



ISO 9001:2000  
Reg. No. : RQ91/2688

# MUSLIM ARTS COLLEGE

THIRUVITHANCODE-629174, KANYAKUMARI DISTRICT  
TAMILNADU.

*National Level Seminar  
on*

**NUTRACEUTICALS AND FUNCTIONAL FOODS  
IN HEALTH AND DISEASE PREVENTION**

## *Certificate*

This is to certify that

Dr./Mr./Mrs./Ms. T. SHERIN MARY, ASSISTANT PROFESSOR of  
PG and Research Dept. of Nutrition and Dietetics

has participated in the

“National Level Seminar on

Nutraceuticals and Functional Foods in Health & Disease Prevention”

on 1<sup>st</sup> October, 2019 as a Delegate / Resource Person /

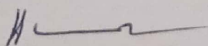
Presented a Paper / ~~Poster~~ entitled

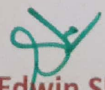
on EFFECT OF SUPPLEMENTATION OF IRON RICH BALLS  
FOR ANAEMIC SCHOOL GOING CHILDREN” (6-12 years).

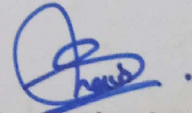
and won \_\_\_\_\_, organized by the Department of

Nutrition and Dietetics, Muslim Arts College, Thiruvithancode,

Tamil Nadu, India.

  
**Lion Dr H. Mohamed Ali**  
Secretary  
Muslim Arts College

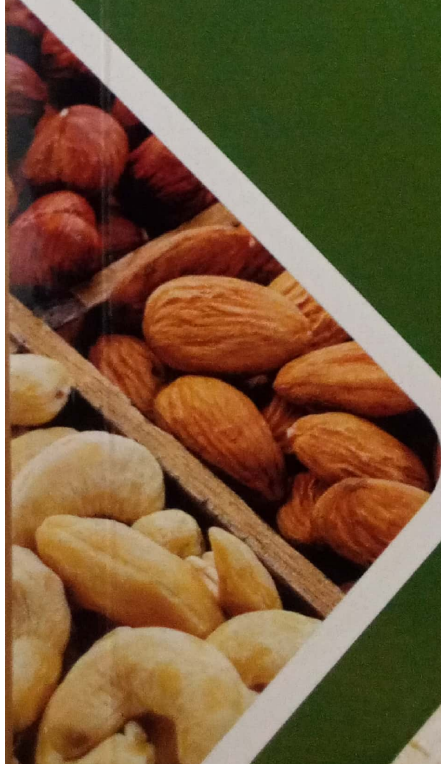
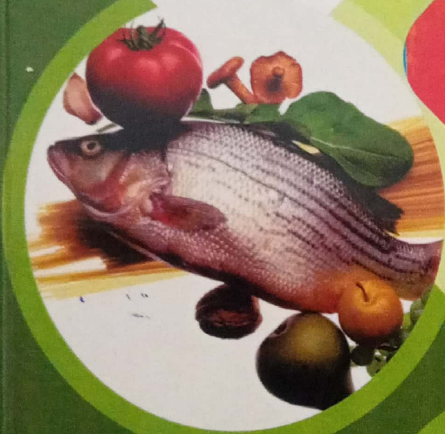
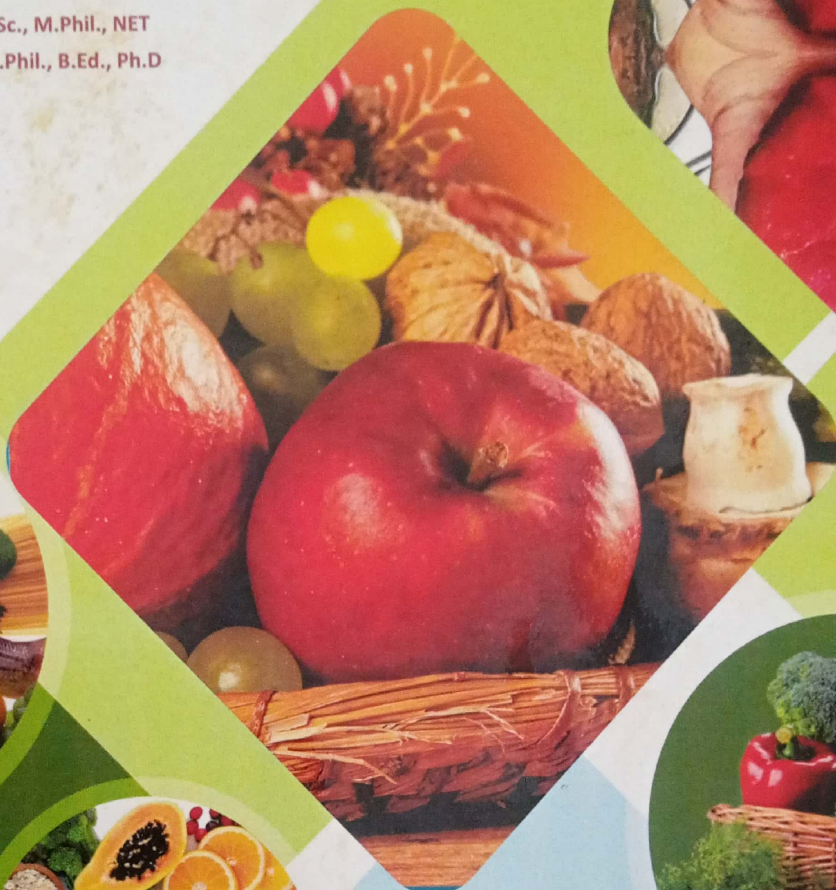
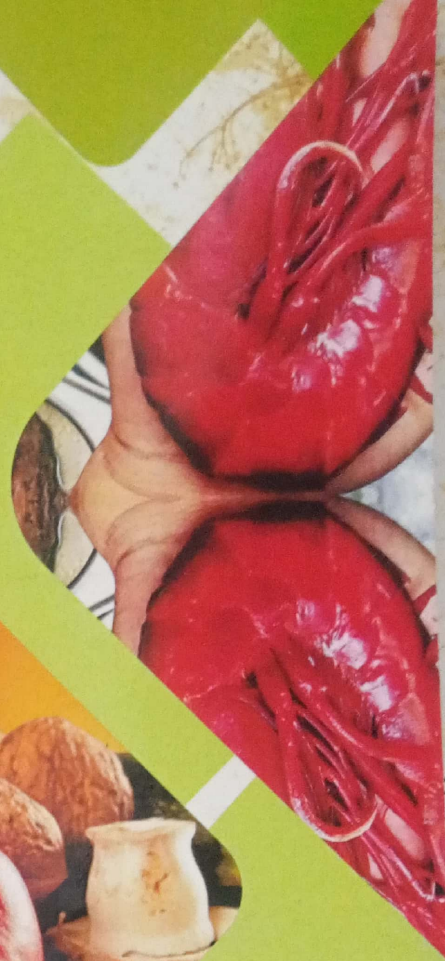
  
**Dr G. Edwin Sheela**  
Principal  
Muslim Arts College

  
**Mrs T. Sherin Mary**  
Head & Convener  
Department of N&D



# NUTRACEUTICALS AND FUNCTIONAL FOODS IN HEALTH AND DISEASE PREVENTION

Ms. T. Sherin Mary, M.Sc., M.Phil., NET  
Dr. T. Kumaran, M.Sc., M.Phil., B.Ed., Ph.D



Organized By



Department of Nutrition and Dietetics  
**MUSLIM ARTS COLLEGE**

THIRUVITHANCODE-629174,  
KANYAKUMARI DISTRICT, TAMILNADU.

HEAD OF THE DEPARTMENT OF NUTRITION & DIETETICS  
MUSLIM ARTS COLLEGE  
THIRUVITHANCODE - 629174

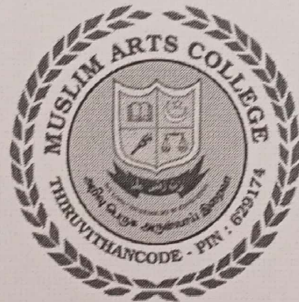
# NUTRACEUTICALS AND FUNCTIONAL FOODS IN HEALTH AND DISEASE PREVENTION

*Editor*

Ms. T. Sherin Mary, M.Sc., M.Phil., NET

Dr. T. Kumaran, M.Sc., M.Phil., B.Ed., Ph.D

HEAD OF THE DEPARTMENT OF NUTRITION & DIETETICS  
MUSLIM ARTS COLLEGE  
THIRUVITHANCODE - 629174



Department of Nutrition and Dietetics

**Muslim Arts College**

Tiruvithancode



Copyright © 2019 by B-DIGEST Publications

All rights reserved.

Reproduction or translation of any part of this book by any means without prior permission from the publisher is unlawful. Requests for permission or further information should be addressed to the publisher.

Rs.: 250/-

ISBN : 978-93-84734-79-4

Published by  
B-DIGEST Publications  
18/7, Devasahayam Street,  
Nagercoil, Kanyakumari District,  
Tamilnadu - 629 001. [www.bdigest.in](http://www.bdigest.in)

Printed by  
**Wimaxx**  
38, Bethesda Complex,  
W.C.C. Road, Nagercoil - 629 001.  
Ph : 04652 420680, 94 866 53 662



28.	<b>TO STUDY THE CUSTOMER PERCEPTIONS OF ONLINE FOOD ORDERING</b> <i>Merlin K Joseph &amp; M. Jagathish</i>	99
29.	<b>FORMULATION OF MUSKMELON SEED INCORPORATED VALUE ADDED PRODUCT BURFI</b> <i>P.Pavithra, N.Sruthi &amp; Mrs.J.Sinthia Juli</i>	103
30.	<b>EFFECT OF SUPPLEMENTATION OF IRON RICH BALLS FOR ANAEMIC SCHOOL GOING CHILDREN” (6-12 years)</b> <i>Beautlin Mistica Paul. M. D., Malar. S. &amp; Mrs. Sherin Mary. T.</i>	105
31.	<b>FORMULATION, STANDARDIZATION AND MICROBIAL ANALYSIS OF THE UTOPIA COOKIES PREPARED FROM CARROT AND OATS</b> <i>M. Pavithra, B. Sudha, M. Vel Selvi, S. Pauline Shekina &amp; Dr. S. Febina Bernice Sharon</i>	109
32.	<b>UNCULTIVATED NATIVE PLANTS USED AS SOURCES OF FOOD FOR INDIGENOUS PEOPLE OF AGASTHEESWARAM TALUK, KANYAKUMARI DISTRICT, TAMILNADU, SOUTH INDIA.</b> <i>Jerlin Deletta. G &amp; B. Parthipan</i>	114
33.	<b>IMPACT STUDY ON SUPPLEMENTATION OF PUMPKIN SEEDS AMONG SCHOOL GOING CHILDREN(7-12 YEARS)</b> <i>Mrs.J.Sinthia Juli , M. Jeevitha and A. Felicia Mercy Grace</i>	120
34.	<b>FORMULATION AND DEVELOPMENT OF HI – FI MULTI GRAIN NOODLES (PEARL MILLET, KODO MILLET, LITTLE MILLET, FOXTAIL MILLET &amp; WHOLE WHEAT)</b> <i>Mrs.G. Jenifa, J. Mevina Brown, Fathima Akila &amp; I, A. S. Karthika Sayee</i>	123
35.	<b>FORMULATION AND DEVELOPMENT OF SPICY KALACHIKAI PICKLE FOR PCOD AFFECTED WOMEN</b> <i>Mrs.G. Jenifa, V.Priya, Fathima Akila &amp; I, A. S. Karthika Sayee</i>	127
36.	<b>THE ROLE OF LOCAL FOOD IN THE TOURISTIC EXPERIENCE IN KANNIYAKUMARI DISTRICT</b> <i>R. Raghi &amp; Dr. M. Jagathish</i>	131
37.	<b>PREVENTION OF CALCIUM DEFICIENCY DISEASE USING STOLEPHORUS INDICUS</b> <i>S. Irfin Fathima &amp; Dr.J.Gracia</i>	134
38.	<b>DEVELOPMENT OF MULTIGRAIN CEREAL BARS</b> <i>U. Krishnapriyal ,C. Sathya Lakshmi</i>	138
39.	<b>EFFECT OF FOOD SUPPLEMENTATION AND IRON NUTRITIONAL STATUS OF SELECTED PREGNANT WOMEN</b> <i>Dr. N. Deepa</i>	142
40.	<b>VERMICOMPOSTING -A SUSTAINABLE TECHNOLOGY (CASE STUDY OF MARUTHANCODE VILLAGE, KANNIYAKUMARI DISTRICT)</b> <i>R.Lekshmi &amp; N.Rajeswari</i>	146

# EFFECT OF SUPPLEMENTATION OF IRON RICH BALLS FOR ANAEMIC SCHOOL GOING CHILDREN” (6-12 years)

Beautlin Mistica Paul. M. D., Malar. S. & Mrs. Sherin Mary. I.

Students, Dept. of Nutrition & Dietetics, Muslim Arts College, Thiruvithancode, Kanyakumari District

Head, Dept. of Nutrition and Dietetics, Muslim Arts College, Thiruvithancode, Kanyakumari District

## Abstract

Anemia is a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiologic needs, which vary by age, sex, altitude, smoking, and pregnancy status. Iron deficiency is thought to be the most common cause of anemia globally, although other conditions, such as folate, vitamin B<sub>12</sub> and vitamin A deficiencies, chronic inflammation, parasitic infections, and inherited disorders can all cause anemias. Children are particularly vulnerable to anemia and according to the World Health Organization an estimated 53% of school-age children suffer from Iron Deficient Anemia (IDA) globally. Hence the present study aimed to evaluate the efficacy of iron rich balls for anaemic school going children. 40 anaemic children are identified and categorized into experimental and control group. The experimental group was given 30g of iron rich balls daily for a period of 60 days. The haemoglobin level was checked before and after supplementation for all the samples. The result shows some extent of changes among the experimental group.

## Introduction

The school age period is nutritionally significant because this is the prime time to build up body stores of nutrients in preparation for rapid growth of adolescence. Iron deficiency in school age children, is associated with retardation of growth, decreased immunity, poor cognitive development resulting in lower Intelligence Quotient (IQ) and behavioural abnormalities. Therefore, it becomes very important to know the nutritional status of school going children. (Gowri, 2005). Anaemia is a condition that develops when the blood lacks enough healthy red blood cells. These cells are the main transporters of oxygen to the organs. If red blood cells are also deficient in haemoglobin, then our body isn't getting enough oxygen. (A. C. Antony, 2007).

Anaemia is very much wide spread more among females than males and higher among infants and children than adults. Severe anaemia with haemoglobin levels <8 g/dl is more frequently seen in severely undernourished children who also exhibit signs associated with deficiencies of calories, proteins, vitamins and minerals. (Srilakshmi, 2008). According to **National Institute of Nutrition (1991)** anaemia is most common in all the age groups of adolescent's girls of 20-25 percent irrespective of social class (Srilakshmi, 2008). A recent report of prevalence of anaemia amongst adolescent girls (UNICEF Study, 1998) indicates that the incidence of anaemia increases from 10

years onwards and continues to remain high till 18 years of age. (Srilakshmi, 2008). Recent WHO statistics indicate a worldwide anaemia prevalence of about 30% with higher rates in developing countries. Young children and pregnant women are the most affected group with an estimated global prevalence of about 40% and 50% respectively. Anaemia is also prevalent in non pregnant woman of 35% and 18% among adult males. (J. L. Minner, 2008). There are many types of anaemia. All are very different in their causes and treatments. Iron deficiency anaemia is the most common type, is very treatable with diet changes and iron supplements. (Reveiz, 2007)

In tropical countries, most cases of megaloblastic disease are due to folate deficiency associated with malnutrition. This anaemia in babies is more frequent in those born to mothers who also have a folic acid deficiency. Low folic acid absorption can occur in celiac disease and in tropical sprue. Folate absorption is impaired in pregnancy. (C. L. Bennett, 2008). Anaemia throughout the world is affecting mainly women in their reproductive years, infants and children. In both rural and urban areas in the tropics, this type of anaemia is extremely common. Iron deficiency is the case for 1/3 of patients suffering from anaemia. (G. Flores, 2008).

Nutritional anaemia is caused by the lack of any dietary essential that is involved in haemoglobin formation or by poor absorption of these dietary essentials. Some anaemia are caused by lack of either dietary iron or high quality protein by lack of pyridoxine (vitamin B<sub>6</sub>), which catalysis the synthesis of the haem portion of haemoglobin molecule, by a lack of vitamin C which influences the rate of iron absorption into the tissues or by a lack of vitamin E, which affect the stability of the red blood cell membrane. Copper is not a part of the haemoglobin molecule but aids in its synthesis by influencing the absorption of iron, its release from the liver or its incorporation into haemoglobin molecule. Folic acid, vitamin B<sub>12</sub> and pantothenic acid play a role in erythropoiesis. Ascorbic acid acts as hydrogen donor in conversion of folic acid into folic acid thus helps in DNA synthesis and haemopoiesis. Anaemia can be microcytic, nor-mocytic or macro-cytic. (S. M. Silver, 2007)

## Methodology

### Selection of Area

“Effect of Supplementation of Iron Rich Balls for Anaemic School Going Children” (6-12 years) is a supplementation oriented work and was carried among the school going children of Government High School, Palkulam area in Kanyakumari District.

### Selection of Sample

40 anaemic children were identified and categorized into experimental group (20 samples) and control group (20 samples). 20 children were selected for each group.

### Preparation and distribution of the Product

For a day 5 g of rice flakes, 5 g of roasted bengal gram, 5 g of amaranth, 5 g of dates and 10 g of jaggery were taken for the preparation of the sample. To the selected samples one ball of iron rich food (30 g) per day for a period of 60 days were given.

### Analysis of Data

Statistical treatments like arithmetic mean, was carried out to analyse the data.

### Result and Discussion

**Table 1. Mean Weight, Height & Haemoglobin Level of the Experimental Group and the Control Group**

Anthropometric Measurements	Reference Value (NCHS)		Experimental Group				Control Group			
	Boys	Girls	Initial		Final		Initial			
			Boys	Girls	Boys	Girls	Boys	Girls		
Weight (kg)	29.7 - 42.3	30.5 - 43.8	29.08	29.14	30.9	30.02	26.15	26.71	27.32	28.13
Height (cm)	134.8 - 153	135.2 - 154.6	132.86	146.41	132.87	146.43	137.07	139.71	137.07	139.71
Mean Haemoglobin Level (g)	12 - 14	11 - 13	11.13	10.3	12.92	11.38	10.95	10.77	10.3	10.72

**Table 2. Nutritive Values of Iron Rich Balls**

Ingredients	Amount (g)	Energy (kcal)	Protein (g)	Calcium (mg)	Iron (mg)	Carotene (µg)
Rice Flakes	5	34.6	0.66	2	2	0
Bengal Gram Roasted	5	18.45	1.25	2.9	0.475	5.65
Amaranth	5	0.95	0.045	13	1.925	11.25
Dates	5	7.2	0.06	1.1	0.365	0
Jaggery	10	38.3	0.04	8	0.2	0
Total	30	99.5	1.928	27	4.765	16.9

### Summary and Conclusion

The present study entitled “Effect of Supplementation of Iron Rich Balls for Anaemic School Going Children” was carried out with the objective for improving the haemoglobin level of the school children under the age group of 6-12 years. From the result it was observed that in the experimental group the haemoglobin level gets increased. Hence, we conclude that, iron rich balls is a low cost diet supplementation and it helped to increase the haemoglobin levels and prevent anaemia

### References

1. Agarwal K.N., Agarwal D. K., Anshus Sharma, Anaemia in Pregnancy Intestate Difference, ]2005.
2. Allen Marginal, Malnutrition and Human Function, 1993.

3. Abeloff M., Editors, "Hemotopoietic by Haemotologic lineage. In oncology, 2<sup>nd</sup> edition New York: Churchill Living Stone Publisher, 2000.
4. Bull N. L., and D. H. Buss Heam and Non-Heam in British Household Diets, 1980
5. Breymann, Christian "Iron Deficiency Anaemia", Blood Cells, Molecules and diseases
6. Chandrika S., Childhood and Adolescent Anaemia in india, 2006
7. Florentino Rudolfo F., The Burden of Iron Deficiency and Anaemia in Asia:- Vision 2020; Asian Congress of Nutrituion PP313-318, 2003
8. Florentino Rudolfa, WHO, Joint Report, 2003
9. Gawarika R., Mishra A. K., Prevalence of Anaemia in Adolescent Girls Belonging to Different Economic Group, 2005
10. Muharlal, Sumarno I., Kumari, Review of Supplementation Studies of Anaemia in Indonesia, Food Nutrition Bull, 1996; 17:3-6
11. Marshfield Clinic, Clinical Medicine and Research, Volumel, Prevention of Iron Deficiency Anaemia in Adolescence and Adult Pregnancies Paul, R. Meier, M. D. H. James a. Meyer, M. D., 2003