MEDWIN PUBLISHERS
Committed to Create Value for Researchers

International Journal of Biochemistry & Physiology
ISSN: 2577-4360

Nutritional Evaluation of Quinoa and its Practicability as a Principal Food in India: An Editorial

Mishra S*

Department of Biotechnology, SR Institute of Management & Technology, India

***Corresponding author:** Sanjay Mishra, Professor, Department of Biotechnology, SR Institute of Management & Technology, India, Tel: 9837096059; Email: sanjaymishra66@gmail.com

Editorial

Volume 9 Issue 2

Received Date: October 14, 2024

Published Date: October 28, 2024

DOI: 10.23880/ijbp-16000259

Keywords: Quinoa Food; Nutritional; Macronutrients; Micronutrients

Editorial

The Quinoa food produce has been practically grown since very long time and is instinctive to Southern American region. Back then in the region it was well-thought-out a holy crop [1,2]. Because of its stable nutritional profile, it is being progressively accepted in various economically advanced countries of the world. It bestows balanced macronutrients and micronutrients, enabling it practically quite noteworthy for the inhabitant that still has a significant number of undernourished and malnourished inhabitants [3]. India is basically having a population that is facing plenty of problems and the root of those problems lie largely in nutritional diet and dynamic lifestyle. Thus, more and more health food options, which are workable to be grown and made reasonable by the population is essential to face this task. Correspondingly, it is quite fascinating how Quinoa displays itself as one of such bases and requires to be encompassed in the staple diet [4,5]. This editorial on nutrition, micronutrients, certain facts and advantages associated with Quinoa and several means to integrate Quinoa in diet and its prerequisites in Indian framework compiled ahead.

Nutrition is principally classified as Macronutrients and Micronutrients. The investigation of quinoa cereal displays occurrence of all essential amino acids of proteins, meaningfully low gluten quantity, fibre, magnesium, vitamin group-B, iron, potassium, calcium, phosphorus, lipids, vitamin-E, pointedly high antioxidant compounds [6,7]. According to the examination accomplished on Quinoa its macronutrient and micronutrient have been explicated as below.

Macronutrients

Macronutrients are foremost nutrients, which are requisite in huge quantities and make available the body with energy to function both physically and metabolically. Basically, three macronutrients are proteins, fat and carbohydrates, which Quinoa as per the macronutrients contains as follows:

Proteins

The protein is one of the very significant components of human diets, helping to restore and build muscles to enable them sturdy. But because of mainstream population remain vegetarian with evading paid to eggs as well the protein is mainly derived from cereals and legumes [8]. These sources persist mediocre to meat and other nonvegetarian sources with respect to protein quantity as well as quality.

But once it comes to quinoa the major facts are considered [9-12] such as (i) Gluten free, high quality and quantity protein with respect to cereals such as barley, oats, maize and wheat The findings of average protein content from different seed varieties form the crop varies from 7.5 % to 22.1 %; (ii) The nutritional value of quinoa protein is analogous to milk and when cooked the protein efficiency rises; (iii) The high protein content of quinoa arises with higher amount of lysine that in most of the cereals originates as a limiting protein. Likewise, threonine and methionine were found comparatively higher; (iv) It was found that all essential and non-essential amino acids were found in Quinoa enabling it a cereal with balanced amino acid profile both qualitatively and quantitatively; (v) Accordingly, it meets the guideline from FAO/WHO /UNU, 1985 recommendations of amino

acid requirements for preschool, school children and adults; (vi) The abundant contentment of protein has therapeutic paybacks such as fatty acid metabolism, cancer metastasis prevention, calcium absorption, formation of antibodies, enhances immune function.

Carbohydrates

The most outstanding features of carbohydrates found in the Quinoa [12-14] are: (i) It is Gluten free which allow is to be fit even for the people who are Gluten Allergic, thus allowing them to complete their carbohydrate needs; (ii) The high fiber content of this grain aids in slow release of energy so becoming ideal source of carbohydrates. Relatively it has low number of sugars once compared to wheat and rice; (iii) Besides, it displays aptness of its usage for mingling it with other flours such as wheat flour and make other consumables; (iv) Fibre accounts for 6% of the grains total weight, and quinoa intake hence promotes intestinal transit, regulates cholesterol, stimulates the development of beneficial bacterial flora and aids prevent colon cancer.

Fats

Quinoa is an outstanding source of essential fatty acids with 2% to 9% fats contents with certain advantages [9,10,12,15] like (i) It has a low Omega-6 : Omega 3 fatty acids so advantageous for cardiovascular health, immune system, autoimmune disease and inflammation; (ii) In view of fatty acid profile of soybeans and maize resembled similarity in levels of linoleic (C18:2), oleic (C18:1), and linolenic (C18:3) fatty acid as that of quinoa bran oil. Therefore, it recommends a blend of high protein, high fat and higher fiber contents with gluten free carbohydrates; (iii) Nevertheless, the quality and quantity of lipids in quinoa enabled it a substitute oilseed crop.

Micronutrients

Several findings have revealed that Quinoa has minerals and vitamins that enables the absorption of proteins from grains more operative and appropriate, as fruits complement grains, thus making quinoa a good package for consumption [15]. The key vitamins and minerals present are magnesium, iron, B group vitamins, iron, potassium, calcium, phosphorus and vitamin E. The excellent quality of this grains is expressed by its high anti-oxidant nature [5,12]. Ratio of calcium to magnesium is 1:3 and calcium to phosphorus is 1:6, standing greater to that is recommended Ca:P ratio i.e. of 1:1.5 [16]. High content of calcium, magnesium and zinc in quinoa than wheat, corn, rice, barley, oats, rye enables it stand out from the rest [17].

Other Evidences and Advantages Associated with Quinoa

Besides above there are certain other facts and benefits pertaining to Quinoa. Those are enumerated as follows: (a) It has anti-oxidative, anti-hypertensive, anti-diabetic characteristics, henceforth can be used as nutraceutical and functional food ingredient [7,12]; (b) Effects of quinoa consumption making it appropriate food source for stable uptake of it in the diet is to relatively lower weight gain, an upgraded lipid profile, saponin content, latent antioxidant effects [7,12]; (c) Quinoa has revealed resistance to stress factors and is grown at high altitudes as well [12,13]; (d) Quinoa has exposed its ability to lessen the risk of ailments such as cardiovascular disorders, type-2 diabetes, many cancers, high blood pressure, obesity and is also a decent option for Gluten allergic people [18]. Improper food habits make metabolic phenomena suffer and impact health unfavorably hence too leading to many other diseases [12,18]; (e) This crop has been observed resistant to drought and has revealed good growth on poorly fertilized saline soil without irrigation [19]; (f) It is highly advantageous for consumers who are at higher health risk group, such as children, the elderly, athletes, lactose intolerant, women prone to osteoporosis, anemic, diabetic, dyslipidemia, obesity, and celiac disease [10,12]; (g) Studies have stated that a serving of quinoa (~40 g) meets a noteworthy part of the daily recommended intake for essential nutrients, mostly vitamins, minerals and essential amino acids [11] and it even concludes intake of compounds like phytosterols, phytoecdysteroids, bioactive peptides etc.; (h) Noteworthy bioactive compounds exhibiting antifungal, antiviral, anticancer, hypocholesterolemic, hypoglycemic, antithrombotic, diuretic and anti-inflammatory activities have been recognized [11]; (i) Buckwheat and Quinoa exhibited the highest antioxidant potential among cereals and pseudocereals studied [5]; (j) Quinoa helps reduce LDL in the body and raise HDL due to its omega 3 and omega 6 content [12].

Means to Integrate Quinoa in Diet and Its Prerequisite in Indian Framework

As highlighted above, there are several nutritional features and therapeutic advantages of quinoa available in literature. Now it is attempted connect how these advantages are a prerequisite for Indian population today that is facing the many challenges like malnutrition in children, pregnant and lactating mothers, undernourishment because of less consumption, undernourishment because of excess junk food consumption, effect on food security because of ecological imbalance, influence on nutritional security of the people living below poverty line, inactive lifestyle and food habits are causing ailments, healthy diets yet not carrying

out nutrient supplies, inaccessibility of a major produce that provides economic worth similar to wheat and rice crop [12,19]. The population of India tolerates the burden of about 24% of world's malnourished population and 30% of world's underdeveloped population of children under the age of 5 [12,20].

Apart from this, the becoming to be parents also faces the same issue that gets exaggerated once it is about the mother. In a study conducted in Kolkata, West Bengal India, about 28 % of women were noticed to be undernourished and belonging to lower socio-economic status family [21,22]. On the other hand, numerous studies revealed that in the urban population some undernourished were due to the reason that they did not consume the accurate quantity of food and some consumed junk food but that was junk [23]. This overstuffed yet undernourished population has explanations as follows to avoid junk food in staple diet. The apprehensions are as follows sensation of lack of energy, reflects poor concentration, high cholesterol levels, different cardiac disorders, low nutrition value, highly addictive nature, high chemical adiitives and preservatives [24,25]. Amongst all this there persists issue of ecological imbalance and deterioration of soil or rising salinity that lays its influence on food security and ultimately distresses every aspect of economy and public policy [12]. Besides, once it comes to the problem of farming incomes quinoa proposes a widespread platform to the farmers to accept this crop as its feasting is gaining momentum in the developed world and here and now in developing countries. Because of its capability to grow in drought, unfertilized saline soil, un-irrigated strata; it can be speedily grown with low investment and providing advanced returns.

The beneficial effects of crops including quinoa or its products were obvious when it was given to a sample group of students aged in the range 18 to 45 for 30 days and they exhibited the lowered total cholesterol, lowered Triglycerides, lowered LDL, confirmed helpful in averting and managing cardiovascular disorders [12,25]. Above are the few approaches, which can be executed to integrate Quinoa in human principal diet in view of relishing the paybacks altogether globally. This necessitates testing of varieties by the Indianagricultural research agencies as apparent from the research accomplished so far [26], reflecting variances made by the varieties and strata, on which it was grown, in the produce delivered. Sustainable tactic is mandatory before starting to grow as the demand is high in developed countries and could be extreme in India as well, thus the economic paybacks may induce the farmers to grow it in maximum triggering same devastation to soil nutrition [26].

Conclusion and Future Perspectives

Quinoa is an extremely nutritious pseudo cereal, having immense advantages concerning with health and many metabolic and genetic disorders. It can be used broadly in India by integrating it via several agencies and government backing as it will be supportive to attain many health and nutrition goals and in total wellbeing of the population. This editorial showed that the attainment of high grain yield besides good grain quality in quinoa cultivation is likely under the hot-arid extreme environmental conditions viz. high salinity and drought of the Sahara Desert. This assisted to recognize quinoa genotypes predominantly appropriate for cultivation under such conditions of this region. Nevertheless, it should be noted that the conditions of the field trial permitted each genotype to express its latent distinctly. Although, some genotypes are shown to be fascinating in terms of yield, others have revealed high performance in terms of quality. Consequently, the decision for growing precise quinoa genotype has to depend on and respond to the production objective.

Acknowledgement

Author is grateful to Mr. Pawan Singh Chauhan, Chairman, SR Institute of Management & Technology, Bakshi Ka Talab, Lucknow- 226201, U.P., India for his generous support and throughout inspiration for accomplishment of this study. Besides, author is thankful to members of Board of Directors, SR Institute of Management & Technology, Bakshi Ka Talab, Lucknow- 226201, U.P., India for providing necessary facilities and time-to-time encouragement for exploring the R&D in the area of Biotechnology.

References

1. Rocio GL, Laura P, Victoria SN, Fernando B (2023) Protein profiling and classification of commercial quinoa grains by MALDI-TOF-MS and chemometrics. Food Chem 398: 133895.

2. Viktoria A, Silva PM, Massuela DC, Khan MW, Alicia H, et al. (2020) Quinoa (Chenopodium quinoa Willd.): An overview of the potentials of the "Golden Grain" and socio-economic and environmental aspects of its cultivation and marketization. Foods 9(2): 216.

3. Kiran A, Wakeel A, Mahmood K, Mubaraka R, Hafsa, et al. (2022) Biofortification of staple crops to alleviate human malnutrition: Contributions and potential in developing countries. Agronomy 12(2): 452.

4. Oustani M, Mehda S, Halilat MT, Chenchouni H (2023)

Yield, growth development and grain characteristics of seven Quinoa (Chenopodium quinoa Willd.) genotypes grown in open-field production systems under hot-arid climatic conditions. Sci Rep 13: 1991.

5. Filho A (2017) Quinoa: Nutritional Aspects. Journal of Nutraceuticals and Food Science 2: 1-3.

6. Adamczewska SK, Sowinski J, Jama RA (2021) The effect of sowing date and harvest time on leafy greens of quinoa (*Chenopodium quinoa* willd.) yield and selected nutritional parameters. Agriculture 11(5): 405.

7. Chavan M, Jain NK, Kumar V, Jain SK, Agarwal C, et al. (2019) Reviews on agronomical and functional aspect of quinoa. Int J Chemical Stud 7(1): 2173-2178.

8. Mariotti F, Gardner CD (2019) Dietary protein and amino acids in vegetarian diets-A review. Nutrients 11(11): 2661.

9. Sharma V, Chandra S, Dwivedi P, Parturkar M (2015) Quinoa (Chenopodium quinoa Willd.): A nutritional healthy grain. Inter J Adv Res 3(9): 725-736.

10. Srujana MN, Kumari B, Suneetha W, Prathyusha P (2019) Processing technologies and health benefits of quinoa. Pharma Innov J 8(5): 155-160.

11. Barakat H, Khalifa I, Ghazal GA, Shams A, Denev PN (2017) Chemical composition and nutritional value of seeds from new quinoa accessions, cultivated in Egypt. Bulgarian chemical communications 49(D): 231-238.

12. Yadav P, Suryavanshi P, Chauhan SK, Mishra S (2021) Quinoa: A review on nutritional analysis and its viability as a staple food in India. IOSR J Environ Sci, Toxicol & Food Technol 15(3): 16-20.

13. Mustafa T, Suleyman T (2017) Studies on the adaptation of Quinoa (*Chenopodium quinoa* Willd.) to eastern Anatolia region of Turkey. Agrofor Int J 2(2): 33-39.

14. Bhathal S, Kaur N (2018) Nutritional analysis of gluten free products from Quinoa (*Chenopodium quinoa*) flour. Int J Pure App Biosci 6(2): 826-836.

15. Minocha S, Thomas T, Kurpad AV (2017) Dietary protein and the health–nutrition-agriculture connection in India. J Nutr 147(7): 1243-1250.

16. Lutz M, Godoy LB (2017) The Revival of quinoa: A crop for health. In tech Open 3: 37-54.

17. (2011) Quinoa: An ancient crop to contribute to world food security. FAO Reports.

18. Singh S, Singh R, Singh KV (2016) Quinoa (*Chenopodium quinoa* Wild), functional superfood for today's world: A review. World Scientific News 58: 84-96.

19. Aijaz R (2017) Preventing hunger and malnutrition in India. Observer Research Foundation Report 182: 2-12.

20. (2020) Global Hunger Report. Foreword pp: 1-80.

21. Mallik S, Choudhury K, Majumdar S (2017) A study on nutritional status of lactating mothers attending the immunization clinic of a Medical College Hospital of Kolkata, West Bengal. JOSR J Dental Med Sci 16(9): 30-34.

22. Xavier A, Amgiasvanth M (2020) Dietary pattern and nutritional status among lactating women in North Karnataka. Inter J Community Med Public Health 7(5): 1875-1879.

23. Ashakiran, Deepthi R (2012) Fast foods and their impact on health. JKIMSU 1(2): 7-15.

24. Bhaskar R, Monika O (2012) Junk food: Impact on health. J Drug Delivery & Therapeutics 2(3): 67-73.

25. Mishra S, Dwivedi SP, Singh RB, Shastun S, Abramova M, et al (2015) Role of oxidative stress in the pathogenesis and progression of coronary artery disease: An overview. World Heart J 6(4): 283-302.

26. Miranda M, Galvez A, Martinez E, Lopez J, Rodriguez M, et al. (2014) Genetic diversity and comparison of physicochemical and nutritional characteristics of six quinoa genotypes cultivated in chile. Cienc Tecnol Aliment 32(4): 835-843.