity is an efficient way .[2]

Nutritive contest of sprirulina :

Component	Dry Weight
Protein	50-70
Carbohydrate	15-25

Spirulina vitamin content: per 10 gm

Vitamin A	23000 IU
Vitamin C	0 mg
Vitamin E	1.0 IU
Vitamin K	200 mcg
Vitamin B1	0.35 mg
Vitamin B2	0.40 mg
Vitamin B3	1.40 mg
folate	1 mcg
Biotin	0.5 mcg
Pantothenic acid	10 mcg

[3]

Total protein Percentage of Spirulina and o some of other protein sources

Food Protein source	Protein %
Spirulina	60-70%
Whole dried egg	47%
Chicken	19-24%
Fish	19.2-20.6%

Treatment in deficiency disorder: Spirulina is one of the rich source of Beta carotene and beta carotene is converted to Vitamin A in human Body . Vitamin A deficiency leads to Night blindness in humans so Spirulina in safe dose used as vitamin A supplement[9] Spirulina is also rich source of Vitamin B-12 which is necessary for RBCs formation.Its deficiency cause pernicious Anaemia.[9]

Spirulina has 10 times more iron than the most iron foods. Iron deficiency is one of the most common mineral deficiency worldwide especially in women. It cause anaemia. Also, Spirulina Iron 60% more easily absorbed than normal iron supplements.[10]

Spirulina is one of the calcium concentrated food and calcium deficiency lead to osteoporosis in adults[9] *Spirulina platensis* also has some of the essential fatty acids like Linoleic acid and gamma-linolenic Acid[9]

Malnutrition: The World Health Organization (WHO) defines "malnutrition" as deficiencies, excesses, or imbalances in an individual's consumption of nutrients and/or energy. Marasmus and kwashiorkor, two diseases brought on by a lack of proteins and energy, are among the effects of malnutrition that have received the most research. Protein-calorie

malnutrition (PCM) manifests as kwashiorkor and marasmus, which are both signs of growth failure (only protein deficiency)[3]
In developing nations, malnutrition, with its two components of protein–energy malnutrition and micronutrient deficiencies, continues to be a serious medical burden.
It is the most major cause for sickness and mortality on a
global scale, affecting hundreds of millions of pregnant women and young children in particular. Other than Marasmus and Kwashiorkor (the two forms of protein–energy malnutrition), iron, iodine, vitamin A, and zinc deficiencies are the most prevalent causes of malnutrition in underdeveloped nations. In many populations, a high prevalence of poor nourishment and infectious disease form a vicious cycle. Although treatment methods for severe malnutrition have been extremely proficient in recent years, the vast majority of patients (particularly in rural regions) have limited or no access to professional health care and are never treated in such settings. [3]

Spirulina As Super Food

Spirulina has all the potential to become alternative treatment as a food and Medicine in 21st century[3,4]
Spirulina has been applied in nutritive purpose to humans.It is used for human consumption in form of , tablets, capsules powder,extracts and recently spirulina products have been introduced like biscuits,noodles etc.Spirulina incorporated food shows properties like Antioxidant effects, good food stability, improved rheological and anti-staling properties. So, S. platensis revealed to be a good ingredient, with better colour stability over time.. Acceptance of this novel microalgae by children are more easier due to their trend for unusual preparing of foods with attractive colour and taste. Adults are more resistant to the acceptance due to the traditional moral and social factors [3]
S. platensis powder in food products like biscuits ,powders is very practical and functional. The demand for healty food is increased . Other Spirulina products formulated for weight loss and as a support for quitting addictions of drugs .

The Spirulina is marketed as pills, capsules,pastries,biscuits ,chocolate bars.The environmentally Compatible Spirulina does not need fertile ground, has a rapid growth, and takes less energy input and less water per kg than soya and corn proteins[3] . Due to its cost-effective and high nutritional value, Spirulina has used as a protein-rich animal feed for improving meat production and quality.[4]
In Countries like Tanzania introduction of Spirulina has potential for cure critical diet based health issues.[5] In developing countries like India,Bangladesh ,Zambia and other where major population of children are suffering from Malnutrition Spirulina supplementation is boon .[5,6]
Discussion: Spirulina has nutritive as well as medicinal properties so It is considered as Nutraceutical food [5]

1. It strengthens the immune system and raises CD4 counts, which is beneficial for HIV/AIDS patients.
2. Boosts the brain's RNA count for more energy
3. Spirulina contains more -carotene than a carrot by more than ten times, making it a great source of antioxidants that fight disease and improve eyesight and oral health[6]
4. Despite common misconceptions, the high levels of vegetable protein and amino acids found in Spirulina can increase muscular mass.

5. Enhances gastrointestinal and digestive health Contains calcium and iron supplements that are simple to absorb and great for mothers and kids.

6. Cancer risk is decreased by antioxidant qualities [6, 7] Has great anti-inflammatory effects, which is a crucial advantage for those with arthritis.

7. It shields against a variety of cardiac disorders Possesses anti-aging qualities. A very high level of B vitamins, which not only break down fats and carbohydrates but also additionally preserve cardiovascular health

Conclusion

As spirulina natural source of food supplement and has high nutritional Profile of vitamins, Minerals,trace elements the *Spirulina Platensis* can be used efficiently in country like India,.Due to its Nutritive as well as medicinal importance it should be absolutely introduced in the states having high malnutrition percentage.Spirulina is safe to use as food for children and adults as per WHO recommendations .Spirulina is next food for future of India and Universe

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