JU-SI ADVENTURES

NUTRITION 101 FOR THRU-HIKERS

April 2019

Thru-Hiking Nutrition – Our Perspective

When planning an expedition, or a thru-hike it is wise to consider what foods to eat. Nutrition is key to remaining healthy and having the energy to perform our favorite endurance activity.

You are asking your body to exert a lot of physical effort for long periods of time. Supplying it with proper fuel will maximise your out-put potential and reduce possible health problems in the future. As we age, we lose some cells, such as muscle cells, which do not replicate. Add to this, the possible *autophagy.* This is a condition where; due to a lack of incoming nutrients, the body eats its own tissues in order to recycle proteins and other building blocks for metabolic functioning. The unsuspecting distance hiker may speed the process of aging and tissue atrophy. In turn, their body will be weaker and more susceptible to disease.

Our bodies need certain nutrients to function well. Here is a brief overview of the *macronutrients* and their basic functions. For a broader understanding of nutrition please investigate books, videos and web documents that explain nutrition, metabolic function and the athletic pursuit (see references).

The larger components, or macronutrients, are proteins, carbohydrates, lipids and fiber.

Proteins are made of amino acids and are the building blocks used for enzymes, hormones and tissue replication and repair. A key component of the muscle cells, proteins assist in increasing the size and strength of muscle fibers.

Sources of protein include meat, poultry, fish, eggs and dairy. Vegetarians can form complete vegetarian proteins by combining rice, legumes and corn.

Carbohydrates are the primary source of energy for cellular function. It is especially important for activities lasting more than 60-90 minutes. If carbs are not used immediately, they are stored as *glycogen* in muscle cells, the liver, or as fatty deposits. 2 hours of aerobic activity will deplete the glycogen stores from the muscle cells. 'Bonking' during an endurance competition, is when all glycogen stores have been depleted and no new carbohydrates are consumed. The athlete will experience weakness, extreme fatigue and light-headedness. Therefore, it is important to eat regularly to replenish glycogen stores.

Sources of healthy carbs include fruits, vegetables, grains, legumes and nuts and seeds.

Lipids (or Fats), are stored in fat cells and in muscle fibers in the form of *triglycerides*. Lipids are utilised in the hormonal system, nervous system and in cellular functioning. Because a gram of fat has 9 calories compared to 4 calories per gram of protein or carbohydrates, it is also a great source of energy. Lipids can provide 50-80% of energy needs during prolonged exercise. The liver will release fat stores as *ketones* which can be used for energy. Fat cells also store fat soluble vitamins (A, D, E, K).

Healthy fats can be found in olive, fish and coconut oils, nuts and seeds and avocado

Fiber is often included in this category. Although it does not provide energy, it improves the health of the gastrointestinal system and therefore, does contribute to improved metabolic function. It is recommended to consume 25-34 grams of fiber per day.

Good sources of fiber can be found in fruits, vegetables, whole grains and legumes

Micronutrients are smaller nutritional components that are required for cellular function, chemical messaging, enzyme and hormone production. These micronutrients include vitamins and minerals.

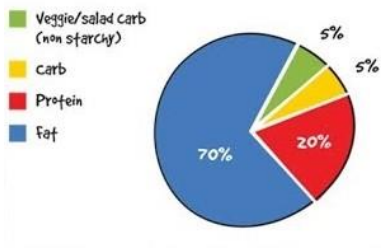
Some minerals, named *electrolytes* include sodium and potassium. These, along with calcium and magnesium assist in chemical messaging and transport into and out of cells. Without these important minerals muscle contractions and metabolic functioning may become negatively affected and lead to serious health problems.

Electrolytes can be found in salty foods, dried fruits, vegetables, nuts and seeds. There are various electrolyte drinks on the market. These vary in effectiveness and quality so research the brands prior to using them.

Consider looking into types of diet and try those that seem to fit with your own body prior to hitting the trail. Whether vegan, vegetarian or omnivore diets interest you, here are 2 macro-ratios worth considering which relate specifically to energy consumption and output:

The Mediterranean diet suggests a ratio of 40% carbohydrates, 40% fats and 20% proteins. This fits well with vegan, vegetarian or omnivore life style choices. Canada's and US food guides are based on this diet. Its chief source of energy comes primarily from carbs.

The Keto diet suggests a ratio of 5% carbohydrates, 70% fat and 25% proteins. The aim of this diet is to change your metabolism from burning carbohydrates to burning fats (production of ketones). Becoming *keto-adapted* may take 3-7 days. Some research suggests that endurance athletes may perform well once keto-adapted. The athletes experience less of the 'bonking' or hypoglycemic lows during their performance as they can readily use ketones as a primary energy source. For more on this type of diet refer to available research in books and articles/videos on the Web relating to this subject.



No matter which diet strategy you choose it makes sense to research what you will consume on your trek. Remember that the more refined or processed a food is, the lower the nutritional value it offers. It may supply basic macros but have little fiber, vitamins or minerals. When choosing foods for your next foray into the woods, choose nutritious options from a variety of sources. This helps with maintaining health, providing optimal fuel for your performance and fight off boredom.

We've included an example of our basic meal plan. It is detailed and includes macro totals and their respective percentages. The two sections of each plan is based on one person (Julie) consuming 3,500 calories and the other (Simon) consuming 5,000 calories per day.

This first plan is for isolated expeditions and is comprised of dehydrated foods:

Freeze dried meal plan 3,500 Cal							**5,000 Cal**					
Food	**Amount**	**Cal**	**Protein**	**Carbs**	**Fat**	**Fiber**	**Amount**	**Cal**	**Protein**	**Carbs**	**Fat**	**Fiber**
BKFT option 1												
Eggs & bacon mix	3/4c	284	29	11	12	4	1.5 c	570	58.5	22.5	24	7.5
oil	1 Tbsp	126	0	0	14	0	1 Tbsp	126	0	0	14	0
Dried onions	1/8 c	24	0	5	0	1	1/8 c	38	0	5	2	0
Sub-total		**434**	**29**	**16**	**26**	**5**		**734**	**58.5**	**27.5**	**40**	**7.5**
BKFT option 2												
Granola	1 c	476.4	10	62	18	6.6	1 c	476.4	10	62	18	6.6
Powdered milk	1/2 c	40	5	5	0	0	1/2 c	40	5	5	0	0
Coconut oil	1 Tbsp	126	0	0	14	0	1 Tbsp	126	0	0	14	0
Dried fruit	1/8 c	62.8	0.5	14.5	0	0.7	1/8 c	62.8	0.5	14.5	0	0.7
Sub-total		**705.2**	**15.5**	**81.5**	**32**	**7.3**		**705.2**	**15.5**	**81.5**	**32**	**7.3**
Snacks												
PB + Mary's crackers	2 Tbsp + 2	468	35	29	20	8	4 Tbsp+ 4	936	70	58	40	16
Mixed salted nuts	1 c	938	24	36	72	12.5	1 c	938	24	36	72	12.5
Dried fruit	1/2 c	130.4	2	28	0	2.6	1/2 c	126.4	1	28	0	2.6
Cheddar cheese	2 oz	410	24	2	34	0	3 oz	606	36	3	50	0
Pepperoni sticks	0	0	0	0	0	0	2	200	24	3	10	0.5
Beef Jerky	4 oz	149	25	1	5	0	4 oz	149	25	1	5	0
Sub-total		**2095.4**	**110**	**96**	**131**	**23.1**		**2955.4**	**180**	**129**	**177**	**31.6**
Supper												
Dried chicken/beef	3/4 c	163	25	0	7	0	1.5 c	326	50	0	14	0
Dried vegetables	3/4 c	64	2	6	0	8	3/4 c	64	2	6	0	8
Soup mix	1/2 c	122	2	20	2	4	1/2 c	122	2	20	2	4
MCT oil powder	1 scoop	78	0	3	6	3	1 scoop	78	0	3	6	3
oil	1 Tbsp	126	0	0	14	0	1 Tbsp	126	0	0	14	0
dried cream/cheese	1 oz	410	24	2	34	0	1 oz	250	24	34	2	0
Sub-total		**963**	**53**	**31**	**63**	**15**		**966**	**78**	**63**	**38**	**15**
Macro totals		434	29	16	26	5		734	58.5	27.5	40	7.5
		2095.4	110	96	131	23.1		2955.4	180	129	177	31.6
		963	53	31	63	15		966	78	63	38	15
		3492.4	**192**	**143**	**220**	**43.1**		**4655.4**	**316.5**	**219.5**	**255**	**54.1**
Macro Percentages			22%	21%	57%				27%	24%	49%	

This second plan is when you have access to fresh foods:

Fresh food plan 3,500 Cal							5,000 Cal					
Food	**Amount**	**Cal**	**Protein**	**Carbs**	**Fat**	**Fiber**	**Amount**	**Cal**	**Protein**	**Carbs**	**Fat**	**Fiber**
BKFT option 1												
Eggs	3	438	39	3	30	0	3	438	39	3	30	0
Olive oil	1 Tbsp	126	0	0	14	0	1 Tbsp	126	0	0	14	0
Radishes/spinach/mushrm	1/2 c	0.8	0	0	0	0.2	1/2 c	0.8	0	0	0	0.2
Onion	1/2 c	42.8	0	8	1.2	0	1/2 c	42.8	0	8	1.2	0
Sub-total		**607.6**	**39**	**11**	**45.2**	**0.2**		**607.6**	**39**	**11**	**45.2**	**0.2**
BKFT option 2												
Granola	1 c	476.4	10	62	18	6.6	1 c	476.4	10	62	18	6.6
Powdered milk	1/2 c	40	5	5	0	0	1/2 c	40	5	5	0	0
Coconut oil	1 Tbsp	126	0	0	14	0	1 Tbsp	126	0	0	14	0
Dried fruit	1/8 c	62.8	0.5	14.5	0	0.7	1/8 c	62.8	0.5	14.5	0	0.7
Sub-total		**705.2**	**15.5**	**81.5**	**32**	**7.3**		**705.2**	**15.5**	**81.5**	**32**	**7.3**
Supper option 1												
Protein	3 oz	300	48	0	12	0	6 oz	440	56	0	24	0
Vegetables	1 c	80	4	12	0	4	1 c	80	4	12	0	4
Soup mix	1/2 c	122	2	20	2	4	1/2 c	122	2	20	2	4
Olive oil	1 Tbsp	126	0	0	14	0	1 Tbsp	126	0	0	14	0
Sub-total		**628**	**54**	**32**	**28**	**8**		**768**	**62**	**32**	**40**	**8**
Supper option 2												
Indian ready to eat	1 pack	177	3	10	13	2	1 pack	177	3	10	13	2
Tuna tetra pack	1 pack	106.5	19	2	2.5	0	1 pack	106.5	19	2	2.5	0
olive oil	1 Tbsp	126	0	0	14	0	1 Tbsp	126	0	0	14	0
Instant rice	3/4 c	23	3	2	0	0.75	3/4 c	23	3	2	0	0.75
Sub-total		**432.5**	**25**	**14**	**29.5**	**2.75**		**432.5**	**25**	**14**	**29.5**	**2.75**
Snacks												
PB + Mary's crackers	2 Tbsp + 2	468	35	29	20	8	4 Tbsp + 4	936	70	58	40	16
Mixed salted nuts	1 c	938	24	36	72	12.5	1 c	938	24	36	72	12.5
Dried fruit	1/2 c	130.4	2	28	0	2.6	1/2 c	126.4	1	28	0	2.6
Cheddar cheese	1 oz	196	12	1	16	0	2 oz	410	24	2	34	0
Mountain bread	1 square	290.8	6	24	18	2.2	2 square	533.6	12	36	36	4.4
Pepperoni sticks	0	0	0	0	0	0	2	200	24	3	10	0.5
Beef Jerky	4 oz	149	25	1	5	0	4 oz	149	25	1	5	0
Sub-total		**2172**	**104**	**119**	**131**	**25.3**		**3293**	**180**	**164**	**197**	**36**
Macro Totals		607.6	39	11	45.2	0.2		607.6	39	11	45.2	0.2
option 1		2172.2	104	119	131	25.3		3293	180	164	197	36
		628	54	32	28	8		768	62	32	40	8
		3408	**197**	**162**	**204.2**	**33.5**		**4669**	**281**	**207**	**282.2**	**44.2**
Macro Percentages			23%	23%	54%				24%	22%	54%	
Macro Totals		705.2	15.5	81.5	32	7.3		705.2	15.5	81.5	32	7.3
option 2		2172.2	104	119	131	25.3		3293	180	164	197	36
		432.5	25	14	29.5	2.75		432.5	25	14	29.5	2.75
		3310	**144.5**	**214.5**	**192.5**	**35.35**		**4431**	**220.5**	**259.5**	**258.5**	**46.05**
Macro Percentages			17%	30%	52%				20%	28%	53%	

Bon appétit!

References:

Conditioning for Outdoor Fitness *by David Musnick & Mark Pierce*

Superbodies *by Greg Wells*

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