

**Creation of an Educational Tool for the Vegetarian and Vegan Athlete's Plates**

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### Abstract

Many individuals choose to adopt a plant-based lifestyle when it comes to their nutritional choices. There are many benefits to choosing to eat a plant-based diet including health benefits; environmental/sustainability motivations; protein and energy efficiency; land, water, and greenhouse gas usage; and athletic performance. This project aims to examine the importance of and need for the Vegetarian and Vegan Athlete's Plate as a tool for athletes and those looking to eat more plant-based to use in conjunction with an educational handout. Eight (n=8) practicing sports registered dietitian nutritionists (RDNs) were recruited. A Qualtrics survey was sent out to the 8 RDNs which assessed the adequacy of the plates for guiding nutritional choices for easy, moderate, and heavy training days. The results from the survey found that the Vegetarian and Vegan Athlete's Plate was deemed nutritionally adequate (scores averaging 3.42-4.67 out of 5 possible points) by the RDNs based upon their scores on the Likert scale and their qualitative feedback. The educational tool that accompanies The Vegetarian Athlete's Plate includes a variety of helpful resources such as a pantry and fridge list, vegan and vegetarian shopping list, information on mineral absorption rates, vegan baking/cooking swaps, information on eight ways to get started on a plant-based diet, resources for eating seasonally, information on why to eat plant-based, instructions on how to build your plate using the Athlete's Plate, easy to make plant-based recipes, and a link to the Vegetarian and Vegan Athlete's Plate web page. In conclusion, there is a growing need for a Vegetarian and Vegan Athlete's Plate and an accompanying educational tool, especially in the athletic population.

*Keywords:* vegetarian, vegan, environment, athletes, performance, Athlete's Plate

## Introduction/Literature Review

### *Background Information*

Vegetarian and vegan diets have known health benefits including lowering the risk of heart disease, diabetes, arteriosclerosis, metabolic syndrome, and obesity (Medawar, 2019). Plant-based eating patterns have grown in popularity in recent decades (Fehér et al., 2020). Despite the rising popularity in plant-based eating today, vegetarian diets date back to the ancient Greek philosopher, Pythagoras who adopted a vegetarian diet far before the vegetarian movement in the mid 1800s (Butler, 2018). Today, individuals of all ages and backgrounds consume plant-based diets and according to the Academy of Nutrition and Dietetics (AND), vegetarian diets are nutritionally adequate for all stages of life and for athletes and may provide health benefits for the prevention of certain diseases (Melina et al., 2016). Vegetarians, those who avoid meat, fish, and poultry represent 5% of the US population (Le & Sabaté, 2014). Vegans, who additionally avoid dairy and eggs, represent 2%, respectively, of the United States population (Le & Sabaté, 2014). For many individuals, the choice to adopt a plant-based diet includes religious and ethical, environmental, and physiological beliefs (Le & Sabaté, 2014). Recently, more and more individuals have become interested in plant-based diets. In the past 30 years, research on vegetarian diets have increased (Le & Sabaté, 2014). The increased number of publications on vegetarian nutrition and major contributions in nutritional epidemiology have contributed to better understanding of the connections between diet and disease (Le & Sabaté, 2014).

### *Motivations for Following a Plant-Based Diet*

#### *Health Benefits*

Dietary motivations for plant-based diets encompass a large variety of benefits, including a reduction in body weight, a lower incidence of metabolic syndrome or diabetes, improvements

of blood pressure and dyslipidemia, a lower mortality related to ischemic heart disease and cancer (Cramer et al., 2017). Some individuals may be motivated to follow a vegetarian diet to reduce the risk of type 2 diabetes. Diet and lifestyle, particularly plant-based diets, are effective tools for the prevention and management of type 2 diabetes (McMacken & Shah, 2017). Cohort studies strongly support the role of plant-based diets and food and nutrient components of plant-based diets, in reducing the risk of type 2 diabetes (McMacken & Shah, 2017). The evidence suggests that the type and source of carbohydrate (unrefined versus refined), fats (monounsaturated and polyunsaturated versus saturated and trans), and protein (plant versus animal) play a major role in the prevention and management of type 2 diabetes (McMacken & Shah, 2017).

Another dietary motivation for consuming a plant-based diet is lowering the risk of cardiovascular disease. In the United States alone, heart disease is the leading cause of death for men, women, and people of most racial and ethnic groups (Center for Disease Control and Prevention, 2020). By the age of 10-14 years old, the majority of American children have fatty streaks in the left anterior descending coronary artery, and more than five percent have more advanced coronary disease (Barnard et al., 2019). Consuming a diet low in animal products and rich in high quality plant foods such as whole grains, fruits, vegetables, and nuts are associated with lower risk of cardiovascular outcomes and intermediate risk factors (Satiya & Hu, 2018). A low-fat, vegetarian diet, along with other healthful lifestyle changes, has been shown to reverse arterial plaque (Barnard et al., 2019). Compared with meat eaters, vegetarians are 32% less likely to develop coronary heart disease (Barnard et al., 2019).

Not only is heart disease the leading cause of death in the United States, but as of January 2019, 606,880 Americans died of cancer (American Cancer Society, 2019). However, despite the

large number of deaths each year, long-term cancer survivors represent a sizable portion of the population (Molina-Montes et al., 2020). A considerable number of studies examined the association between individual nutrients or foods and cancer mortality (Molina-Montes et al., 2020). These studies have focused particularly on associations between pre-diagnosis dietary intake and cancer-related outcomes. Despite cancer being a multifactorial disease with many external risk factors that need to be considered, dietary and lifestyle factors play key roles. In recent years, nutrition has been highlighted as a key risk factor and is now considered to be responsible for 30% of all cancer cases in industrialized countries (Ritter et al., 2016). A high body mass index (BMI) and obesity play a major role in cancer development (Ritter et al., 2016). Other cancer risk factors include food that has been prepared at high temperatures, high saturated and trans-fat consumption, and the excessive amount of sodium (Ritter et al., 2016). Additionally, the Current World Health Organization (WHO) supports the hypothesis that above all, red and processed meats are important carcinogens (cancer-causing agents), partly due to the nitrites contained in these foods (Ritter et al., 2016). Moreover, current studies indicate that cancer is low in vegan populations, which can be attributed to the absence of animal product consumption and various other factors such as lifestyle choices (Ritter et al., 2016).

### *Environmental Motivations*

#### *Current Meat-Eating Habits*

The United States food production systems uses about 50% of the total United States land area, 80% of the freshwater, and 17% of the fossil energy used in the country (Pimentel & Pimentel, 2003). This heavy dependence on fossil energy suggests that the United States food system is not sustainable. The United States livestock population consumes more than 7 times as much grain than is consumed directly by the entire American population (Pimentel & Pimentel,

2003). The amount of grain that is fed to the United States livestock is sufficient enough to feed about 840 million people who follow a plant-based diet (Pimentel & Pimentel, 2003). From the livestock population, a total of 8 million tons of animal protein is produced annually (Pimentel & Pimentel, 2003). This protein is sufficient enough to provide about 77 grams of animal protein daily per American (Pimentel & Pimentel, 2003). It is important to note that the recommended dietary allowance (RDA) of protein per adult individual is about 56 grams of protein from a mixed diet based on a 70 kg individual (Pimentel & Pimentel, 2003). Based on this evidence, the average American consumes approximately twice the RDA of protein. Additionally, per capita meat consumption has been holding steady, but each year the population continues to rise in the US, increasing overall meat consumption which indicates that our current dependence on fossil energy, land, water, and greenhouse emissions will only continue to increase (Daniel et al., 2011).

#### *Protein and Energy Efficiency*

The global demand for meat is growing: over the past 50 years, meat production has more than tripled (Ritchie & Roser, 2017). In the United States, more than 9 billion livestock are slaughtered to supply the animal protein consumed each year (Pimentel & Pimentel, 2003). This livestock population on average outweighs the US human population by about 5 times (Pimentel & Pimentel, 2003). Substantial differences exist between the varying forms of livestock production in terms of net energy and protein feed requirements per pound of meat produced (Woods et al., 2010). Approximately 273 pounds of meat is eaten per American per year (Pimentel & Pimentel, 2003). Of the meat eaten, about 97 pounds are from beef, 68 from pork, 105 from poultry, and 2.2 pounds of other types of meat (Pimentel & Pimentel, 2003). For every 2.2 pound of high-quality animal protein that is produced, an average of 13.2 pounds of plant



protein is fed to the livestock (Pimentel & Pimentel, 2003). Nearly six times the amount of plant protein is needed to produce a little over 2 pounds of meat. Moreover, the energy that is required to produce the amount of meat necessary to keep up with American population growth continues to rise. Meat and dairy contribute the most to greenhouse gas emission and energy demand of the U.S diet (Heller et al., 2018). The average fossil energy input for all the animal protein production systems is 25 kcal fossil energy input per 1 kcal of protein produced (Pimentel & Pimentel, 2003). This energy input is more than 11 times greater than that for grain production, which is about 2.2 kcal of fossil energy per 1 kcal of plant protein produced (Pimentel & Pimentel, 2003).

### *Land*

More than 99.2% of United States food is produced on land (Pimentel & Pimentel, 2003). This continued use and productivity of the land is a growing concern due to the rapid rate of soil erosion and degradation (Pimentel & Pimentel, 2003). Each year, approximately 90% of United States cropland loses soil at a rate of 13 times above a sustainable rate and 60% of the United States pastureland is being overgrazed, becoming subjected to accelerated erosion (Pimentel & Pimentel, 2003). The amount of commercial fertilizer that would be required to replace some nutrient loss resulting from soil erosion would require excessive fossil fuels/energy, resulting in further pollution. Additionally, the loss of productive land due to animal agriculture is responsible for the loss of biodiversity and increasing intensity or frequency of wildfires (Tolleson & Meiman, 2015). The increasing U.S population results in the demand for increased meat production. Since meat production demands will increase with a growing population, more land will be required to sustain meat production. In the US, the development of land (both urban and other forms) is expected to increase by 41-77% between 2010 and 2060 and would likely

have significant impacts on the land area available for animal agriculture (Tolleson & Meiman, 2015). Worldwide since 2003, there has been an annual urban population growth of 3% (Tolleson & Meiman, 2015). In turn, it was reported that meat production (worldwide) has more than doubled over that same time period, with the vast majority of the increased production occurring in the form of poultry and swine (Tolleson & Meiman, 2015). Due to the needs for land in order to fulfill the demands for animal pasture/meat production, the US will continue to use more land to keep up with the rising meat requirements, resulting in a further loss of biodiversity.

#### *Water*

Like the world population, the US population continues to grow rapidly (Pimentel & Pimentel, 2003). Agricultural production, including livestock production, consumes more freshwater than any other activity in the US (Pimentel & Pimentel, 2003). The global average water footprint (the total amount of water needed) to produce one pound of beef is 1,799 gallons of water; one pound of pork required 576 gallons of water (Wein et al., 2016). In comparison, the water footprint of soybeans is 216 gallons and corn is 108 gallons (Wein et al., 2016). The amount of water that it takes to produce only one pound of beef is over 7 times greater than that of soybeans. This is because the larger the animal, the greater the animal's body mass, such as bone, skin, and tissue. Due to this, beef conversion ratios are the highest and it takes exponentially less water and energy inputs to produce grains, beans, and vegetables than meat (Wein et al., 2016). In addition to the larger size of the animal, the second reason for meat production's great water footprint is due to the immense scale. The animal production system is expanding rapidly around the world and in order to keep up with demands, the American system developed a conventional model (Wein et al., 2016). However, this conventional model is

extremely problematic. The conventional model was developed over the last 50 years and works to create faster animal growth and shorter meat-to-market times (Wein et al., 2016). However, faster does not equal better, and over the past 50 years, water use has increased steadily each year as a result. The US population of 285 million is projected to double to 570 million in the next 70 years, which would place an even greater stress on the already limited supply of water resources (Pimentel & Pimentel, 2003).

### *Greenhouse Gas Emission*

The production of food for human consumption, particularly by industrialized agricultural practices, causes significant greenhouse gas emissions (Sabate & Soret, 2014). These greenhouse gases may occur directly from carbon dioxide emissions due to fossil fuel use on the farm or in the supply chain, nitrous oxide emissions resulting from fertilizer application, and methane emissions from animals or indirectly as a result of land use change (Sabate & Soret, 2014). Additionally, the agricultural production process, the transport, processing, packaging, marketing, sales, purchasing, and cooking of food also contribute to the greenhouse gas emissions (Sabate & Soret, 2014). Half of all food-related greenhouse gas emissions are generated during the farming process and from agriculturally-induced change in land use, especially deforestation (Sabate & Soret, 2014). This creates a large issue for pollution into the atmosphere. Beyond contributing to greenhouse gas emission, agriculture production is responsible for chemical runoffs and algal blooms (Sabate & Soret, 2014). Compared with plant foods, meat and dairy products showed that energy inputs required were 2.5 times more primary energy, 13 times more fertilizer (resulting in greater atmospheric pollution), and 1.4 times more pesticides than for the vegetarian diet (Sabate & Soret, 2014). Additionally, studies reported several-fold increases in greenhouse gas emissions and environmental degradation scores for

conventional meat diets compared with vegetarian diets (Sabate & Soret, 2014). Similar to land and water use, greenhouse gas emissions are projected to increase over the next 50 years due to the projected population increase (Sabate & Soret, 2014). The intensive production of meat is considerably more taxing to the environment than a nutritionally equivalent plant protein diet.

### *Vegetarian Diets and Athletic Performance*

Over the years, consuming a plant-based diet has grown in popularity among athletes, perhaps due to literature supporting the benefits that it can provide for performance (Barnard et al., 2019). Present day vegan athletes including Tony Gonzalez of the Kansas City Chiefs, Ironman triathlete Brenden Brazier, track and field Olympian Carl Lewis, and bodybuilder Kenneth Williams provide evidence that a highly-demanding athletic career can be sustained with a plant-based diet (Fuhrman & Ferreri, 2010). Despite their ability to follow a plant-based diet, not every athlete may have access to the same resources, including education when it relates to following a plant-based diet. Moreover, the American College of Sports Medicine has found that recovery from sporting activities is enhanced by following well-chosen nutrition strategies (Barnard et al., 2019). What we do know is that avoiding deficiencies and consuming a whole foods diet, while maintaining a healthy body fat percentage can maximize muscle endurance and disease resistance (Fuhrman & Ferreri, 2010).

Additionally, literature suggests that following a strictly vegetarian or vegan diet is not solely responsible for the performance or health benefits seen (Fuhrman & Ferreri, 2010). The avoidance of meat and other animal products alone cannot be attributed to the known benefits. Rather, the health and performance benefits that are seen can be attributed to the increased consumption of whole plant foods (fruits, vegetables, seeds, nuts, beans) and the associated beneficial nutrients including fiber, vitamins, minerals, and antioxidants (Fuhrman & Ferreri,

2010). The increased consumption of these plant foods decreases the amount of processed foods consumed, thus reducing the number of calories consumed from processed foods daily (Fuhrman & Ferreri, 2010).

Some athletes have adopted a plant-based diet in order to improve their physical performance. The concept of vegetarian or vegan diets has firmly been linked to sports and exercise even since ancient history (Wirnitzer, 2020). However, since 2017 there has been a higher frequency of publication of review articles on veganism in sports than ever before, which all contribute to and reflect the increasingly high scientific interest in the linkage between vegan diet and sports (Wirnitzer, 2020). In a study that compared strict collegiate and post-graduate male vegetarian athletes to age and sex matched athletes who eat meat, specifically looking at their time to exhaustion on a stationary bicycle, lifting an external load by hand grip meter, holding a horizontal arm position, and deep knee bends they found that: (1) Performances of vegetarian or vegan athletes were two-fold to three-fold higher in terms of endurance, stamina, and strength (2) The time needed for complete recovery was found to be markedly reduced in strict vegetarians, with some cases needing a fifth of the time that meat-eating athletes needed (Wirnitzer, 2020). This study indicates that vegans and vegetarians are able to tolerate and even sustain higher physical burdens for longer durations of time and are able to recover from physical stress rapidly (Wirnitzer, 2020).

Appropriately planned vegetarian diets can provide sufficient energy and an appropriate range of carbohydrate, fat, and protein intakes to support peak performance and health (Venderley & Campbell, 2006). Performance advantages that come with following a plant-based diet has been shown to reduce body fat, leading to a leaner composition, which can lead to performance improvements in some sports (Barnard et al., 2019). Additionally, since plant-based

diets are higher in carbohydrates, they foster effective glycogen storage (Barnard et al., 2019). During heavy training, maximizing body glycogen storage can improve endurance performance (Barnard et al., 2019). Blood viscosity is also reduced and improves arterial flexibility and endothelial function among vegetarians in comparison to omnivores (Barnard et al., 2019). This can allow for improved vascular flow and tissue oxygenation (Barnard et al., 2019). Free radicals, which play a role in some conditions such as cardiovascular disease and the development of some cancers, are produced during exercise (Barnard et al., 2019). A plant-based diet rich in fruits and vegetables contains antioxidants. These antioxidants may help combat free radical production that is produced during exercise (Lynch et al., 2018). These physiological advantages can be seen as motivations to follow a plant-based diet.

#### *Prior Research About Athlete Nutrition Education*

Competitive athletes have specific nutritional needs as a result of rigorous training and athletic performance that can be enhanced by optimal dietary intake (Karpinski, 2012). However, dietary practices of collegiate athletes are of particular concern because of the increased risk for suboptimal eating, misguided nutritional practices, a rigorous schedule, and the drive to excel in sports (Karpinski, 2012). It is important that all athletes, especially collegiate athletes who are under both physical and mental stressors, have access to education on how to fuel optimally. The risk of receiving misinformation about nutrition and dietary supplements from the many influences in their lives, including friends, family, coaches, and athletic trainers is one that collegiate athletes face during their athletic career (Karpinski, 2012). Although many universities require or highly encourage students to take a nutrition class, many times those classes are intended to educate students in majors who will potentially be working with athletes

in the future (i.e., athletic training, exercise physiology, and coaching) and not targeted directly at athletes (Karpinski, 2012).

The need for and lack of nutrition education among collegiate athletes has been well established in the literature, and although the National Collegiate Athletic Association's (NCAA) members recognize proper nutrition as the key not only to keeping student-athletes healthy, but also to achieving peak athletic performance, a comprehensive nutrition education program does not exist (Karpinski, 2012). Despite the lack of a comprehensive educational tool for athletes/collegiate athletes, there are external sources that can provide education regarding nutrition. Eat to Compete is resource for which universities must pay a fee that provides sports nutrition education for individual athletic teams, entire athletic departments: DI, DII, and DIII, coaches conferences, sports medicine clinics, school assemblies, summer camps, clubs, and professional organizations (Eat to Compete, 2021). Eat to Compete works to teach student athletes to maintain nutrition awareness by organizing concepts into 18 topics that are immediately familiar and memorable to student athletes (Eat to Compete, 2021). Additionally, websites such as the United States Department of Agriculture (USDA) offer free general information on improving health and performance that is created by sports dietitians for coaches and athletes (USADA, 2021). However, these resources are not individualized and require athletes, coaches, and administrators to seek out these sources. This can not only be a lengthy process, but it can also be expensive to provide to collegiate teams.

### *The Original Athlete's Plate®*

Nutrition education visual tools are designed to help the general population translate science into practice (Reguant-Closa et al., 2019). Because of this, the original Athlete's Plate® was created for athletes as a visual tool designed to help sports dietitians working with athletes

and athletes themselves to adjust their nutrition to variable training loads when following a periodized training and competition plan (UCCS, 2021). These plates provide three different templates for training intensity of easy, moderate, and hard. Athletes can build their own meals based on these plates and customize them to fit their food preferences. The key protein sources from the Athlete's Plate are meat, fish, and poultry. These plates offer a great template for omnivorous athletes looking to understand how to properly build a meal for before or after a specific training session.

### *Current Gap in Literature*

Despite the evidence that exists to support the physiological/health benefits, performance benefits, protein and energy efficiency, reduced land and water usage, and greenhouse gas emissions, there is not a validated visual tool for athletes and individuals looking to eat a more sustainable plant-based diet. Due to these profound environmental impacts, the research team is interested in developing an educational tool to help all athletes eat in a more environmentally sustainable way. Currently, a research team based out of the University of Colorado, Colorado Springs (UCCS) is in the process of validating a visual tool (The Vegetarian and Vegan Athletes Plate) for athletes and individuals looking to eat a more sustainable diet. The Vegetarian and Vegan Athlete's Plate created by UCCS accommodates easy, medium, and hard training days. However, these meal plans/plates are hypothetical, have not yet been tested on athletes. Additionally, an educational tool will accompany The Athlete's Plate in order to aid in meal ideas/foods to incorporate in a plant-based diet. Once this tool is validated and in-person testing is conducted, it can aid as a guide in consuming a more plant-based diet.



## Methods

### *Development of Vegetarian and Vegan Meal Plans*

This study is a mixed model validation study that was approved by the University of Colorado-Colorado Springs Institutional Review Board. Eight participants (n=8), 8 practicing sports registered dietitians were recruited. Participants' first attempts at a sports nutrition-appropriate vegetarian and vegan meal plan were sent to two lead investigators who provided feedback to continue working towards the completion of meal plans. The meal plan templates were broken down into two weight categories of 60kg and 75kg. A total of 99 meal plans were assessed. Graduate students created 48 vegan meal plans and 51 vegetarian meal plans for both weight categories. Of those meal plans, 33 were created for an easy day of training, 33 for a moderate day of training, and 33 for a hard day of training. UCCS sports nutrition graduate students then created theoretical daily meal plans for both weight categories as well as vegetarian and vegan templates. These meal plans were then analyzed for nutrient composition using the ESHA Food Processor (SQL version 11.1) and compared to sport nutrition recommendations.

Table 1:

**Number of Meal Plans Created by Dietary Pattern and Athlete Weight**

| Diet Type          | Easy Training | Moderate Training | Heavy Training |
|--------------------|---------------|-------------------|----------------|
| Vegetarian (60 kg) | 33            | 33                | 33             |
| Vegetarian (75 kg) | 33            | 33                | 33             |
| Vegan (60 kg)      | 33            | 33                | 33             |
| Vegan (75 kg)      | 33            | 33                | 33             |

Total Number of Meal Plans Created for Both Vegetarian and Vegans: 99

### *Evaluation of the Vegetarian and Vegan Athlete's Plate by Sport Dietitians*

In this study, a Qualtrics survey was created in order to determine if the vegetarian and vegan plates were appropriate for guiding athletes to meet sport nutrition recommendations. The

survey was sent to 8 registered dietitians who specialize in sports dietetics and are familiar with plant-based diets. The registered dietitians provided qualitative and quantitative feedback regarding if they think that the vegetarian/vegan athletes' plates are adequate for guiding athletes to meet sport nutrition requirements.

#### *Educational Handout*

In conjunction with the vegetarian and vegan athletes' plates, an educational handout was developed as a tool to accompany the plates (specifically my role in the project). These handouts consist of a list for the pantry, fridge, freezer, and shopping; plant-based protein breakdown that includes serving size, calories, absorption rates; information about vitamins, and vegan swaps for common cooking ingredients. The educational handout also has specified lists for both vegetarians and vegans. This handout will be made available on the UCCS website with the vegetarian/vegan athletes' plates.

The first round of in-person testing began April 6<sup>th</sup>, 2021 and the second round was on April 13<sup>th</sup>. UCCS plans to conduct another round of in-person testing in the fall semester of 2021 with an additional cohort of students. UCCS is bringing athletes into the UCCS athletes' dining hall and providing an introductory presentation as well as a pre-session survey about athletes' knowledge regarding vegetarian nutrition. Athletes are building their own plates (with real food) in the cafeteria using the vegetarian/vegan athletes' plates as guides. Then researchers photograph the plates that the athletes create, making note of two things: vegan or a vegetarian plate and the type of training day (easy, moderate, or hard). Following the meal, athletes participate in focus groups with registered dietitian sport nutrition experts and complete a post-survey. After data is collected, the nutrient content of the athlete's plates will be assessed and

compared to sport nutrition guidelines to determine the efficacy of The Vegetarian and Vegan Athlete's Plate as an educational tool.

## Results

### *Educational Handout*

(See Appendix I for full handout)

This educational tool has been created in order to help guide the athlete or individual who is looking to eat more plant-based or follow a vegetarian/vegan diet. This handout includes a variety of helpful resources such as a pantry and fridge list, vegan and vegetarian shopping list, plant protein ideas, information on mineral absorption rates, vegan baking/cooking swaps, information on eight ways to get started on a plant-based diet, resources for eating seasonally, information on why to eat plant-based, instructions on how to build your plate using the Athlete's Plate, easy to make vegan/vegetarian recipes, and a link to the vegan/vegetarian Athlete's Plate web page ([www.uccs.edu/swell](http://www.uccs.edu/swell)). This educational tool is created to provide an interactive experience and is planning to be offered as an online PDF document along with the Vegetarian and Vegan Athlete's Plates. Additionally, portions of this PDF can easily be printed and put in athletic facilities and dining halls.

### *RDN Survey*

The current data collected are from registered dietitians when the Vegetarian and Vegan Athlete's Plate was being created and assessed for nutrient quality. The 8 practicing sports RDNs were sent a Qualtrics survey consisting of questions that were created to rank the Athlete's Plate using a quantitative and qualitative approach on a scale of 1 (strongly disagree) to 5 (strongly agree) and open-ended feedback regarding the Athlete's Plate as a whole (see Appendix II for the questions asked and the RDNs feedback). The questions asked about the appropriateness of

macronutrient and micronutrient distribution, overall approach for this tool in a dining hall setting, how understandable the tool is, evaluation of the adequacy of the guides with respect to the training intensity, the inclusion of plant and vegetarian sources of protein, identification of vitamin sources and inhibitors for bioavailability, fermented foods, and additions of condiments and beverages. The average scoring range was 3.42-4.67 out of 5 possible points. See table below.

Table 2:  
**Registered Dietitians Average Scores-Quantitative Feedback**

| Questions                             | Q #1  | Q #2  | Q #3  | Q #4  | Q #5  | Q #6  | Q #7  | Q #9  | Q #10 | Q #11 |
|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>Dietitian’s Ranking (averages)</b> | 4     | 3.85  | 4.14  | 4.14  | 4.43  | 4     | 3.43  | 4.67  | 4     | 3.66  |
|                                       | Q #13 | Q #14 | Q #15 | Q #17 | Q #18 | Q #19 | Q #21 | Q #22 | Q #23 |       |
|                                       | 4.33  | 4.33  | 4     | 4.33  | 4.17  | 3.67  | 4.67  | 4.33  | 4.17  |       |

Note: the skipped boxes refer to the qualitative questions that the dietitians provided as written feedback regarding the Athlete’s Plate as a whole (see Appendix II).

Discussion/Conclusion

*RDN Survey and Feedback*

The Qualtrics survey was a valuable tool in order to gauge if the Vegetarian Athlete’s Plate is nutritionally adequate to fulfill the sports nutrition guidelines. These results show us that the Vegetarian Athlete’s Plate was deemed nutritionally adequate by the RDNs based upon their scores on the Likert scale and their qualitative feedback. Upon evaluation of the plates, the RDNs had mixed comments, but overall, they all had positive remarks regarding the concept of the plate. Positive feedback from the RDNs highlighted that once the Vegetarian Athlete’s Plate

is explained to the athletes, it will function as a helpful teaching tool. Additionally, once paired with the educational handout, the athlete will have the tools necessary to properly build their plate and make informed dietary decisions. The RDNs also recommend that the Vegetarian Athlete's Plate consider different cultures and eating patterns. Since the survey, the Vegetarian Athlete's Plate has been updated in order to accommodate cultural backgrounds through including diverse grain options, varied spices/flavors, assorted fruits and vegetables, and diversified protein options. The feedback provided the research team with constructive feedback that has been used to strengthen the efficacy of the Athlete's Plate.

#### *The Impacts of Covid-19*

This project was subject to limitations as a result of the Covid-19 pandemic. In-person testing was put on pause in late August of 2020 due to COVID-19. This in-person testing will utilize UCCS's athletic population in order to analyze the nutrient qualities of each plate and determine the efficacy of the Athlete's Plate. In-person testing is currently expected to take place in April 2021 since UCCS received IRB approval as of late March 2021. During this delay, the research team has photographed the meals corresponding to recipes for the educational handout.

#### *Adaptations Due to Covid-19*

In order to adapt to the impact of Covid-19, in-person testing has been postponed by the IRB until mid-April 2021. However, UCCS's dining staff and facilities are ready and have received IRB approval to begin in-person testing once athlete recruiting measures have been taken. During this setback, the research team looked at alternative options that included a virtual scenario. This option involved the creation of a phone application in order to provide athletes with the full experience of virtually building their own plates. The application planned on including all three Vegetarian Athlete's Plates templates and the option to select an easy,

moderate, or hard plate based on the intensity of the athlete's training day. Ideally, the athlete would then have the option to add the foods of their choice to their virtual plate. Once their plate had been completed and drinks and condiments were added, the athlete would be able to submit their plate for nutrient analysis. This virtual option was considered as UCCS received a proposal for a bachelor of innovation which offered to work on the initial stages of the application. Students, interns, and professors all worked on the creation of this application. However, resources were lacking and would require another team to continue to move forward in the creation of this application. An application may still be a viable tool for future use. Additionally, the research team believes that in-person testing is the best way to ensure that athletes are provided with thorough background information about the Athlete's Plate and are educated on how to properly use and build their plates.

#### *The Vegetarian Athlete's Plate and the Future*

The Vegetarian Athlete's Plate and its associated educational handout are versatile tools that can be used not only for athletes but for a multitude of other educational purposes. This plate and handout can be powerful instruments for schools to incorporate during health classes or in university-level courses that teach about health and sustainability. The Vegetarian Athlete's Plate can also be used for athletic nutrition education purposes as a way to aid both nutrition professionals and athletes who are looking for a visual tool to help guide food choices based upon various training intensities while maintaining a plant-based diet. In order for athletes to perform at their best, it is important that an athlete who is interested in plant-based eating has access to resources such as the Vegetarian and Vegan Athlete's Plate in order to enhance their quality of life. Currently, a cross-sectional study that looks at the quality of life among different

sporting divisions is in the publication process.<sup>1</sup> If an athlete has access to proper nutrition education, they can increase their quality of life and overall health. With the proper education (provided by the educational tool), the Athlete's Plate can be a key visual tool for the future of plant-based eating.

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<sup>1</sup> As part of my work on my honors project during the summer of 2020, I served as a co-author for the paper titled "Quality of Life is Lowest Among Female Athletes at the Community College Compared to University Sport Levels". It has been accepted for publication in the *Journal of Amateur Sport* and will be published in the Fall 2021 edition.

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Appendix I: Educational Handout

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## Appendix II

## Questions, Written Feedback, and Statements from the RDN Qualtrics Survey

*Question 1*

Upon review, please rate the Vegan/Vegetarian Athlete's Plate's qualitative approach using the qualitative scale as a whole. The overall approach using the qualitative tool for the evaluation of the athlete's plates in a dining hall setting is feasible.

*Question 2*

Upon review, please rate the Vegan/Vegetarian Athlete's Plate's qualitative approach using the qualitative scale as a whole. The scale is comprehensive, covering the most important aspects of the Athlete's Plate for Vegan/Vegetarian athletes.

*Question 3*

Upon review, please rate the Vegan/Vegetarian Athlete's Plate's qualitative approach using the qualitative scale as a whole. The scale is understandable for sports dietitians in training (sport nutrition graduate students) when using it after familiarization.

*Question 4*

Upon review, please rate the Vegan/Vegetarian Athlete's Plate's qualitative approach using the qualitative scale as a whole. The scale can be used to evaluate both Athlete's Plates made by omnivore and vegan/vegetarian athletes.

*Question 5*

Please evaluate the following scale component with respect to relevance, specificity, and clarity: Overall evaluation of the plates. Evaluation according to activity level chosen 1) (quantity) added vessels: soup bowl, salad plate, 2nd plate on hard days, 2) (quality)

healthfulness (color, variety, balance) and 3) performance-based impression overall (sources and forms of macronutrients, quantity, and distribution. (1-3 points) - Relevance.

*Question 6*

Please evaluate the following scale component with respect to relevance, specificity, and clarity: Overall evaluation of the plates. Evaluation according to activity level chosen 1) (quantity) added vessels: soup bowl, salad plate, 2nd plate on hard days, 2) (quality) healthfulness (color, variety, balance) and 3) performance-based impression overall (sources and forms of macronutrients, quantity, and distribution. (1-3 points) - Specificity.

*Question 7*

Please add comments on the following scale component: Overall evaluation of the plates. Evaluation according to activity level chosen 1) (quantity) added vessels: soup bowl, salad plate, 2nd plate on hard days, 2) (quality) healthfulness (color, variety, balance) and 3) performance-based impression overall (sources and forms of macronutrients, quantity, and distribution. (1-3 points).

*Question 8 (open-ended feedback)*

Please add comments on the following scale component. Overall evaluation of the plates. Evaluation according to activity level chosen 1) (quantity) added vessels: soup bowl, salad plate, 2nd plate on hard days, 2) (quality) healthfulness (color, variety, balance) and 3) performance-based impression overall (sources and forms of macronutrients, quantity, and distribution. (1-3 points).

*Comments from RDNs for Question 8:*

- “I suggest including starchy vegetables in the carbohydrate group. Further, include 100% fruit juice (instead of diluted juice) for hard days”.

- “What is put on the plate, will depend on the size, sex, general activity, and sport activity. Thus, the evaluation seems simplistic and would need to be more individualized to know if the training given the athlete and how they fill their plate meets the criteria. If you do not care about kcal consumed, and just consuming a variety of foods, then this approach might work. However, a light day for a female gymnast vs a light day for a male soccer player can be quite different, since the gymnast might not opt to add beverages with kcals, the 'high protein snack', etc. It is very difficult to determine if this is the right approach without seeing a pilot of the tool used with real athletes to determine what needs to be fixed. What if the athlete doesn't want to use fermented foods or yeast to get some of their nutrients, do you suggest they take a supplement? A supplement would not be at the food court. Also, you are examining 'one-plate' of what the athlete might eat in a day, so it doesn't include all that they would eat. It would be good to also have as part of your pilot what the plates look like throughout the day and if you combined all the food for the day, would it match the goal of each individual plate. Finally, I noticed that light and moderate days had 'eat a high protein snack' while the heavy day says eat another plate to get the extra kcals. Does this assume the athlete would not snack on heavy days?”
- “Would athletes know where to put in a "treat"? Should that be an added side item along the bottom? Do they know what a pulse is (not always the most common verbiage used for those foods)? Visually easy to follow”.
- Overall the concept is good, and this is a difficult task. There are many things I do not like which would mean I would not use it in athletes as it stands. The soup bowl is confusing. While nuts and seeds are high in fat they also have a lot of other nutrients. I am not sure why fruit and vegetables are distinguished and why fruit is off the plate.



Tomatoes, eggplant, squash, and peppers are fruits. They both provide the same nutrients... but some are obviously higher in calories and sugar. Is that why they are distinguished or is it the way fruit is eaten which is cultural. Have you thought about making different plates, breakfast plate, sandwich plate, mixed meal plate? I also do not like that nuts are listed off the plate with the oils. While they are high in fat they also provide many other nutrients, not in oils. Should cheese be in this group?"

*Question 9*

Please evaluate the following scale component with respect to relevance, specificity, and clarity: Composition and adjustment according to EASY, MODERATE, HARD. Evaluation of proportion: 1) whole grains and grains (include form), 2) fats\*, 3) proteins, 4) vegetables and fruit (include form of vegetables and fruit and placement of fruit outside of plate or in hand) (1-4 points).

\*refers to an item that should be indicated on the card after the athlete is asked if they added oils-  
Relevance.

*Question 10*

Please evaluate the following scale component with respect to relevance, specificity, and clarity: Composition and adjustment according to EASY, MODERATE, HARD. Evaluation of proportion: 1) whole grains and grains (include form), 2) fats\*, 3) proteins, 4) vegetables and fruit (include form of vegetables and fruit and placement of fruit outside of plate or in hand) (1-4 points).

\*refers to an item that should be indicated on the card after athlete is asked if they added oils –  
Specificity.

*Question 11*

Please evaluate the following scale component with respect to relevance, specificity, and clarity: Composition and adjustment according to EASY, MODERATE, HARD. Evaluation of proportion: 1) whole grains and grains (include form), 2) fats\*, 3) proteins, 4) vegetables and fruit (include form of vegetables and fruit and placement of fruit outside of plate or in hand) (1-4 points).

\*refers to an item that should be indicated on the card after athlete is asked if they added oils – Clarity.

*Question 12 (open-ended feedback)*

Please add comments on the following scale component: Composition and adjustment according to easy, moderate, and hard: Evaluation of proportion: 1) whole grains and grains (include form), 2) fats\*, 3) proteins, 4) vegetables and fruit (include form of vegetables and fruit and placement of fruit outside of plate or in hand) (1-4 points).

\*refers to an item that should be indicated on the card after the athlete is asked if they added oils

*Comments from RDNs for Question 12:*

- “For the light plate, the instructions are 1-3 tsp of oils (nuts, fats, etc.), yet the plate includes nuts in the protein section of the plate. Should this be nut oils? I would venture to say most athletes wouldn't know if they included 1-3 tsp of oil/fat unless they are only measuring butter/margarine, nut butter, etc. Also, if the food is prepared by the dining hall, how will they know the amount of 'fat' added to the mixed dishes? Yes, there might be a 'card' indicating extra oils for this research project, but there will not be when they are dining out or eating where this information is not provided. It is not clear how 'mixed'

dishes will be scored. For example, if I have pizza, how will this be scored? Grain, veggies (tomato paste), dairy (cheese/protein)".

- "Easy, Moderate, Hard +Proportion +4 points".
- "A concern is not knowing the oil content in the preparation methods".
- "The recommended grains and proteins seem reasonable. Sorry I lumped all my comments earlier, likely in the wrong box but I do not like the fruit outside of the plate and again struggle with why distinguish between the two. Botanically, a fruit is anything that was originally part of the ovary of a flowering plant. Peppers, tomatoes, squash, corn, etc. are fruit whereas vegetables are roots, leaves, and stems. I think what you are trying to distinguish is the fruits and vegetables that are less calorically dense being better for those who need to lose weight or watch weight or in the off-season, performing more skill-based training vs more calorically dense vegetables and fruits for those doing hard training. In theory, I understand the emphasis on more raw veggies for the former, but I also am not in favor of this. Why not look at Barbara Roll's book and incorporate this concept. Could have salad or non-cream-based soup off plate along with the beverage but put things back on the plate".

### *Question 13*

Please evaluate the following scale component with respect to relevance, specificity, and clarity: Inclusion of plant and vegetarian sources of protein (1 means some inclusion but not enough, 2 is sufficient) Evaluation of plant protein inclusion such as soy, lentils, peas, pulses, nuts, seeds and dairy and eggs for vegetarians (1-2 points) - Relevance.

*Question 14*

Please evaluate the following scale component with respect to relevance, specificity, and clarity: Inclusion of plant and vegetarian sources of protein (1 means some inclusion but not enough, 2 is sufficient) Evaluation of plant protein inclusion such as soy, lentils, peas, pulses, nuts, seeds and dairy and eggs for vegetarians (1-2 points) - Specificity.

*Question 15*

Please evaluate the following scale component with respect to relevance, specificity, and clarity: Inclusion of plant and vegetarian sources of protein (1 means some inclusion but not enough, 2 is sufficient) Evaluation of plant protein inclusion such as soy, lentils, peas, pulses, nuts, seeds and dairy and eggs for vegetarians (1-2 points) - Clarity.

*Question 16 (open-ended feedback)*

Please add comments on the following scale component:

Inclusion of plant and vegetarian sources of protein (1 means some inclusion but not enough, 2 is sufficient). Evaluation of plant protein inclusion such as soy, lentils, peas, pulses, nuts, seeds, and dairy and eggs for vegetarians (1-2 points).

*Comments from RDNs for Question 16*

- “Do you want to include any "Meat substitutes" or plant-based protein options (even powders)?”
- “This is very arbitrary since you have not provided us with the 'pre-training nutrition information' given to the athletes, so it is difficult for me to say if your approach is correct. How would anyone know if the amount of protein in 'one-plate' is adequate unless there is none or very little? We don't know what the rest of the day looks like. If you say, 30 g of protein should be provided by this plate and you train athletes and RDs

what 30 g of protein looks like on the plate in advance, then this might work. However, we haven't seen what is being taught, so it is difficult to know if the tool is measuring/testing the knowledge and application you hope the athlete will have gleaned”.

- “I think this aspect is fine”.
- “Inclusion 2 points. Evaluation Lacto-ovo clarification, pulses 1 point”.

#### *Question 17*

Please evaluate the following scale component with respect to relevance, specificity, and clarity: Critical micronutrients for vegans/vegetarians (1 means some inclusion but not enough; 2 means sufficient) Identification of vitamin B12\*, iron\*, and zinc\* sources and possible enhancers and inhibitors for bioavailability (i.e., fermented foods, nutritional yeast, caffeine, vitamin C source) (1-2 points) - Relevance.

#### *Question 18*

Please evaluate the following scale component with respect to relevance, specificity, and clarity: Critical micronutrients for vegans/vegetarians (1 means some inclusion but not enough; 2 means sufficient) Identification of vitamin B12\*, iron\*, and zinc\* sources and possible enhancers and inhibitors for bioavailability (i.e., fermented foods, nutritional yeast, caffeine, vitamin C source) (1-2 points) - Specificity.

#### *Question 19*

Please evaluate the following scale component with respect to relevance, specificity, and clarity: Critical micronutrients for vegans/vegetarians (1 means some inclusion but not enough; 2 means sufficient) Identification of vitamin B12\*, iron\*, and zinc\* sources and possible enhancers and inhibitors for bioavailability (i.e., fermented foods, nutritional yeast, caffeine, vitamin C source) (1-2 points) - Clarity.

*Question 20 (open-ended feedback)*

Please add comments on the following scale component:

Critical micronutrients for vegans/vegetarians (1 means some inclusion but not enough; 2 means sufficient). Identification of vitamin B12\*, iron\*, and zinc\* sources and possible enhancers and inhibitors for bioavailability (i.e., fermented foods, nutritional yeast, caffeine, vitamin C source) (1-2 points).

*Comments from RDNs for Question 20*

- “Are you training the athlete on how much nutritional yeast one needs to eat to get adequate amounts of B12 for the day? What about Fe and Zn, are they supposed to be getting 1/3 of RDA in each meal or do you expect all in the one meal they prepare in the testing. The same with vitamin C, etc. Do you train the female athletes to get more Fe from the food? Remember, if a female athlete is eating 1800 kcal/d or so, they have to make great food choices to get close to their RDA for Fe, and then this Fe might not be available, depending on the rest of the meal. Their current Fe status can also change Fe absorption”.
- “Critical 2 points. Identification 1 point - identified on the food plate. But, will there be a list of items or will they be marked on the food selections?”
- “I think this could be done a little better with colored boxes maybe. I like the way VRG does this”.

*Question 21*

Please evaluate the following scale component with respect to relevance, specificity, and clarity: Additions of condiments and beverages: (1 means some inclusion but not enough, 2

means sufficient) Evaluation of added condiments, including oils\*, salsa, ketchup, guacamole etc., and calorie-containing beverages (1-2 points).

\*refers to an item that should be indicated on the card after the athlete is asked if they added oils-  
Relevance.

#### *Question 22*

Please evaluate the following scale component with respect to relevance, specificity, and clarity: Additions of condiments and beverages: (1 means some inclusion but not enough, 2 means sufficient) Evaluation of added condiments, including oils\*, salsa, ketchup, guacamole etc., and calorie-containing beverages (1-2 points).

\*refers to an item that should be indicated on the card after the athlete is asked if they added oils-  
Specificity.

#### *Question 23*

Please evaluate the following scale component with respect to relevance, specificity, and clarity: Additions of condiments and beverages: (1 means some inclusion but not enough, 2 means sufficient) Evaluation of added condiments, including oils\*, salsa, ketchup, guacamole etc., and calorie-containing beverages (1-2 points)

\*refers to an item that should be indicated on the card after the athlete is asked if they added oils-  
Clarity.

#### *Question 24 (open-ended feedback)*

Please add comments on the following scale component:

Additions of condiments and beverages: (1 means some inclusion but not enough, 2 means sufficient). Evaluation of added condiments, including oils\*, salsa, ketchup, guacamole, etc., and calorie-containing beverages (1-2 points).

\*refers to an item that should be indicated on the card after the athlete is asked if they added oils

*Comments from RDNs for Question 24*

- “Can one not get enough condiments? What if an athlete didn't eat any condiments? I can certainly see where a meal could be 'adequate' and be condiment-free, so not sure how and why this is being evaluated. This category is the most confusing for me (e.g. I am not sure what you are actually trying to measure or get at)”.
- “Additions 2 points. Evaluation 2 points”.
- “There are many condiments not on there. What about spices and herbs? Also, is guacamole really a condiment. If nuts are with the oils maybe it should be there too”.

*Question 25 (open-ended feedback)*

Upon evaluation of these areas, are there any significant components missing in this qualitative scale?

*Comments from RDNs for Question 25*

- “Although we do not want to promote supplements over whole foods, I would suggest addressing plant-based protein drinks and shakes”.
- “Good job!”
- “Knowing what was in the pre-testing training would have been important. Not sure why you would not do a pre-test on the 'athletes' plate along with a post-test, just to see where you stand. Even if an athlete had heard of the athlete's plate they certainly could have had other 'nutrition' or 'dietary' training about how to eat for exercise. It would be very interesting to see what they would have selected before the training and then what they select on a different day after the training. I think this is a major flaw in the project. Even if you ask, have you heard of the 'athletes' plate' in advance, you still don't know what



they typically eat and if your training made a difference in their food selection. You only know if they can fill a plate the way they were trained after one training. It doesn't tell you if they will continue this behavior and/or if it is any different from what they typically do”.

- “I would like to see a treat or dessert listed under the side items to evaluate as (especially for vegan plans) having some calorically dense foods can be critical when needing to meet the daily calorie goals for sport; To that end, even some concentrated sweets added to the condiments section ex. brown sugar if they add it to oatmeal”.
- “Omega-3 vs Omega-6 sources? Vitamin D sources vs. sun exposure, iodized salt”.

*Question 26 (open-ended feedback)*

Do you have any other feedback and suggestions for us?

*Comments from RDNs for Question 26*

- “As mentioned - I would change diluted fruit juice to 100% fruit juice for hard days (potentially include whole milk as well). You may also consider differentiating between starchy and non-starchy vegetables (other than potatoes)”.
- “Once explained to the athletes, I think it will be a very helpful teaching tool. Thanks!”
- “I think I have provided my feedback. It would have been very helpful to actually know what your specific objectives were for the 'plate filling' exercise compared to what you specifically emphasized in the training. Also, it is hard to know if you are expecting each 'plate' to meet 1/3 of their kcal/energy and nutrient requirements, or if you just wanted to know if they can make good food selection. Thus, assuming they would get enough kcals in their other meals”.
- “I think this is going to be a great tool - thank you!”

- “I believe I mentioned everything. Again, a nice start for this difficult task but more work is needed. The other issue is that different cultures have different eating patterns including use of spices, peppers, meal patterns, what goes on the plate, and what does not”.



# THE VEGAN/VEGETARIAN ATHLETE'S® PLATE GUIDE

A Guide to Eating More  
Plant-Based and Plant Forward!

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*This Guide was developed by Point Loma Nazarene University  
in Collaboration with the University of Colorado Colorado Springs*

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University of Colorado  
Colorado Springs

# *Some Definitions First*

## **OMNIVOROUS**

Diet including meat, fish, and poultry

## **PLANT-BASED OR VEGAN**

Diet composed of food of plant-based origin.

## **LACTO-VEGETARIAN**

Diet that excludes meat, fish, poultry and eggs. Dairy products, such as milk, cheese, yogurt and butter are included.

## **OVO-VEGETARIAN**

Diets exclude meat, poultry, seafood and dairy products, but allow eggs.

## **LACTO-OVO VEGETARIAN**

Diets exclude meat, poultry, seafood but includes dairy products and eggs.

## **PLANT-FORWARD, FLEXITARIAN**

This is a relatively new term and is defined by the Menu of Change Initiative (see [www.plantforwardkitchen.org](http://www.plantforwardkitchen.org)) as a style of cooking and eating that emphasizes and celebrates, but is not limited to, plant-based foods. Plant-forward eating is also called flexitarian but signifies a focus on plants or vegetables rather than animal proteins although they are sometimes added in small quantities.

# *What's Vegetarian/Vegan in my Pantry?*

**Legumes:** Black beans, garbanzo beans, kidney beans, lentils, fava beans, lima beans, pinto beans, split peas

**Grains:** Brown and white rice, quinoa, einkorn, emmer/farro, spelt, rolled oats and other flakes, whole grain and white pasta (including couscous), diverse flours (whole grain and white), corn, corn meal, tortillas.

**Nuts:** Peanuts, almonds, walnuts, cashews, pecans, pine nuts, hazelnuts/filberts, macademia nuts.

**Seeds:** Ground flaxseed, chia seeds, pumpkin seeds, sunflower seeds, hemp seeds.

**Dried fruits:** Raisins, dates, apricots, mango, figs, sour cherries (look for no sugar added varieties).

**Cooking oils:** Olive oil, canola oil, sesame oil, avocado oil, pumpkin seed oil, linseed oil.

**Spices/seasonings:** Salt, pepper, garlic salt, ketchup, mustard, vinegar, barbecue sauce, nutritional yeast, miso, wasabi, soy sauce, herbs, spices, ginger, turmeric, curry.

**Sweeteners:** Brown sugar, honey\*, agave, pure maple syrup, coconut sugar.

**Pasta sauces and pastes:** Choose those that are dairy-free.

\*vegetarian; not vegan



# *What's Vegan in my fridge?*



## **Vegan**

**Milk:** Soy milk, almond milk, rice milk, hemp milk, cashew milk, coconut milk

**Yogurt:** Almond, coconut or soy based yogurt alternatives

**Cheeses:** Almond or soy based dairy-free cheeses

**Tortillas:** Corn and Wheat

**Pastes:** Tahini, hummus, miso, tomato, chile

**Juices:** Orange, apple, grapefruit, etc.

**Fresh Seasonal fruits and vegetables**

**Plant-Based Protein Alternatives:** Tofu, tempeh, seitan, vegetarian burgers (look for egg and dairy free veggie burgers)

**Fermented vegetables, fruits, grains, and legumes:** Kimchi, sauerkraut, pickled cucumbers, pickled ginger, sourdough bread, sprouted breads, kombucha

## **Vegetarian Additions**

**Cow, Goat, Sheep Milk**

**Yogurt, Sour Cream, and Kefir**

**Cheeses**

**Eggs**



# *Vegetarian/Vegan Shopping List*

\*It is important to note that you should try to shop seasonally for produce as not all types of produce are likely to be available everywhere year round\*

**Produce:** Apples, Bananas, Berries, Melons (honeydew, watermelon, etc) Onions (white or red), Tomatoes, Avocados, Broccoli, Mushrooms, Yams, Potatoes, Spinach, Carrots, Corn, Cucumbers, Peppers, Cabbage

**Sauces:** Tomato paste (for cooking), Pasta sauce (marinara), Coconut milk, Tahini, Curry paste, Diced tomatoes

**Dried bulk:** Black beans, Garbanzo beans, Pinto beans, Kidney beans, Navy beans, Chia seeds

**Pantry staples:** Pastas, Rice, Tortillas, Bread, Quinoa, Polenta, Grits, Lentils, Peanut butter or almond butter, Nuts, Oil (such as olive oil, coconut oil or avocado oil), Whole wheat flour, Salt, Pepper, Garlic powder, Onion powder, Paprika, Chile powder, Cinnamon, Soy sauce, Hot sauce, Ketchup

**Baking essentials:** Baking powder, Baking soda, Vanilla extract, Whole grain and Sprouted flours

**Other:** Fermented foods (kimchi or sauerkraut), Ginger, Nutritional yeast (flavoring), Sourdough bread

**Vegetarian essentials:** Greek yogurt, Kefir, Cheeses, Eggs, Milk





# What About Protein?

\*There are many ways that vegetarians and vegans can get a sufficient amount of protein as well as the essential amino acids in their diets! Here are a few ways that you can include more plant based protein sources in your diet\*



## FOOD (SERVING SIZE)

## PROTEIN (G)

|   |    |
|---|----|
| Tempeh (100 g)                              | 20 |
| Edamame, prepared (1 cup = 155 g)           | 19 |
| Lentils, cooked (1 cup = 198g)              | 18 |
| Black beans, cooked (1 cup = 172g)          | 15 |
| Tofu, extra firm (0.2 block = 91g)          | 10 |
| Soy milk, original & vanilla (1 cup = 243g) | 6  |
| Chia seed (1 oz=28g)                        | 5  |
| Hemp seeds (1 Tbsp=17g)                     | 3  |
| Nutritional Yeast (17g or 1 Tbsp)           | 5  |
| Vital wheat gluten (17g or 1 Tbsp)          | 7  |
| Greek yogurt, plain (7 oz = 200g)           | 20 |
| Milk, fat-free (1 cup = 245 g)              | 8  |

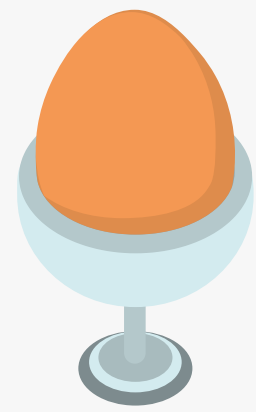




# Vegan Swaps



\*Eggs are easily replaceable, here are some ideas!  
Transform the recipes you already now into a vegan friendly option



1 egg



Baking (breads, muffins, cookies),  
pancakes

1/4 cup overripe banana or 2  
Tbsp. arrowroot or potato  
starch + 3 Tbsp. water, or 1  
Tbsp. flaxseed meal + 3 Tbsp  
water

Scramble, frittata, quiche,  
mousse, "egg salad"

1/4 cup silken tofu  
1/4 cup vegan yogurt

Baking, fritters, burgers, pancakes,  
breadcrumbs binder

1 Tbsp. chia seeds + 3 Tbsp.  
warm water

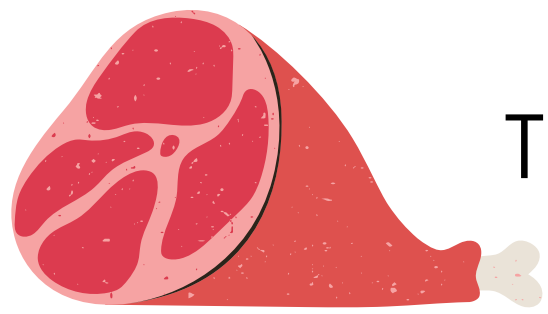
Mousse, ice cream, cake icing,  
custard, pies, cheesecakes  
cakes, merengue, royal icing,  
mousse, mayonnaise

1/4 cup fruit or veggie pure  
1/4 cup mashed avocado  
2 Tbsp. cornstarch + 3 Tbsp.  
water  
3 Tbsp. Aquafaba (chickpea  
water) or 3 Tbsp. nut butter



# Vegan Swaps

\*As you start navigating in this plant-based world, you will find more and more ideas to swap and keep making your favorite dishes.



## Meat

- Tofu and tempeh
- Seitan
- Beans
- Lentils
- Chickpeas
- Mushrooms
- Eggplants
- Jackfruit



## Honey

- Agave nectar
- Maple syrup
- Coconut nectar
- Stevia leaves
- Panela
- Brown sugar



## Cheese

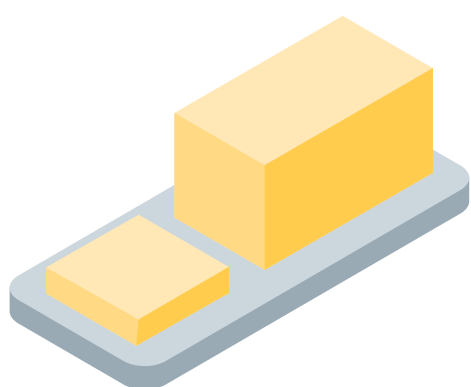
- Tofu cheese
- Nutritional yeast
- Cashew cheese
- Potato cheese
- Carrot cheese



## Milk/yogurt

- Soy milk
- Hemp milk
- Rice milk
- Almond milk
- Coconut milk
- Cashew milk

\*To make buttermilk just add 1 tsp to 1 cup of a plant-based milk.



## Butter

- Coconut oil
- Olive oil
- Sunflower oil
- Vegan butter



# *How Can I Start?*



## **8 Ways You Can Get Started:**

**Eat lots of vegetables:** Fill half your plate with vegetables at lunch and dinner. Make sure you include plenty of colors in choosing your vegetables. Enjoy vegetables as a snack with hummus, salsa, or guacamole.

**Change the way you think about meat:** Have smaller amounts. Use it as a garnish instead of a centerpiece.

**Choose good fats:** Fats in olive oil, olives, nuts and nut butters, seeds, and avocados are particularly healthy choices.

**Cook a vegetarian meal at least one night a week:** Build these meals around beans, whole grains, and vegetables.

**Include whole grains for breakfast:** Start with oatmeal, quinoa, buckwheat, or barley. Then add some nuts or seeds along with fresh fruit. Go for greens.

**Try a variety of green leafy vegetables:** Try adding kale, collards, swiss chard, spinach, and other greens into your daily diet. Steam, grill, braise, or stir-fry to preserve their flavor and nutrients.

**Build a meal around a salad:** Fill a bowl with salad greens such as romaine, spinach, bibb, or red leafy greens. Add an assortment of other vegetables along with fresh herbs, beans, peas, or tofu.

**Eat fruit for dessert:** A ripe, juicy peach, a refreshing slice of watermelon, or a crisp apple will satisfy your craving for a sweet bite after a meal.





# Resources For Seasonality



Aim to eat vegetables, fruits, grains, legumes, milk, cheese, and mushrooms that are grown and produced locally!

**LocalHarvest** connects people looking for good food with the farmers to produce it

- [Click here for Local Harvest Website](#)

**California Alliance of Farmers Markets** promotes a direct farmer-to-consumer relationship and supporting small independent farmers

- [Click here for California Alliance Farmer's Markets](#)



Buying local is about enjoying more flavor and nutrition in your foods and developing strong local economies and healthy communities



# COLORADO'S LOCAL FOOD RESOURCES

[www.coloradoproud.org](http://www.coloradoproud.org)

\*Look for the Colorado Proud logo in the grocery store

\*Find Farmers' Markets in your city or area.

\*Join a **CSA** (Community Supported Agriculture)

\*Use the Colorado Produce Calendar to make sustainable choices.

**Click here for:**

**[Colorado Farmers' Market locations](#)**

**[Download the Free Colorado Farm Fresh Mobile App-Apple Version](#)**

**[Download the Free Colorado Farm Fresh Mobile App-Android Version](#)**

**[Colorado Produce calendar](#)**

**There are many CSAs in Colorado Springs plan to share with friends or family!**



# Why Do We Care?



Why choose to eat more plant-based and vegetarian?

## **Health Benefits**

- Including a reduction in body weight, lower incidence of diabetes, improvements in blood pressure, lower risk of death related to heart disease and cancer

## **Environmental Protection**

- Decreased water and land use due to lower meat production
- Lower greenhouse gas emissions
- Decreased destruction of biodiversity

## **Social Justice**

- Lower number of livestock slaughtered to sustain current meat-eating habits and greater care of animals and workers

## **Athletic Performance**

- May help improve stamina and shorten recovery after exercise
- Maintained or possibly improved performance

## **Some risks of vegan diets:**

- Vegan diets can be low in iron, zinc, and vitamin B12. These micronutrients are important for oxygen transport (iron and vitamin B12), the immune system and wound healing (zinc).
- Athletes should have their iron status assessed to determine if they need supplementation. Vegan athletes need vitamin B12 supplementation.
- Athletes are encouraged to use nutrient-rich fruits, vegetables, seeds, nuts, sprouted and fermented grain and legume products such as sourdough breads, tofu, or tempeh. Fermentation improves nutrient availability.
- Plant-forward diets are high in fiber, make sure to train your gut during off-season periods.



# Using the Athlete's Plate®

1 easy workout/day or recovery/off day



- Include seasonal fruits and veggies for half the plate
- Include protein rich sources for 1/3 of your plate
- Choose whole grains and starchy vegetables
- Add healthy fats and flavors
- Consume 1 serving of fermented food/drink per day
- Add high protein snacks throughout the day
- Consider adding a Vit B12 supplement on a vegan diet
- Add vegetarian options as desired and to increase protein

Vegetarian/Vegan Athlete's Plate®

## EASY TRAINING

Consider Vitamin D, B12, Iron, and Zinc Supplements

**FATS**  
1-3 tsp



**WHOLE GRAINS**  
Pasta, Rice  
Diverse Grains  
Starchy Veggies,  
Breads, Crackers,  
Corn, Masa, Grits,  
Polenta



**FRUITS & VEGETABLES**  
Seasonal, Local, Fresh  
Veggies and Fruit,  
Vegetable Soups,  
Cooked Vegetables



**PLANT PROTEIN**  
Soy-based Protein  
(Tofu, Tempeh,  
Edamame)  
Diverse Beans, Peas,  
Lentils, Hummus, Falafel  
Meat Alternatives\*  
Nuts/Seeds



**DAIRY & EGGS**  
for vegetarians



**FLUIDS**

Consume at Least 1 Serving of Fermented Food/Drink per Day

**FLAVORS**



Consume Protein-Rich Snacks Throughout the Day

\*minimally processed

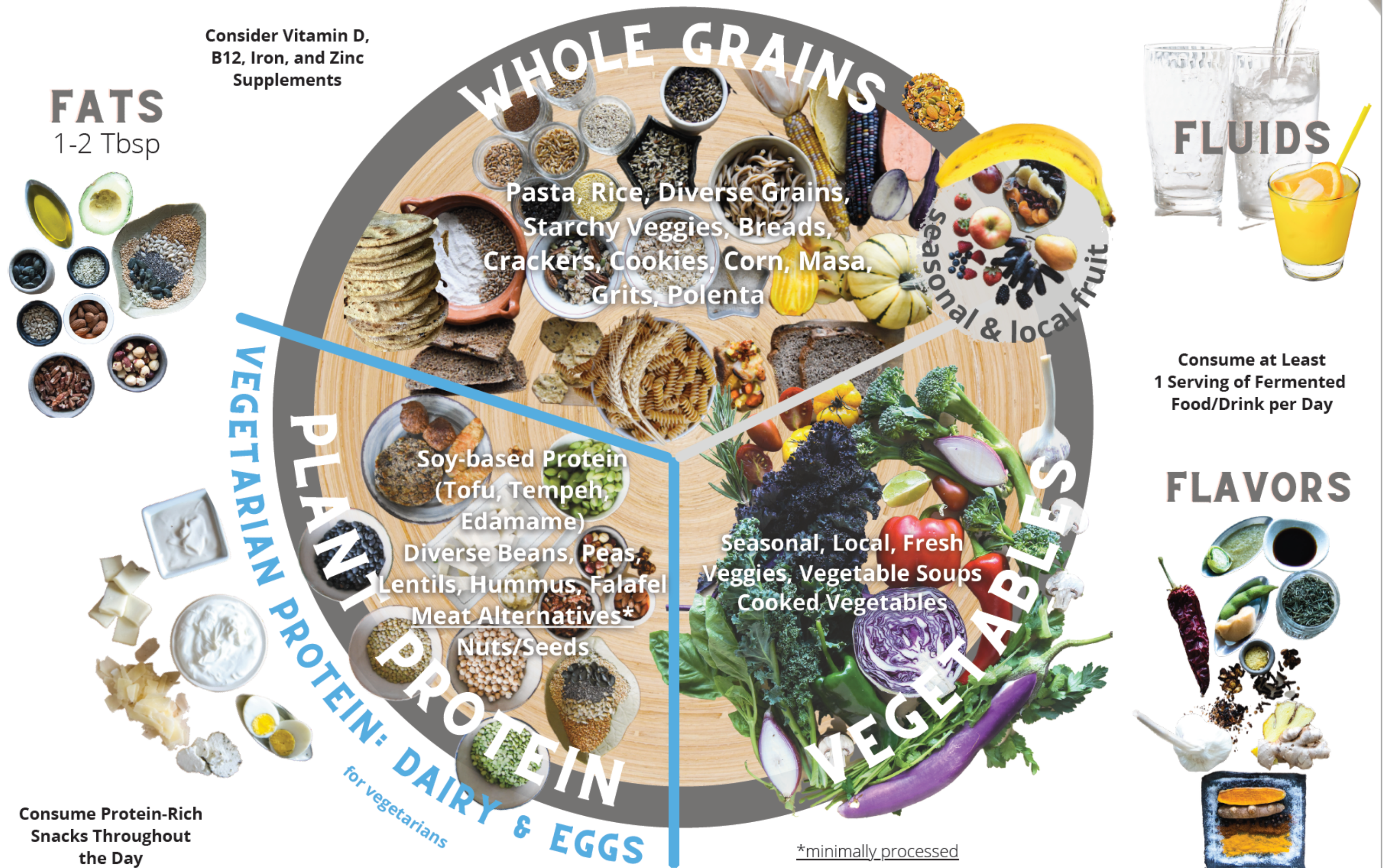
# Using the Athlete's Plate<sup>®</sup>

1-2 workouts per day with 1 harder session

- Increase whole grains and starchy vegetables to 1/3 of plate
- Maintain protein rich sources at 1/3 of plate
- Maintain seasonal vegetables and fruits
- Increase healthy fats and keep food flavorful
- Integrate some diluted juices for fluids
- Consume 1 serving of fermented food/drink per day
- Add high protein snacks throughout the day
- Consider adding a Vit B12 supplement on a vegan diet
- Add vegetarian protein options as desired

Vegetarian/Vegan  
Athlete's Plate<sup>®</sup>

## MODERATE TRAINING





# Using the Athlete's Plate®

2-a-day workouts, competition, tournaments

- Replace whole grains with easily digestible, refined options and maintain starchy vegetables such as potatoes
- Maintain protein rich sources at 1/3 of your plate
- Reduce raw vegetables and replace with cooked vegetables
- Maintain seasonal fruit and add juices
- Increase healthy fats and keep food flavorful
- Consume 1 serving fermented food/drink per day
- Add high protein snacks throughout the day
- Consider adding a Vit B12 supplement on a vegan diet
- Add vegetarian protein options as desired

Vegetarian/Vegan  
Athlete's Plate®

## HARD TRAINING

Consider Vitamin D,  
B12, Iron, and Zinc  
Supplements

**FATS**  
2-3 Tbsp



Consume Protein-Rich  
Snacks Throughout  
the Day



**FLUIDS**



Consume at least  
1 serving of fermented  
food/drink per day

**FLAVORS**



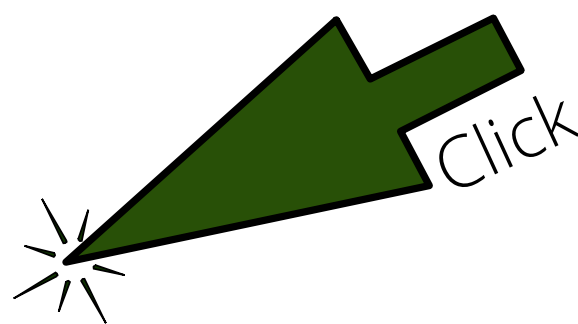
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# Resources

*There are many books and online resources that will help you with additional information. This list provides scientific web sites and some fun blogs for you to explore.*



- [Blue Zones](#)
- [Pick up lime- Recipes](#)
- [Forks over knives - Recipes](#)
- [PCRM \(Physician committee for Responsible Medicine\)/Recipes](#)
- [Bianca Zapatka/Recipes](#)
- [Vegan society/Recipes](#)
- [Mastering Diabetes/Recipes](#)
- [Taaza Table/Recipes](#)
- [Cuisinicity/ Recipes](#)
- [The Food pharmacy/Recipes](#)
- [Cocoon Cooks/Recipes](#)
- [Plant Strong organization](#)
- [UC Davis Integrative Medicine](#)
- [Nutrition Studies Organization](#)
- [Ornish program](#)
- [Dr. Esselstyn web site](#)
- [Happy Cow/Searcher](#)
- [J.L. Goes Vegan \(Colorado Springs chef\)](#)



Recommended reading:

- The China Study, T. Colin Campbell, PhD.
- How Not to Die, Michael Greger, MD.
- Un-Do it, Dean Ornish MD & Anne Ornish
- [Plant-Based Diets for Cardiovascular Safety and Performance in Endurance Sports](#). Neal D. Barnard., Et al.

Recommended Documentaries:

- The Game Changers
- Plant Pure Nation
- Cowspiracy/Seaspiracy
- Forks Over Knives

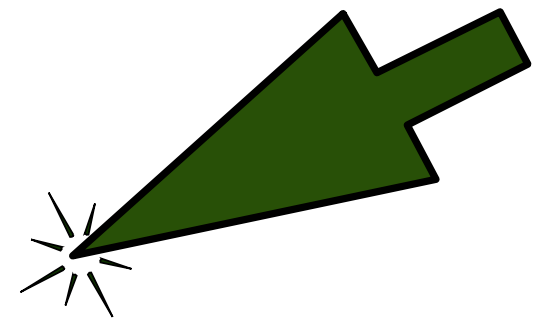




# Additional Resources

*Here are some articles that are helpful tools to expand on the information on the "why do we care" page.*

- [Click here for a peer-reviewed article on health benefits](#)
- [Additional peer-reviewed article on health benefits](#)
- [Click here for a peer-reviewed article on water usage, social justice, and environmental impacts](#)
- [Click here for a peer-reviewed article on vegan diet and athletic performance](#)
- [Click here for a peer-reviewed article on risks/benefits of plant-based diets](#)
- [Click here for more information on supplementation when starting a plant-based diet](#)

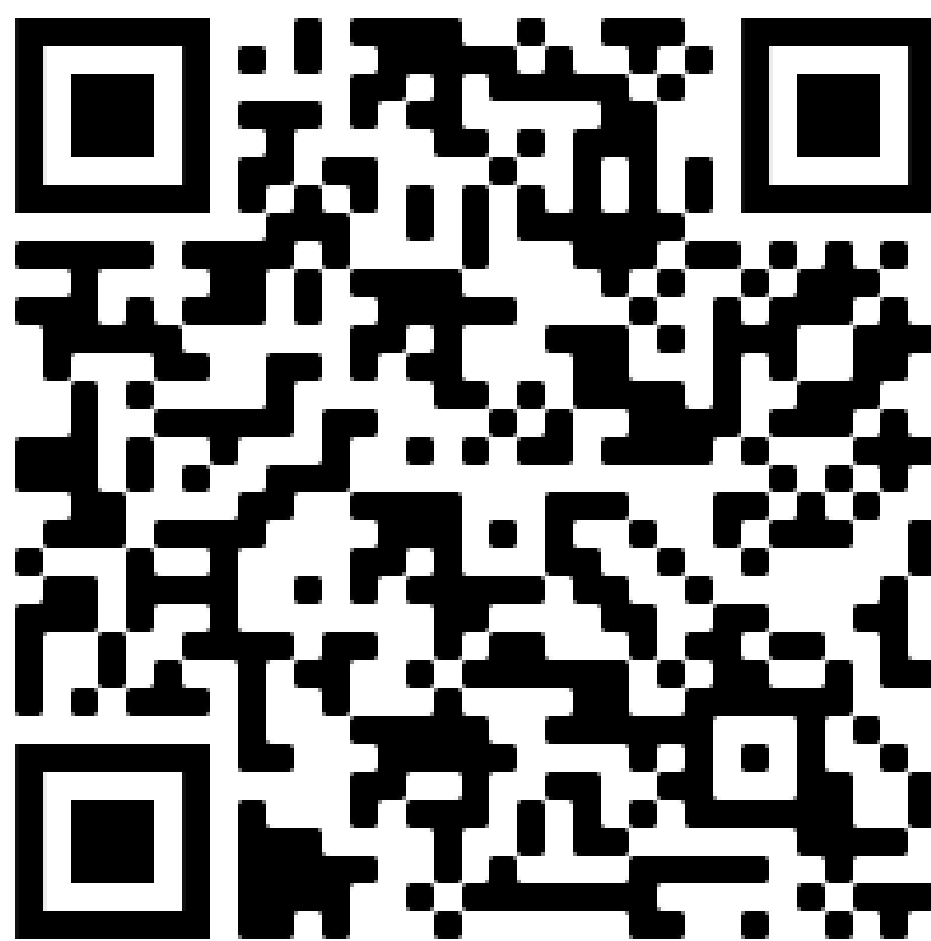




# *Vegetarian/Vegan Athlete's Plate<sup>®</sup> Web Page*



[www.uccs.edu/swell](http://www.uccs.edu/swell)



University of Colorado  
Colorado Springs