

NUTRIENT DENSITY, NUTRITIONAL VALUE, AND COST OF NUTRIENTS OF MEAT PRODUCTS AND NON-MEAT FOODS HIGH IN PROTEIN

Benjamin M. Bohrer¹*

¹Department of Food Science, University of Guelph, Guelph, Ontario Canada

*Corresponding author email: bbohrer@uoguelph.ca

Abstract – In recent years, consumers are becoming more diverse when choosing foods to consume. Specifically, there is an increase around the world in the population and percentage of people who choose to consume a non-meat diet, and utilize non-meat foods as their source of protein. This research focused on comparing nutrient density, nutritional value, and cost of nutrients of meat products and non-meat foods high in protein. Twenty-five meat products (beef, pork, lamb, and poultry), six fish products, and eighteen non-meat foods were compared for nutrient composition. Nutrient composition information was used to assign value based on nutrient density. Nutrient cost was expressed in nutrients available per US dollar and prices were assessed from the USDA economic research service and the USDA agricultural marketing service when available, and with a marketplace assessment when information was unavailable otherwise. Energy, protein, total fat, saturated fat, cholesterol, vitamin B12, sodium, phosphorus, iron, and zinc content in protein-rich foods were analyzed for nutrient density and value. Individual comparisons for the cost of nutrients was generated from this dataset that will enable further research and categorization of high protein foods.

Key Words – consumer nutrition, protein, sustainable protein

I. INTRODUCTION

In most places in the world, the consumption of meat is held in high esteem and is widely regarded as a food product with high nutritional value and desirable eating experience [1, 2, 3]. Specifically, meat and meat products are considered an excellent source of zinc, heme-iron, bioavailable B vitamins, protein and essential amino acids [3, 4, 5, 6]. The percentage of individuals choosing not to consume meat is a relative small percentage of people (estimated 2 – 10% in developed nations) [7, 8, 9]. However, this small percentage of people still make up a significant population of people around the world, and this demographic of people have a significant influence on the dynamics of the food marketplace. There have been many studies evaluate and discuss the health benefits and challenges of a well-planned vegetarian or vegan diet [4, 5, 10, 11, 12]. However, it is important to consider and review the nutritional content of the food products making up a well-planned vegetarian or vegan diet when compared with the food products making up a more traditional meat-consuming diet. Thus, the objective of this research was to investigate the nutrient density, nutritional value, and cost of nutrients in meat products and non-meat products high in protein.

II. MATERIALS AND METHODS

Twenty-five meat products (raw, unprepared beef, pork, lamb, and poultry), six fish products (raw, unprepared tuna, salmon, pollock, halibut, tilapia, and catfish) and eighteen non-meat foods (chicken eggs, Greek yogurt, kale, lentils, broccoli, green peas, spinach, black beans, pinto beans, lima beans, kidney beans, great northern beans, soft tofu, firm tofu, hummus, peanuts, almonds, and cashews) were compared for nutrient composition. Nutrient composition information was used to assign value based on nutrient density. Cost of nutrients was evaluated on a basis of nutrients per US dollar. Nutrients were sourced from USDA food composition database (2016). Estimated retail costs were sourced from the USDA agricultural marketing service (2016), the USDA economic revenue services (2013), and current marketplace assessment, when there were no values reported by the USDA.

III. RESULTS AND DISCUSSION

The average of the twenty-five meat products was 1.81 times greater in protein density (19.71 g vs. 10.90 g/100 g sample) compared to the average of the eighteen non-meat foods. The average of the twenty-five meat products and the average of the six fish products were relatively similar in protein density (19.71 g vs. 19.78 g/100 g sample). The cost of protein (expressed as grams of protein per US\$) was similar when comparing the average of twenty-five meat products and eighteen non-meat foods (23.45 g/US\$ vs. 22.47 g/US\$). The cost of protein was much cheaper in meat products and non-meat foods when compared with the average of the six fish products (8.77 g/US\$). Comprehensive information and comparisons of nutritional density, nutritional value, and cost were also conducted for energy, fat, saturated fat, cholesterol, vitamin B12, sodium, phosphorus, iron, and zinc in meat products, fish products, and non-meat food products high in protein.

IV. CONCLUSION

Meat is an excellent source of protein, vitamins, and minerals when compared to non-meat foods products deemed to be a source of high protein. Consideration needs to be made when replacing meat in the diet with non-meat foods, because most non-meat foods contain only 20 – 60% protein density on an equal serving size basis. Additionally, when the cost of protein was evaluated, meat and non-meat foods had a similar cost when expressed as grams of protein per currency.

ACKNOWLEDGEMENTS

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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