



## Fueling Strategies For Triathletes – TRAINING

The first article in this series dealt with the use of specific E-CAPS supplements on a daily or “as needed” basis; now we’re talking fueling – the fluids, calories, and electrolytes your body needs during and after your workouts. First, let’s look at the Hammer Nutrition fuels -[Hammer Gel](#), [Hammer H.E.E.D.](#), [Sustained Energy](#), [Perpetuem](#), [Endurolytes](#), [Hammer Soy](#), [Hammer Whey](#) – what they’re about and how best to use them. Next, we’ll get into specific usage/dosing suggestions for training and recovery.

### Hammer Nutrition Fuels – Calorie/Energy Sources

- [Hammer Gel](#) and [Hammer H.E.E.D.](#) - Because they are both all-carbohydrate fuels, are the best choices for fast-paced events lasting 1-2 hours, especially when the pace is fast and intense (75-85% MHR)
- [Sustained Energy](#) – A neutral flavored fuel that contains 87% carbohydrates (no added simple sugars of course), and 12+% soy protein, the combination of which is ideal when rate of exercise is between 70-85% MHR... a "sustained" effort in events lasting 3-12 hours.
- [Perpetuem](#) – Contains 75% carbohydrates (no added simple sugars of course), 13% fatty acids from a specially made long-chain lyso-lecithin, and nearly 10% soy protein. It was designed primarily for the extreme endurance athlete doing events that last from 6 hours to 6 days or longer. Perpetuem digests very slowly and thus provides maximal benefits at an aerobic pace (under 70% MHR)

### Primary differences between [Sustained Energy](#) and [Perpetuem](#)

A.) [Sustained Energy](#) is a neutrally flavored drink whereas [Perpetuem](#) has an orange-vanilla "Dreamside" flavor.

B.) [Perpetuem](#) contains a specific amount of a specific lyso-lecithin fat whereas [Sustained Energy](#) does not. The primary benefit for including this fat is for longer distance workouts and races, when the pace is more aerobic. When the body receives a small portion of fat it “gives a signal to the body” that it’s “OK” to release its stores of fatty acids more liberally. Considering that fatty acids fulfill up to 70% of one’s energy requirements in long bouts of exercise getting the body to access and utilize them more liberally is definitely a bonus. A little bit of fat also tends to make the one feel more calorically "satisfied" (fat slows the rate of digestion slightly), which is attractive when doing long distance/primarily aerobic bouts of exercise.

C.) [Perpetuem](#) contains sodium tribasic phosphate, which, among its other benefits, is a tremendous lactic acid buffer. [Sustained Energy](#) does not contain this nutrient.

D.) [Perpetuem](#) contains a newer strain of soy protein called "XT," which, along with the sodium contained in the sodium tribasic phosphate component, provides a more complete mineral profile. The mineral content in a 2-scoop serving [Perpetuem](#) may (key word “may”) allow the athlete to cut back on their [Endurolytes](#) dose by 1 capsule an hour (although I have personally not found this to be the case). Also, the “XT” soy protein contains a higher isoflavone content. Isoflavones, which are naturally occurring phyto-chemicals in soy protein, are believed to have superb cardiovascular health benefits. [Sustained Energy](#) does have soy protein in it and its isoflavone content is excellent, but the strain used in [Perpetuem](#) has an even higher isoflavone content.

### NOTES:

1.) The above “fuel selection guidelines” are just that; they’re guidelines only and what may be ideal for some athletes under specific conditions may not work for others in identical conditions. For example, though [Perpetuem](#) was designed for more aerobic paced, longer distance efforts, we receive positive reports daily from athletes who have used [Perpetuem](#) only in much shorter races.

2.) All Hammer Nutrition fuels are completely compatible with one another so they can be used interchangeably if desired. This is especially beneficial in training because you have a greater variety of fuel to choose from. In a race (which I’ll discuss in more detail in the next article) [Perpetuem](#) and/or [Sustained Energy](#) is the ideal choice during the bike portion while, [Hammer Gel](#), if only because it’s easier to carry and consume, may be a better choice during the run portion. If carrying a bottle of calories is not problematic for you, [Hammer H.E.E.D.](#) is a fantastic choice during the run portion. Again though, I’ll discuss race fueling strategies in more detail in the next article.



3.) During long workouts and races, just because [Hammer Gel](#) and [Hammer H.E.E.D.](#) are designed to be used for events/workouts in the two-hour range and lower, it doesn't mean you have to start with them for the first two hours, then switch to [Sustained Energy](#) or [Perpetuem](#). Again, all these fuels are very compatible with each other and in long distance workouts/races you have a couple options:

- A.) You can use [Sustained Energy](#) or [Perpetuem](#) as your sole calorie source every hour from beginning to end, or:
- B.) You can use [Hammer Gel](#) and/or [Hammer H.E.E.D.](#) occasionally during the workout/event, as long as [Sustained Energy](#) or [Perpetuem](#) is their primary source of fuel (approximately two-thirds to, ideally, three-quarters of the time). You **do not** need to start with [Hammer Gel](#) or [Hammer H.E.E.D.](#) the first two hours, then switch to [Sustained Energy](#) or [Perpetuem](#).

### Hammer Nutrition Fuels – Electrolytes and Protein Powders

- [Endurolytes](#) is a full spectrum, rapidly assimilated electrolyte supplement and is as important a component of your fueling as the water you're drinking and the calories you're eating. While the above four fuels provide the calories your body needs to make energy (the body's "gasoline"), electrolytes can be thought of as the "motor oil" for the body, providing it with the essential minerals it needs to maintain the optimal performance of many important functions, such as muscular contraction.
- [Hammer Soy](#) – A great "all purpose" all-vegetable protein that has many health benefits. Believe it or not, most athletes have woefully inadequate protein intakes from their daily diet. Soy protein, in addition to the health benefits it supports, is a concentrated protein source, which helps athletes to fulfill the complete protein needs.
- [Hammer Whey](#) – For supporting rapid recovery - lean muscle tissue rebuilding and optimal immune system functioning - between workouts and races, whey protein has no peer. It is the most bioavailable form of protein with the highest amount of Branched Chain Amino Acids (BCAA) than any other protein source. Hammer Whey adds three (3) grams of glutamine per scoop, providing even more muscle rebuilding and immune system enhancing benefits.

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## Basic Fueling Principles

Although the topic of how to properly fuel the body during endurance exercise is a subject that requires much more than a few paragraphs (please see "[The Endurance Athlete's Guide to Success](#)" for more detailed information), there are some key things that endurance athletes should know and apply, which I believe will yield tremendous benefits.

Dr. Bill Misner, the head of R&D at E-CAPS/Hammer Nutrition states: "To suggest that fluids, sodium, and fuels-induced glycogen replenishment can happen at the same rate as it is spent during exercise is simply not true. Endurance exercise beyond 1-2 hours is a deficit spending entity, with proportionate return or replenishment always in arrears. The endurance exercise outcome is to postpone fatigue, not to replace all the fuel, fluids, and electrolytes lost during the event. It can't be done, though many of us have tried."

What this means, in regards to fluids, calories, and electrolytes/sodium, is that the body cannot be replenished at the same rate that it becomes depleted. Yes, the body needs your assistance in replenishing what it loses but that donation must be in amounts that cooperate with normal body mechanisms, not in amounts that override these crucial mechanisms.

### **FLUIDS**

When it comes to fluid intake, experts such as Dr. Tim Noakes and Dr. Ian Rogers suggest that a fluid intake between 500-750 milliliters/hr (16.9-25.4 fluid ounces per hour) will fulfill most athlete's hydration requirements under most conditions. I like what Dr. Rogers says: "Like most things in life, balance is the key and the balance is likely to be at a fluid intake not much above 500 milliliters (16.9-25.4 fluid ounces per hour) per hour in most situations, unless predicted losses are very substantial." [Fluid and Electrolyte Balance and Endurance Exercise: What can we learn from recent research? by Ian Rogers @: <http://www.wms.org/education/Hyponatremia.htm>]



# Coach-Athlete Q&A

A look at some coach-replies to common questions by topic.

We at E-CAPS/Hammer Nutrition have found that most athletes do very well, under most conditions with a fluid intake of 20-26 ounces per hour (roughly the equivalent of a small to large water bottle). Sometimes you may not need that much fluid, sometimes you might need slightly more. If more fluid intake is found to be necessary (under very hot conditions, for example) it will most likely be necessary to increase electrolyte intake as well.

## CALORIES

As far as calorie replenishment is concerned, the body has a limit to what it can accept from carbohydrate donation for return to the energy cycle. Researchers such as Coleman, Noakes, and others (in carbohydrate oxidative research) agree that up to 1.0 - 1.1 grams of carbohydrate per minute can be utilized from exogenous (outside) carbohydrate donation. A 1.0 g/carb per minute donation is 240 carbohydrate calories per hour. A 1.1 g/carb per minute donation is 264 carbohydrate calories per hour. Taking into account that some of those calories - approximately 6-23% - are burned/lost during the digestive process, this suggests that for the average athlete the minimum intake is 254.4 calories to obtain 240 calories per hour (1.0 per minute with 6% lost in route) while the absolute upper maximum is 324.72 carbohydrate calories required in order to regenerate 264 carbohydrate calories (1.1 per minute with 23% lost in route).

We take the conservative side and suggest a slightly lower overall dose after finding that these higher amounts only induced gastric stress disorders and reduced performance in many athletes. This is why our common recommendation is approximately 60-70 grams of carbohydrates hourly (240-280 calories). That will, in most situations, and for most athletes, provide enough carbohydrates for energy production (the limit of what the body can metabolize) while taking into account a percentage of those calories being lost/burned during the digestive/metabolic processes.

### Simple Sugars vs. Complex Carbohydrates

Another primary factor of importance to endurance athletes is the type of carbohydrate used. We believe the only type that any athlete should consume, especially during exercise, are long-chain (a.k.a. "complex") carbohydrates and never short-chain carbohydrates (a.k.a. "simple sugars"). Fuels containing simple sugars (glucose, sucrose, fructose, dextrose) must be mixed in weak 6-8% solutions in order to match body fluid osmolality and be digested with any efficiency. Unfortunately, solutions mixed and consumed at this concentration will only provide about 100 or so calories an hour, which is inadequate for maintaining energy production. However, you can't make a "double or triple strength" mixture from a simple sugar-based in the hopes of obtaining adequate amounts of calories because the concentration of that mixture will exceed 6-8%. Once that 6-8% solution concentrate is exceeded (or if a simple sugar-based fuel is consumed with or near a complex carbohydrate product) osmolality is raised and, unless more water and electrolytes are added to the mix (at which point the athlete might very well be flirting with over hydration), that concentrated simple sugar solution will not pass the gastric channels... it will literally sit in the stomach. Even more problematic is that if more fluids and electrolytes are not available the body will recruit these from other areas in the body (areas that critically need these fluids and electrolytes) and divert them to the digestive system to aid in the digestion of this too-concentrated simple sugar mix. Simply put, simple sugar-based drinks or gels have to be mixed and consumed at very dilute (and thus, calorically weak) concentrations in order to be digested with any efficiency. And again, when a simple sugar-based product is used it at properly mixed proportions it cannot provide adequate amounts of calories for energy production.

Complex carbohydrates, however, will match body fluid osmolality, not at a 6-8% solution, but a more concentrated 15-20% solution. Even at this seemingly too-high concentration complex carbohydrates (such as maltodextrins/glucose polymers) will empty the stomach at the same efficient rate as normal body fluids and provide substantially more calories (up to three times more) than simple sugar mixtures will.

To sum up, if the athlete consumes a simple sugar fuel the body will only permit 6-8% of it in solution into circulating serum for fuel replacement. On the other hand, complex carbohydrate fuels are easily and more-rapidly absorbed in a 15-20% solution. More calories are absorbed faster, and are available for energy production, from complex carbohydrates than simple sugar. The higher the simple sugar content, the higher the solution osmolality, the less of it is absorbed immediately. The longer the chain of sugars linked together as a complex carbohydrate the more of it is absorbed in higher solution because its osmolality is closer to that of body fluids. Therefore, the ideal carbohydrate source for athletes is long-chain complex carbohydrates.



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A look at some coach-replies to common questions by topic.

## The Need For Protein

When exercise goes into the second hour and beyond, supplemental protein will fulfill the 5-15% energy requirements of the body while also preventing the cannibalization of lean muscle tissue (which, among other things, produces excess amounts of performance-robbing ammonia). Therefore, it makes sense during long exercise sessions or races, to include some protein in the fuel mix. A donation in the range of 3-10 grams of protein (12-40 calories) will satisfy this 5-15% protein requirement. We believe that soy protein, with its specific amino acid profile and naturally occurring isoflavones, is an ideal protein source for use during exercise.

## ELECTROLYTES

Electrolyte replenishment is as important a component of proper fueling as the fluids you drink and the calories you consume because they are crucial for maintaining the optimal performance of many of the body's functions such as proper muscular contraction. Far too many athletes forget to replenish electrolytes consistently or mistake "electrolyte replenishment" for "sodium or salt replenishment." Sodium chloride (a.k.a. "salt") is indeed an important component of electrolyte replenishment but it does not fulfill the entire requirements. A satisfactory electrolyte replenishment product needs to include sodium, chloride, calcium, magnesium, and potassium as all these minerals play a key role in the maintenance of these important body functions.

In terms of sodium replenishment, far too many athletes "over salt" their bodies during exercise, with bloating, water retention (edema-like symptoms), and stomach distress being the usual outcome. We want our body to re-circulate adequate amounts of sodium for supporting systemic balance of osmolality, carbohydrate transit across gastric membranes, and nerve transmission for muscle contractions. Too much of a sodium donation neutralizes this re-circulation process and again, may contribute towards those aforementioned, performance-inhibiting problems. The key for electrolyte replenishment, as it is with calories and fluids, is to provide an adequate dose to support bodily functions without overwhelming the body with too much, which will override and neutralize those body functions. Therefore, to satisfy the body's crucial electrolyte requirements, we suggest consistent/hourly replenishment from a balance of electrolytes, which would include a donation of up to 300-600 mg sodium chloride (a.k.a. "salt").

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## Pre-Workout Fueling

- 1.) First, let's talk about pre-workout food consumption. There are two ideal choices available in terms of pre-workout food consumption:
  - Complete food consumption (200-400 calories is all that is necessary) three hours prior to the workout. This will prevent the too-rapid depletion of muscle glycogen stores, which is a hard-earned, premium fuel, the first your body will use when exercise begins.
  - If completing food consumption three hours prior to the beginning of a workout is not possible (if your workout begins first thing in the morning, for example) you can accomplish the same "muscle glycogen preservation" goal by either consuming a small amount of fuel (approximately 100-275 calories) 5-10 minutes prior to the workout or eating nothing at all prior to the workout; simply begin refueling the body shortly after it begins.

For more detailed information about this particular subject, please read "The Pre-Race Meal Simplified" in the fueling handbook "[The Endurance Athlete's Guide to Success.](#)"

- 2.) Using the suggested dosages suggested in the Supplement Strategy article, remember to take your pre-workout dose of [Race Caps Supreme](#), [Mito-R Caps](#), and, prior to longer workouts, [Anti-Fatigue Caps](#).
- 3.) Take 1-3 [Endurolytes](#) with your other pre-workout supplements. Consider this dose as a "pre-emptive" strike of sorts, having these minerals in your body prior to the workout will take care of your electrolyte requirements during the first portion of your workout.



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## During Workout Fueling

### Workouts of 1-2 Hours

#### Calories - Suggested Doses\*:

- **Up to 120 pounds:**  
[Hammer Gel](#) – 2 servings/hour **OR**  
[Hammer H.E.E.D.](#) – 1 to 1.5 scoops/hour
- **120-155 pounds:**  
[Hammer Gel](#) – 2.5 servings/hour **OR**  
[Hammer H.E.E.D.](#) – 2 to 2.5 scoops/hour
- **155-190 pounds:**  
[Hammer Gel](#) – 3 servings/hour **OR**  
[Hammer H.E.E.D.](#) – 2.5 to 2.75 scoops/hour
- **190+ pounds:**  
[Hammer Gel](#) – 3 to 3.5 servings/hour **OR**  
[Hammer H.E.E.D.](#) – 3 scoops/hour

\* These are estimated doses. Each athlete should determine in training, under a variety of conditions, their personal optimum.

If you've consumed some fuel just prior to your workout (in the 5-10 minute window) that may very well satisfy energy requirements for workouts up to 2 hours in length. However, it still is a good idea to carry additional calories in the event additional fuel becomes necessary (the "it's better to be looking at it, than looking for it" train of thought). If no calories are consumed just prior to the workout you'll definitely need to refuel your body during your workout, especially if it goes beyond an hour. [Hammer Gel](#) or [Hammer H.E.E.D.](#) will be ideal fuels to use during workouts of 1-2 hours, when carbohydrates + muscle glycogen stores will fulfill energy needs.

#### Electrolytes - Suggested Dose:

- 1-6 [Endurolytes](#) per hour

Unlike calorie and fluid absorption and depletion rates, which remain fairly constant from athlete to athlete, electrolyte expenditure (and thus replenishment) varies tremendously. Body weight, level of fitness, weather conditions, acclimatization level, and biological predisposition all greatly affect electrolyte depletion and hence, the need for replenishment. That's why the hourly replenishment dose of [Endurolytes](#) can be anywhere from 1-6 capsules an hour. That being said, a good "starting dose" for lighter weight athletes is 1-2 capsules an hour. For medium weight athletes it's 2-3 an hour, for larger athletes it's 4-6 an hour. Remember though, these are suggested starting doses and the amount you need may be different, and may vary from hour to hour. If you've consumed [Endurolytes](#) prior to your workout that may completely fulfill most, if not all, your electrolyte requirements during one-hour training sessions.



NOTE: Each 2-scoop serving of [Hammer H.E.E.D.](#) contains the equivalent of about 1.5 capsules of [Endurolytes](#); for some, that may completely fulfill an hour's worth of electrolyte requirements. For others it's a good base from which to add a few [Endurolytes](#) capsules.

## Workouts 2-3 Hours or longer

### Calories - Suggested Doses\*:

- **Up to 120 pounds:**  
[Sustained Energy](#) – 1.5 scoops/hour **OR**  
[Perpetuem](#) – 1 scoop/hour
- **120-155 pounds:**  
[Sustained Energy](#) – 1.75 - 2 scoops/hour **OR**  
[Perpetuem](#) – 1 – 1.5 scoops/hour
- **155-190 pounds:**  
[Sustained Energy](#) – 2.25 – 2.5 scoops/hour **OR**  
[Perpetuem](#) – 2 scoops/hour
- **190+ pounds:**  
[Sustained Energy](#) – 2.5 – 3 scoops/hour **OR**  
[Perpetuem](#) – 2.25 – 2.5 scoops/hour

*\*These are estimated doses. Each athlete should determine in training, under a variety of conditions, their personal optimum.*

### To achieve best results during longer workouts, remember:

- 1.) [Sustained Energy](#) or [Perpetuem](#) should be your primary source of fuel (approximately two-thirds to, ideally, three-quarters of the time).
- 2.) You can use [Sustained Energy](#) or [Perpetuem](#) as your sole calorie source every hour from beginning to end or you can use [Hammer Gel](#) and/or [Hammer H.E.E.D.](#) occasionally during the workout to provide a little variety in your menu (remember to keep [Sustained Energy](#) or [Perpetuem](#) as their primary source of fuel).
- 3.) You **do not** need to start with [Hammer Gel](#) or [Hammer H.E.E.D.](#) the first two hours, then switch to [Sustained Energy](#) or [Perpetuem](#).
- 4.) If you're using E-CAPS supplements, don't forget to take your hourly doses of them, as suggested in the " [Supplement Strategies For Triathletes](#)" article

### Electrolytes - Suggested Dose:

- 1-6 [Endurolytes](#) per hour

Remember, electrolyte expenditure (and thus replenishment) varies tremendously due to many variables such as body weight, level of fitness, weather conditions, acclimatization level, and biological predisposition. That's why the hourly replenishment dose of [Endurolytes](#) can be anywhere from 1-6 capsules an hour. That being said, a good "starting dose" for lighter weight athletes is 1-2 capsules an hour. For medium weight athletes it's 2-3 an hour, for larger athletes it's 4-6 an hour. Remember though, these are suggested starting doses and the amount you need may be



different, and may vary from hour to hour. If you've consumed [Endurolytes](#) prior to your workout that should take care of the first hour's electrolyte requirements. Remember to take [Endurolytes](#) every 30-60 minutes during your workout.

## SUSTAINED ENERGY/PERPETUEM MIXING OPTIONS

You can mix and consume [Sustained Energy](#) or [Perpetuem](#) three different ways depending on individual preference and logistical concerns. Please experiment with the following options to determine which works best for you.

- The One-Hour Bottle:** This method works best in training or racing situations where you have a support crew and vehicle. Because you have a crew going along with you, they can keep your mixed bottles chilled, mixing up fresh bottles of fuel along the way. If you're without a support crew but want to use this option for mixing, keep in mind that because both hydration and caloric requirements are essentially trying to be satisfied from one source, this limits your ability to adjust your fluid intake without affecting your caloric intake and vice versa. To use this method, simply mix the suggested amount of scoops of [Sustained Energy](#) or [Perpetuem](#) for your bodyweight in a water bottle, small (20 ounces) or large (24-28 ounces). Consume one bottle hourly.
- The Multi-Hour Bottle:** This is by far the most convenient method of fueling because it allows you to be self contained for many hours, requiring only additional plain water along the way. The only limitation is how many scoops you can fit into a bottle. Determine your proper hourly intake in scoops by experimenting with the numbers from the dosage chart above. For example, let's say you've determined through testing that 1.5 scoops of [Perpetuem](#) per hour is your ideal caloric intake. You need a 6-hour fuel supply. Simply mix 9 scoops (1.5 x 6) in a large bottle with as much water as will fit in. You may need to add a few scoops with some water and shake thoroughly before adding the remainder of the desired total number of scoops to get all of them to fit into the bottle. You then "nurse" this bottle taking small sips every 15-20 minutes. In this concentration, the water in the mixed bottle does not contribute more than a couple of ounces to your hourly fluid intake needs. To meet your fluid requirements, you carry a second and possibly even a third bottle of plain water (or use one of the many hydration packs/systems available). Drink from them according to the temperatures so that you are consuming a total of 16-24 ounces of plain water per hour, depending on the severity of the heat stress. This way, as long as you can pick up more water from aid stations or a store, you're set.
- Gel or Paste:** If you want to carry the highest volume of calories in the least amount of space, this is your best option. [Sustained Energy](#) or [Perpetuem](#) can be made into a super-concentrated, near-paste like consistency and dispensed from a [Hammer Gel flask](#). Using a blender or bowl and spoon, mix scoops of with a small amount of water, gradually adding water as necessary to create the consistency desired. Remember that the heavier, more concentrated [Perpetuem](#) is mixed, the sweeter and stronger the flavor will become. Depending on how many scoops per hour you have determined you require, and based on how concentrated the mix is, each flask of [Sustained Energy](#) or [Perpetuem](#) can supply you with 2-4 hours of fuel. As with the multi-hour bottle, to meet your fluid requirements, you carry additional bottles of plain water or use a hydration pack. Drink from them according to the temperatures so that you are consuming a total of 16-24 ounces of plain water per hour, depending on the severity of the heat stress. This way, as long as you can pick up more water from aid stations or a store, you're set.

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## Post-Workout Fueling

Recovery begins as soon as the workout ends and the sooner you "re-fill" the tank, the quicker your recovery will be and the better prepped your body will be for the next workout. In other words, how well you recover today greatly determines how well you perform tomorrow. To put the "finishing touches" on your workouts, and to get the full value out of every minute you've put into them, make sure you consume adequate amounts of high quality and easily digested carbohydrates and protein as soon as possible after each of your training sessions. Now is also a good time to take the post-workout supplements as suggested in the "[Supplement Strategies For Triathletes](#)" article. For more detailed



information on the importance of post-workout fueling, please refer to the article “Superior Recovery” in [“The Endurance Athlete's Guide To Success.”](#)

### Suggested Recovery Formulas\*:

- 1 – 1.5 scoops [Hammer Whey](#) + 3-4 servings of your favorite flavor of [Hammer Gel](#) in 6-8 ounces cold water. You can of course use more water than the 6-8 ounces suggested. However, both the [Hammer Whey](#) and [Hammer Gel](#) components will all mix quite easily in very little water, which may be desirable if you don't want to eat or drink much after a hard workout.
- 1 – 1.5 scoops [Hammer Whey](#) + 2-4 scoops of [Hammer H.E.E.D.](#) in 12-24 ounces cold water.
- 1 – 1.5 scoops [Hammer Whey](#) + 2-3 scoops of [Sustained Energy](#) in 12-24 ounces orange juice.

\* Experiment! The amount you use can be determined by your body size (lighter weight athletes may use the lower amounts, heavier athletes the higher amounts) or by length/intensity of the workout (you can use the lower suggested amounts after shorter workouts, the higher amount after longer or harder workouts).

**Steve Born is a technical advisor for E-CAPS with over a decade of involvement in the health food industry. He has worked with hundreds of athletes – ranging from the recreational athlete to world-class professional athlete - regarding their supplement/fueling program. Steve is a three-time RAAM finisher, the 1994 Furnace Creek 508 Champion, 1999 runner-up, the only cyclist in history to complete a Double Furnace Creek 508, and is the holder of two Ultra Marathon Cycling records. In February 2004 Steve was inducted into the Ultra Marathon Cycling Hall of Fame.**

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