

Instant Energy Products: An Analysis

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Abstract— *In today's era, our eating habits play a significant role in increasing our number of years. We can always stay healthy if we pay attention to what we eat and drink. The proposed research focuses on packaged foods and their nutritional value. The study also conducted a comparative analysis of children's BMI and their balanced diet. Research has divided food items into different nutrition categories and analyzed which food is required by different types of humans in various conditions based on their age, workout, pregnancy, and disease. The proposed research is based on a primary dataset collected by students for study purposes, and it has been done to raise public awareness. This research also inspires the food item company to make its product more useful.*

Keywords- BMI, nutrition, Protein, carbohydrates, sugar.

I. INTRODUCTION

Food is one of the essential requirements for every living being. Every food contains some nutrients which provide us energy to live. Generally, energy is measured in calories. Energy consumption may differ from person to person on the basis of age, sex, weight, and height. It may also depend on the level of activity of a person. In today's life eating balanced food is a challenging task for us. We are generally used to eating junk foods and other edible items such as biscuits and chocolates. Nowadays we are surrounded by several diseases such as hypertension, high blood pressure, obesity, sugar, and other dangerous diseases. These diseases are happening because of our day-to-day casual eating habits. We usually get hungry after some work or after a period of time. We require energy after feeling tired. So we eat some chocolates or cookies for quick energy.

This research has analyzed the products which can be used by gym persons, pregnant women, old age persons, young guys, athletes, and children under 18 years. Research collected the primary dataset by using the google form for collecting the questionnaire answers on the basis of various instant energy products then preprocessing has been done on the collected dataset by removing the duplicates and missing values by using MS Excel tool and python. The collected dataset keeps the nutrients such as energy, protein, carbohydrates, sugar, fats, minerals, etc.

A. Kinds of nutrients

In a scientific way [2], nutrients are divided into different major groups: such as carbohydrates, fats, protein, minerals, vitamins, and water.

Carbohydrates: Carbohydrates provide the fastest energy to the body after prolonged fasting. It is also called the first energy source. Near about, all the carbohydrates we eat come from plants. Especially carbohydrates can be found in cereal grains and plants like potatoes and paddy (rice). In fact, the sugars found in fruits and vegetables, etc. are also

carbohydrates. Sugarcane is a rich example of carbohydrates.

Fats: Fats provides about twice more energy than carbohydrates. Fats are generally understands as a bad thing but nowadays recent researches proved that the healthy fats are important for the body. According to Harvard Medical School [3], fat supports many of your body's functions such as vitamin and mineral absorption, blood clotting, building cells, and muscle movement.

Protein: Proteins are also known as tissue-builders. It helps in keeping the bones, skin, and muscles healthy. It is also required for body processes. There are various forms of proteins that have different functionality in the human body. Proteins can be found in fish in very rich amounts. Eggs and other animal products are also the sources of protein.

Micronutrients: Minerals and vitamins are called micronutrients. It is named micronutrients because it is needed in a very small amount. Minerals include calcium, phosphorus, iron, iodine etc. This might needed in small amount in our body but it plays a very important role as it provides strength to our bones, contribute in healthy blood and iodine helps in prevention of goiter.

Vitamins: Vitamins helps us to keep a safe distance from diseases which mean it helps us to stay healthy. There are 13 vitamins which are required to our body to function properly. Example- vitamin b1 (thiamine) helps in regulate the release of energy from carbohydrates etc.

B. Hypotheses and considerations

When it comes to the gym, there are different exercises for different weights. Weights and exercises are different and depend on the person to people. We assumed that a gym guy is working out normally in the gym and burning an average number of calories. Also, the amount of energy required completely depends on the workout and eating environment.

Similarly, all considerations have been made for the elderly, pregnant women, young men, and children under the age of 18. We believe that approximately every old age man will require the same amount of energy and that he may be a

sugar patient. We assumed that sugar disease primarily affects the elderly.

II. RELATED WORK

The answer to our inquiry has been discovered through analysis of the many records kept by earlier scholars. Numerous researches have been done on the protein and energy requirements of athletes and gym users. Here is a quick summary of some of the most important studies in this field. It is advised that athletes and gym goers ingest enough carbohydrates and fat to support their strenuous workout and meet their energy needs. Athletes should ingest 1.2–1.7 grams of protein per kilogram of body weight and roughly 3-5 grams of carbohydrates per kilogram of body weight according to the American College of Sports Medicine. About protein consumption, getting enough protein is crucial for athletes and gym goers since it supports muscle growth and repair. According to the International Society of Sports Nutrition, athletes should consume 1.4 to 2.0 [8].

Exercise performance and recuperation can also be affected by the time of nutrition consumption. Before and after exercise, consuming carbs and protein can enhance muscle recovery and glycogen resynthesize. There are numerous nutritional supplements that can benefit athletes and gym-goers in supplying their protein and energy requirements. These include of liquids for recovery, energy gels, and protein powders. It is crucial to remember that supplements shouldn't take the place of a healthy diet, and that it is always preferable to obtain nutrients from whole foods wherever feasible. It's crucial to remember that each person's requirements for protein and calories can differ depending on their age, sex, body composition, and level of exercise. So consumer should never hesitate to consult a sports dietitian or other healthcare expert.

III. ANALYSIS

We have used Microsoft Excel and python for analyzing our dataset. We have collected 150 food item details with their nutrition's values as primary data set by floating the google survey form. As we know, fitness is important in increasing an individual's healthy lifespan and ensuring that they are capable of performing physical labor effectively. Developing countries, such as India, have low median ages, which is an ideal time to focus on fitness. Nutrition is an important factor in bodybuilding success. However, current statistics show that India has high rates of malnutrition, which leads to poor physical capability. The Body Mass Index is one way to determine whether a person is nourished or malnourished. In adults, there is a clear distinction between being overweight, fit, and underweight [1]. The following information is contained in the table below:

Table 1: BMI range

Category	BMI Range
Underweight	<18.5
Normal	18.5 - 24.9
Overweight	25.0 - 29.9
Obese	>30

However, for children, BMI is determined by two major factors that adults do not consider: age and gender.

Table 2: BMI for boys

Category	Age/years												
	5	6	7	8	9	10	11	12	13	14	15	16	17
Underweight	<13.9	<13.8	<13.8	<13.9	<14.0	<14.2	<14.5	<15.0	<15.5	<16.0	<16.5	<17.0	<17.7
Normal	13.9-16.8	13.8-17	13.8-17.7	13.9-18.0	14.0-18.6	14.2-19.5	14.5-20.2	15.0-21.0	15.5-21.8	16.0-22.6	16.5-23.4	17.0-24.2	17.7-24.9
Overweight	16.8-18.0	17.0-18.2	17.7-21.1	18.0-20.0	18.6-21.0	19.5-22.0	20.2-22.1	21.0-24.2	21.8-25.2	22.6-26.0	23.4-26.8	24.2-27.6	24.9-28.2
Obese	>18.0	>18.2	>21.1	>20.0	>21.0	>22.0	>22.1	>24.1	>25.2	>26.0	>26.8	>27.6	>28.2

Table 3: BMI for Girls

Category	Age/years												
	5	6	7	8	9	10	11	12	13	14	15	16	17
Underweight	<13.6	<13.5	<13.5	<13.6	<13.8	<14.0	<14.3	<14.8	<15.2	<15.8	<16.3	<16.8	<17.2
Normal	13.6-16.8	13.5-17.0	13.5-17.7	13.6-18.2	13.8-19.0	14.0-20.0	14.3-21.0	14.8-21.8	15.2-22.5	15.8-23.3	16.3-24.0	16.8-24.4	17.2-25.2
Overweight	16.8-18.0	17.0-18.8	17.7-19.8	18.2-20.8	19.0-21.8	20.0-23.0	21.0-24.0	21.8-25.2	22.5-26.3	23.3-27.2	24.0-28.2	24.4-28.8	25.2-29.6
Obese	>18.0	>18.8	>19.8	>20.8	>21.8	>23.0	>24.0	>25.2	>26.3	>27.2	>28.2	>28.8	>29.6

The United Nations International Children's Emergency Fund (UNICEF) has released studies in 2020 [9] worldwide, indicating the percentage of children in each country who are either underweight or overweight.

Table 4: Weight categorization of Children by Country

Country	Children Between ages 5-19	
	Percentage Underweight	Percentage Overweight
India	27	7
Indonesia	10	15
China	3	29
Japan	2	14
Singapore	2	22
USA	1	42
United Kingdom	1	31
Norway	1	27
France	1	30
Switzerland	<1	22

India has a significantly higher percentage of underweight children than all other developed countries in the chart, highlighting the fact that malnutrition is a major issue in India. Although BMI is widely used to assess a country's nutrition, actual nutrient intake is a more conclusive method. Nutrition is important during childhood development because it is responsible for both physical and mental growth. Adolescent growth is characterized by adequate caloric, protein, vitamin, and mineral consumption.

The Mayo Clinic and Kaiser Permanente [10] both provide information on the recommended amounts of calories, proteins, and carbohydrates for children between the ages of 4 and 18, according to various age groups. The information is

compiled in the table below:

Table 5: Distribution of nutrients for a balanced diet in children

Age group	Protein(g)	Carbohydrates(g)	Fats(g)	Calories(kcal)
4-8(Male)	85-100	150-250	33.3-55.6	1,200-2,000
4-8(Female)	85-100	150-225	33.3-50.0	1,200-1,800
9-13(Male)	110-170	200-325	44.4-72.0	1,600-2,600
9-13(Female)	110-170	175-275	38.9-61.0	1,400-2,200
14-18(Male)	160-200	250-400	55.6-88.0	2,000-3,200
14-18(Female)	110-170	225-300	50.0-66.0	1,800-2,400

In India, a rice-based Indian meal may suffice to meet caloric requirements. The same cannot be said for protein content. According to Forbes India, the Indian Market Research Bureau's report indicates that protein deficiency affects more than 80% of Indians. A typical diet includes one cup of dal, one glass of milk, and one cup of yoghurt. To meet the daily protein requirement, one would have to consume numerous bowls of dal or several glasses of milk per day.

This research also focus on different categories of person such as children under age of 18, Person who are doing gym, old age persons, young age persons, pregnant woman and athletes and if they are out of station and they required instant energy to survive. According to International Society of Sports Nutrition, a person doing moderate to intense physical activity, the recommended intake is between 1.3 g – 1.6 g per kilogram of body weight per day. However, consuming up to 2 g of protein per kg of body weight per day is safe for healthy adults and an older people who are moderately or severely ill may require between 1.2 to 1.5 g of protein per day per kg of body weight. In this study we have used online gram to calorie convertor tool. Similarly the average level of sugar intake for men is 36 grams, For Women is 25 grams, and for children is less than 24 grams.

A. Analysis of packaged food Items on the basis of energy

This analysis is based on the minerals and energy provided by the food. People can eat snacks when they are away from home and working for a living. Snacks may include biscuits and chocolates, as well as salty and soft drinks. According to the printed information on their sachets, these snacks contain some nutrients and minerals. We gathered information about these products and analyzed their significance based on their nutritional values.

Table 5: Data Samples of different food items

[c] data_df.head(10)

	Brand Name	Product Name	Flavor	Energy	Protein	Carbohydrate	Total Sugars	Added Sugars	Total Fat	Saturated Fat
0	Britania	Tiger Krunch chocoChips	Sweet	483.0	6.00	72	30	28.2	19.00	8
1	Haldiram's	Aloo bhujija	Salty	577.3	9.70	44.4	3.7	0	40.10	6.5
2	Haldiram's	Bhujija	Salty	579.6	14.10	39	3.1	0	40.80	6.7
3	Bikaji	Bhujija	Salty	609.0	14.00	37	0	0	45.00	14
4	Bikaji	All in one(kuch kuch)	Salty	572.0	17.00	38	11	0	39.00	16

5	Let's Try	Dal Biji	Salty	526.5	17.42	44.1	0	0	31.14	0
6	Cadbury	Oreo(Strawberry)	Sweet	483.0	5.20	71.5	38.4	38.3	19.70	9.8
7	Cadbury	Oreo	Sweet	483.0	5.20	71.9	38.8	38.7	19.60	9.7
8	Parle	Fabio	Sweet	477.0	4.90	74.6	41.9	0	17.70	8.7
9	Parle	Fabio Strawberry		410.0	8.40	75.4	40.3	0	16.40	8

10 rows x 22 columns

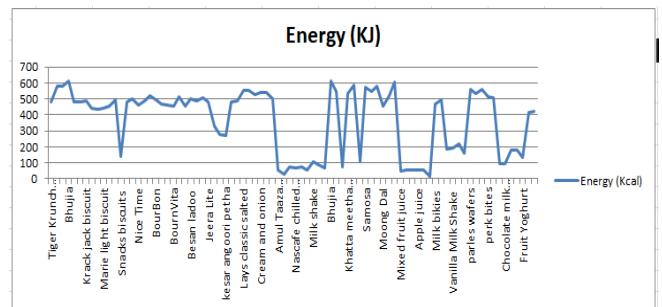


Fig 1: Energy from products

As illustrated in fig. 1, different food items retain varying levels of energy based on the printed values on their packaging. If anyone requires instant energy for survival, they can select one of the products from the list.

B. Analysis of packaged food Items on the basis of Protien & Carbohydrate

According to data samples, various food items retain varying levels of carbohydrates and protein based on the printed values on their packaging, as shown in fig. 2.

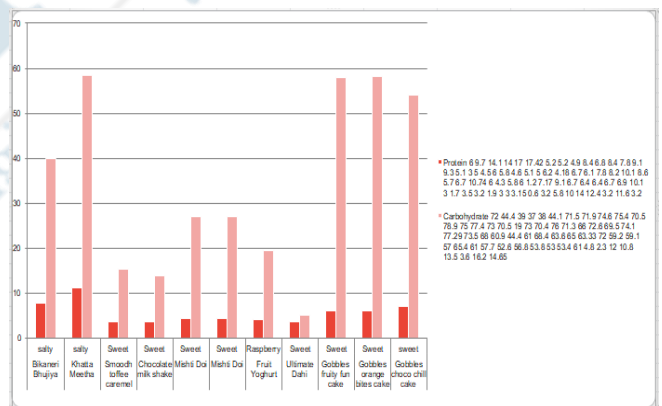


Fig 2: Protein & carbohydrate based food items

As we all know, we need a sufficient amount of protein and carbohydrates for our daily activities. So there is a graph that shows that a few food items have high carbohydrate content but low protein content and vice versa. If anyone requires instant nutrients in this category for survival, they can choose from the list.

C. Analysis of packaged food Items on the basis of Total sugar, added sugar & fat

Excessive consumption of added sugars has been linked to a number of health issues. Nutrition labels were created to assist consumers in understanding the nutritional value of the products they purchase. However, they can be difficult to

understand at times, particularly the section of the label that lists the sugar content. Sugar is usually divided into two categories on nutrition labels: total sugars and added sugars. The total sugars section on nutrition labels does exactly what it says it does: it tells you how much sugar is in a food or drink product. This includes both naturally present sugars in foods and sugar added during processing.

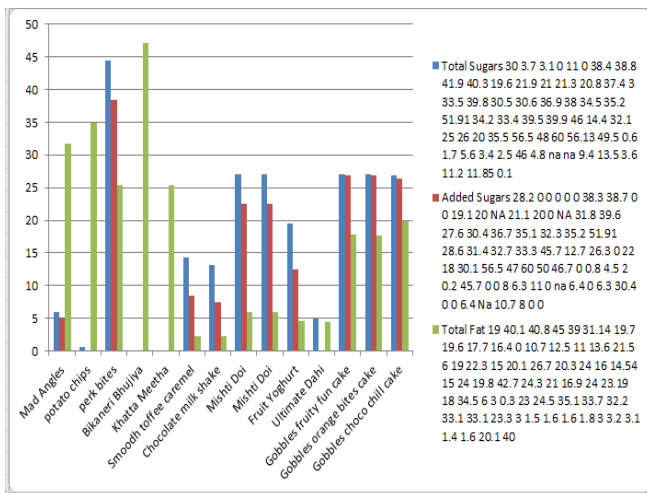


Fig 3: Total sugar, added sugar and fat based food items

Young people are generally fit and healthy, so they do not consider their health when eating fast food or junk food. However, they should consider whether the product is beneficial to their health. We conducted a case study on 50 students and classified them as having sugar, obesity, hypertension, or high blood pressure. Ten students agreed that they were suffering from sugar, obesity, hypertension, or high blood pressure as a result of not doing any physical exercises. As a practical matter, it is critical to maintain one's health while eating.

IV. RESULT AND DISCUSSION

In this research paper, we examined the various company products in terms of the nutrients and minerals they contain. According to our findings, people generally enjoy sweet products such as cookies and chocolates. This interest may differ from person to person and across age groups, so we divided the population into five categories and analyzed the data on the basis of protein and sugar.

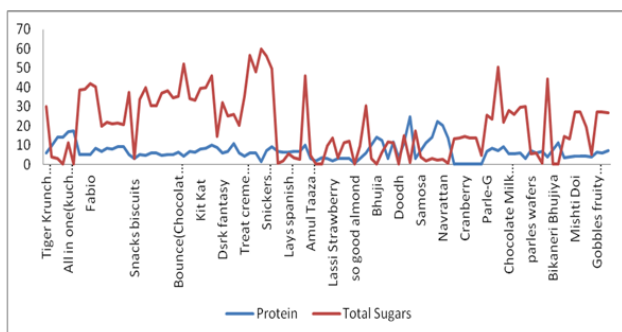


Fig 4: protein vs. sugar

According to our survey, biscuits and chocolates contain sugar, fat, and added sugars, which may cause a variety of diseases in the human body such as sugar, obesity, hypertension, high blood pressure, and so on.

Person who are doing gym

People who exercise should consume high-protein foods such as milk and peanuts. As shown in the graph in fig.4, sugar is variable and proteins are less. According to the findings, gym goers should avoid using such products unless absolutely necessary. They should prefer foods with less sugar and more protein [5]. The blue line in the graph represents protein, and the red line represents the sugar level in that product. We discovered that masala peanuts, bhujija, and navaratan are the products with the highest protein content and the least amount of sugar in our dataset. So when a gym guy wants to eat something, he can enjoy such types of products.

In the graph blue line shows protein and red line shows sugar level in that product. In our dataset we found that masala peanuts and bhujija and navaratan are the products which contain high protein and less sugar. So a gym guy can use the above products when he wants to eat something.

Old Age Persons

People over the age of 65 should consume foods high in calcium, vitamins, minerals, and protein. People generally become weak and surrounded by various diseases as they age, so they should take special care of their food. They can also consume sugar-free biscuits. According to the graph above, sweet products generally contain a lot of sugar, which is bad for the health of elderly people.

Young Age Persons

Young people generally require more energy. The younger generation consumes a lot of food, but when they get hungry at work or in their spare time, they prefer to eat biscuits and chocolates. According to our findings, young people should be cautious about what they eat because they may develop diabetes, obesity, high blood pressure, and other diseases as they age. To be on the safe side, they should choose high protein and low sugar products. They can use fruity cakes and low-sugar cashew cookies in particular. We can see from the graph above that the products have high sugar content, which is not good for a young person. It also contains some essential minerals, but the overall fat and sugar content is higher, which can be harmful to a young person over time. Avoiding high-sugar foods may protect them from a variety of serious diseases.

Pregnant Woman

Pregnant women must workout special caution when eating because what they eat will affect their unborn child. According to our findings, if the sugar level is high during the operation, it causes problems and unexpected blood loss.

As a result, she should consume low-sugar products such as fruity cake and sugar-free cookies. The graph above clearly shows that they should avoid eating sweet and fatty foods.

Athlete

Athletes require a lot of energy because of their hard work and sport practices. We noticed that when they exercise, they use up a lot of energy very quickly. As a result, they should consume products that are high in carbohydrates, sugar, and protein [4].

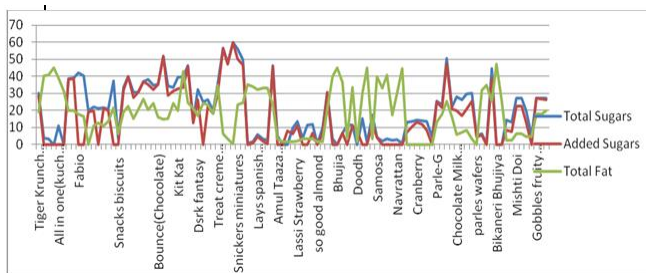


Fig 5. Sugar vs added sugar vs total fat

According to the graph in figure 5, products high in carbohydrates and proteins are very beneficial to athletes because carbohydrates provide energy to the body first [6].

V. CONCLUSION

In our daily lives, we all eat snacks when we are hungry or need something to intake. However, poor eating habits are now causing a variety of diseases such as upset stomach, obesity, diabetes, and high blood pressure [7]. So, in order to avoid these diseases, we should be cautious about what, when and how much we have to eat. The primary goal of this paper is to assist people in eating healthier snacks based on their work, age, and condition. In this paper, we gathered information about packaged food items based on the nutrition labels found on their packages. Children's BMI ranges and nutrient distribution for a balanced diet in children and adults have been the focus of research. In this study, we looked at packaged food items in terms of energy, protein, carbohydrate, total sugar, added sugar, and fat.

According to the findings of this study, few products have high sugar content, low calcium content, no minerals, no vitamins, and lesser proteins which are harmful for consumer if these are using in as a daily routine. According to the findings, an athlete requires a high protein, carbohydrate, and balanced sugar diet, an elderly person requires high calcium and low sugar products, and a pregnant woman requires proteins, carbohydrate, vitamins, low sugar, and minerals in a balanced diet. A gym goer who exercises and follows a diet plan requires low sugar and high protein products. So that they can choose a few food items based on their needs during an emergency and survive.

This research will provide a new direction for those doing the research on this topic and will assist consumers in choosing the fruitful product. Of course, due to a lack of

resources and a small number of items collected, this research has some limitations. Still this research inspires the food item company to make its product more useful.

REFERENCES

- [1] Bali, S. , Dayal, D. , Sood, A. P. S. , Panda, S. , Gupta, P. "The Relationship Between Weight Status, Vital Signs and Physical Fitness in Children with Simple Obesity: A Cross-Sectional Observational Study". *International Journal of Disabilities Sports and Health Sciences* 5 (2022): 106-112
- [2] Tahara, Y., & Shibata, S. (2013). *Chronobiology and nutrition. Neuroscience*, 253, 78-88. <https://doi.org/10.1016/j.neuroscience.2013.08.049> <https://pubmed.ncbi.nlm.nih.gov/16277817/>
- [3] Jessica Fanzo, Coral Rudie, Iman Sigman, Steven Grinspoon, Tim G Benton, Molly E Brown, Namukolo Covic, Kathleen Fitch, Christopher D Golden, Delia Grace, Marie-France Hivert, Peter Huybers, Lindsay M Jaacks, William A Masters, Nicholas Nisbett, Ruth A Richardson, Chelsea R Singleton, Patrick Webb, Walter C Willett, Sustainable food systems and nutrition in the 21st century: a report from the 22nd annual Harvard Nutrition Obesity Symposium, *The American Journal of Clinical Nutrition*, Volume 115, Issue 1, January 2022, Pages 18–33, <https://doi.org/10.1093/ajcn/nqab315> <https://pubmed.ncbi.nlm.nih.gov/2889977/>
- [4] Pramuková B, Szabadosová V, Soltéssová A. Current knowledge about sports nutrition. *Australas Med J*. 2011;4(3):107-10. doi: 10.4066/AMJ.2011.520. Epub 2011 Mar 31. PMID: 23390456; PMCID: PMC3562955.
- [5] Scapin, T., Fernandes, A. C., Coyle, D. H., Pettigrew, S., Figueiredo, L. D. S., Geraldo, A. P. G., & Proença, R. P. D. C. (2022). Packaged foods containing non-nutritive sweeteners also have high added sugar content: A Brazilian survey. *Journal of Food Composition and Analysis*, 111, 104626. <https://doi.org/10.1016/j.jfca.2022.104626>
- [6] Desbrow, B., Burd, N. A., Tarnopolsky, M., Moore, D. R., & Elliott-Sale, K. J. (2019). Nutrition for Special Populations: Young, Female, and Masters Athletes. *International Journal of Sport Nutrition and Exercise Metabolism*, 29(2), 220-227. Retrieved Feb 13, 2023, from <https://journals.humankinetics.com/view/journals/ijsnem/29/2/article-p220.xml>
- [7] Valter D. Longo, Rozalyn M. Anderson, Nutrition, longevity and disease: From molecular mechanisms to interventions, *Cell*, Volume 185, Issue 9, 2022, Pages 1455-1470, ISSN 0092-8674, <https://doi.org/10.1016/j.cell.2022.04.002>. (<https://www.sciencedirect.com/science/article/pii/S0092867422003981>)
- [8] Drew E. Gonzalez, Matthew J. McAllister, Hunter S. Waldman, Army A. Ferrando, Jill Joyce, Nicholas D. Barringer, J. Jay Dawes, Adam J. Kieffer, Travis Harvey, Chad M. Kerksick, Jeffrey R. Stout, Tim N. Ziegenfuss, Annette Zapp, Jamie L. Tartar, Jeffery L. Heileson, Trisha A. VanDusseldorp, Douglas S. Kalman, Bill I. Campbell, Jose Antonio & Richard B. Kreider (2022) International society of sports nutrition position stand: tactical athlete nutrition, *Journal of the International Society of Sports Nutrition*, 19:1, 267-315, DOI: 10.1080/15502783.2022.2086017
- [9] UNICEF. Healthy environments for healthy children [Internet]. New York (NY): UNICEF; [cited 2023 January 8]. Available

from: <https://www.unicef.org/health/healthy-environments>

- [10] Baddour, Larry M., John C. O'Horo, Mark J.ENZler, and Rahul Kashyap, eds. *Mayo Clinic Infectious Disease Case Review: With Board-style Questions and Answers*. Oxford University Press, 2022.

