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Indian Food Composition Table 1939-2017: Review

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Abstract: ***Food composition table is the data of chemical constituents; energy yield and nutritive value of food brought first time by NIN in 1939 and has been constantly revised in the year 1951, 1971 1989 with more precision. However, 202 common foods with altered nutrient composition were noted. Significant rise infat content with reduction in protein and micronutrient was found. Hence in the year 2017 foods were sampled with valid sampling methods unlike earlier study adding 136 new components and Vitamin D_2 components. Analysis showed that green gram and black lentil has less protein by 10% and 6.2 % respectively than earlier. Milk and eggs has reduced prtein than before. Also, thiamine, magnesium and zinc declined in tomato, cabbage and potato by 41-56%. Micronutrients level rises in some foods like masoor and green leafy vegetables but reduced in other foods like apple has 60% less iron. Major reason recognized for this decline in nutrients content is rigorous agricultural practices resulting in stripping of soil quality. Further, increased level of carbon dioxide affecting plant nutrition by inhibiting nitrogen uptake and hence protein concentration in food. All the above findings demands immediate consideration by researchers, agricultural scientist and policy makers to find the substitute with more nutrient dense food and fortification policy to uplift health statistics by diluting micronutrient hunger in the country.***

Keywords: Food Composition Table, chemical analysis, decline food nutrition, deficiency disorder,soil nutrient

I. INTRODUCTION

Food composition table is the data of chemical constituents, energy yield and nutritive value of food based on chemical analysis. The first ever Indian Food composition Table(FCT) was brought out in the year 1939 by NIN Hyderabad and has been constantly revised in the year 1951,1971, 1989 and 2017 including more food stuff and with better analytic techniques.The base of all these revision was incidence and prevalence of deficiency disorder prevalent in the country, thus identifying rich sources of deficient nutrients was the chief objective. In 1939, team was headed by Aykroyd. They enlisted 218 food stuffs in addition to biological value of thirty six foods and percentage of available iron out of total iron in 26 iron rich food to drop Iron Deficiency Anaemia (IDA).he first revised version of Health bulletin by Aykroyd *et al.* in 1951consist of 298 foods adding data of new foods. The key outcome of this work was incidence and cure of pellagra demonstrated in India which was a major contribution in this field. Moreover, nutrient composition of undiluted buttermilk was found similar to milk except for the fat content, honey was reported to contain 80% fructose sugar and vitamin A was found plenty in animal origin food besides aamla as richest vitamin C source. the year 1963, Aykroyd, Gopalan and Balasubramanium contributed to revised edition with total 186 food adding fish, fat, edible oil and skimmed milk powder in the list. Six new elements were included in mineral data namely magnesium,sodium, potassium, copper, sulphur and chlorine. Percentage ionisable iron out of total iron was introduced in iron rich foods. Oxalic acid content of 830 foods was communicated. Further, phosphorus content was sub-categorised into total-phosphorus, phytin- phosphorus and percentage phytin phosphorus. Newly included components were biotin, choline, inositol, panthothenic acid, pyridoxine, vitamin K and folic acid. folate and reported that only animal source food contain vitamin B_{12}.During 1970s with the initiation of green revolution the prevalence of Vitamin A Deficiency (VAD) and malnutrition substantially decreased however, goitre was still burning issue. Consumption of sugar, fat and animal source food was slightly raised as compared to vegetable and food grain. This time vitamins were quantified in µg or mg/100g in place of IU/100g and amino acid content in mg/g N against g/g N.Thus,progressing towards precision.

II. NEED OF RE-EVALUATION

Itwas noticed that 202 common foods has altered nutrient composition despite several revision with time and advanced analytical technique. Significant rise in fat content and thiamine reduction was found along with other micronutrients. This generates the need to update composition table of food items. Now- a-days interest in food components and varieties is in trend among the people. Also, sampling procedure earlier followed was not well documented.Comparative analysis by Donald Davis *et al.* (2004) of 43 different vegetable and fruits data from US department of Agriculture Nutrition reported decline in the amount of calcium, phosphorus, iron, riboflavin, vitamin C and protein over past 50 years. Similar work published in British Food Journal in 2013 from

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the data of British nutrient from 1950 to 1980 and found regression in in calcium, potassium and iron by19%, 14% and 22% respectively.Several other studies also shows decline in food nutrition over past 70 year.

III. INDIAN FOOD COMPOSITION TABLE (IFC) 2017: DEVIATION

In January 2017, NIN issued revised Indian food composition table, all chief foods were sampled across the country with valid sampling methods from six geographical regions of the country, which represents food supply and consumption pattern among population. A total of 528 foods were enlisted with 158 constituents to tackle apparent nutritional issues. In this edition NIN presented Vitamin D_2 content in plant food for the very first time in the world.A major trend observed when food composition table of 1937 and 2017 compared for 7 nutrients in 10 foods. It was found that some nutrients declined significantly in cereal, pulses, vegetables and fruits. Moreover, milk and eggs has reduced protein than before.Analysis by NIN Hyderabad, showed that green gram and black lentil has less protein by 10% and 6.2 % respectively. Micronutrients level rises in some foods like masoor and green leafy vegetables but reduced in other foods. Also, thiamine, magnesium and zinc declined in tomato, cabbage and in roots and tubers by 41-67%however, potato has more iron than before while fruit has less vitamin C, thiamine and carotene by 6.4 to 22.7%. Carbohydrate showed significant 12% decline in green leafy vegetables. Change in mean value below 10% was found insignificant.

IV. CAUSES OF DECLINE

Major reason for this decline recognised as agricultural over exploitation practices and chemical deterioration of soil by artificial fertiliser resulting in stripping of soil quality which was assessed by Indian Institute of Soil Sciences, Bhopal and reported that Country's soil is deficient in zinc, iron, magnesium and copper by 43, 12.1, 5.4 and 5.4 respectively.Intensive production techniques depleting mineral level in the soil faster than the microorganism replenish them.These could also be due to increased harvest index and production. However, nutritional content in the food rely on the soil nutrients on which it is cultivated. Upsurge use of chemical pesticide reduces mineral uptake by plants.This raised the awareness of soil and environment quality among people as their deterioration led to decline in food nutrition. Moreover, lowered protein in fish and milk likely to be explained by the quality of animal feeds plus animals are yielding 3-4 times more per day than ever before.Further,increased level of carbon dioxide affecting plant nutrition by inhibiting nitrogen uptake and hence protein concentration in food. Journal Nature in 2014 published that wheat grown in elevated carbon dioxide level has less zinc, iron and protein by9.3, 5.1 and 6.3 % than wheat grown in optimum CO_2 level.

V. RECOMMENDATIONS

All the above findings demands immediate consideration by researchers to find the substitute foods with more nutrient density in today's world. Agricultural scientist need to invent plants variety with superior quality in terms of nutrients. Data in food composition table 2017 should be more appropriately used by dietician to help and educate people in making healthy choices. Also, fortification seems to be a noble alternative for consideration by policy maker to uplift health statistics by diluting micronutrient hunger in the country. Above all, we need more study and investigation to plug the underlying cause of decline food nutritional value.

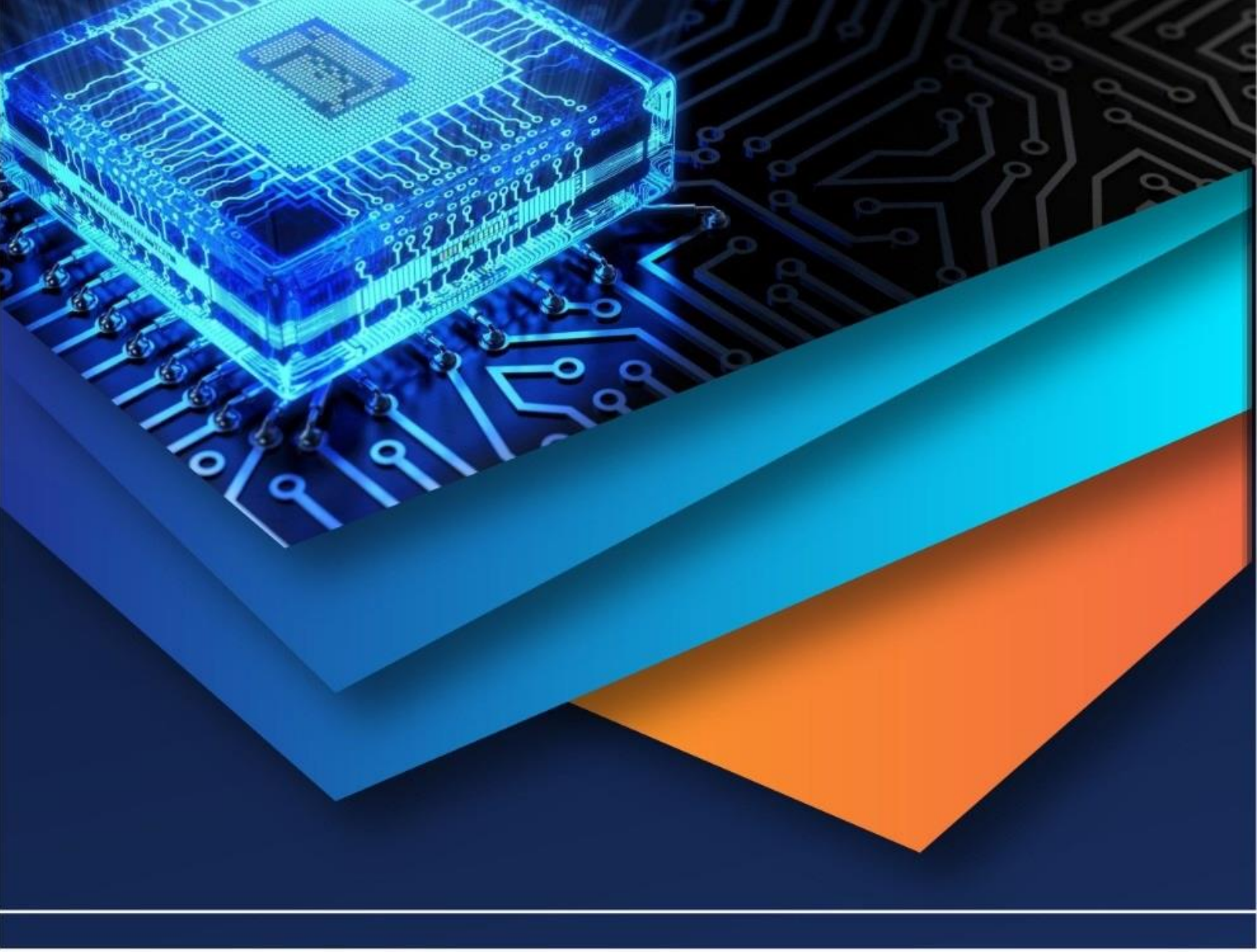
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