



Performance Nutrition: How to Optimize Performance

SOF Operators often seek out their SOF Performance Dietitians for guidance on how to enhance performance during training and missions. More often than not, many Operators are using only water during physical events lasting more than 60 minutes, and the amounts consumed tend to still be inadequate to mitigate performance deficits caused by dehydration. Many Operators also do not carry adequate carbohydrate, electrolyte or protein sources, if they pack them at all. Studies show that fueling appropriately during physical events lasting over 60 minutes, will increase endurance potential and time to exhaustion, maintain desired pace longer (especially during events longer than 90 minutes), as well as help maintain a higher intensity for longer durations.

Consuming carbohydrates during events lasting >1 hour will extend endurance performance, but the physiologic mechanisms for processing carbohydrates will change as the event intensity and duration change. Most forms of carbohydrate can be tolerated up to the 2 hour mark; after that time focusing on the type of carbohydrate can be important. Utilizing easily digested carbohydrate sources, like glucose, glucose plus fructose, other simple sugars and maltodextrin seem effective. However, when event duration is 2-3 hours, focusing on glucose or maltodextrin, which are rapidly digested, optimizes the absorption of dietary carbohydrates during the event. When event duration is expected to extend beyond 2.5 hours, consuming carbohydrates in the form of glucose plus fructose versus glucose alone can enhance your carbohydrate digestion as well as aid in tolerating the higher ingestion rates of carbohydrates needed for these durations. Subsequently, the glucose plus fructose combination will aid in enhancing fluid absorption, may reduce gastrointestinal stress and can even enhance performance more than when ingesting glucose alone. Mixing and matching carbohydrate sources via bars, gels, or fluids can also be done as the carbohydrates contained within these forms are all digested similarly. Be cautious of consuming fructose alone as a carbohydrate source, this may adversely cause diarrhea issues.

Ensuring adequate, but not excessive, hydration and maintaining an appropriate electrolyte balance can further optimize performance. Performance deficits can begin with as little as a 2-3% loss of body weight due to sweat. On a hot humid day, an Operator might sweat 1-2 liters per hour with some Operators sweating as much as 2-3 liters per hour. Additionally, the sodium lost through sweat can range from 575-1725 milligrams per liter. Including a sodium source during events aids in reducing electrolyte imbalances and preventing hyponatremia. Combining sodium appropriately with fluids during events, can also aid in preventing both hypo- and hypernatremia. It may not be practical to test for sodium losses in sweat, therefore Operators experiencing muscle cramps, white residue on their clothes, stinging eyes from sweat during training or whose skin is gritty after training most likely are "salty sweaters". These Operators should ensure adequate salt intake throughout the day by consuming high sodium foods or by lightly salting their foods during meals and snacks. Additionally, "salty sweaters" may want to aim for 800mg sodium per liter of fluid per hour during events lasting >60 minutes. In general, most Operators should aim for 400mg sodium per liter of fluid per hour for events lasting 1-3 hours, increasing to 800mg sodium per liter of fluid per hour when event duration is expected to exceed 3 hours.

Because many SOF Operators carry kit and/or ruck loads during training and missions, it is important to consume protein during prolonged events to prevent or minimize lean mass losses. Total event duration is not always known in advance, therefore when it becomes apparent that events will exceed 3 hours, it is recommended to consume no more than 0.2g protein/Kg/hour, (i.e. ~ 15-20g protein per hour for both males and females, however Operators weighing >200 lbs may need more). Consuming a protein source that contains 20-25g protein every 2-3 hours is also sufficient.

Lastly, within the 60 minutes immediately following training or missions, it is recommended to consume 20-25g protein in a liquid form that is high in leucine (i.e. milk or whey) to optimize muscle synthesis. Coupling post-training/mission protein with carbohydrate will also accelerate the replacement of muscle carbohydrate stores and can spare ingested protein for use in muscle recovery, repair and building. Nutrition is a powerful performance enhancer, exploit this performance edge. See chart provided for summary of recommendations to optimize performance with nutrition.



Performance Nutrition: Fueling Requirements

Day to Day

Timing	Fluid Needs	Electrolyte Needs	Carbohydrate Needs	Protein Needs	Fat Needs
Everyday Nutrition	Drink to prevent dry mouth	Lightly salt foods or consume sodium containing foods throughout the day	Aim for 3-8g/kg daily	1.5-2g/Kg daily	0.7-1g/Kg daily

Before, During and After Training/Missions

Timing	Fluid Needs	Electrolyte Needs	Carbohydrate Needs	Protein Needs	Fat Needs
During the 24-72 hours before endurance events lasting >90	Drink to prevent dry mouth	Lightly salt foods or consume sodium containing foods throughout the day	Aim for 10g/Kg/day	20g protein spaced 5-6x daily	~20-30% of total daily energy intake
2+ hours before event	16-24oz fluid	N/A	Consume a meal that provides carbohydrates, proteins and fats.		
30 min before event	5-10oz fluid	N/A	30g	N/A	N/A
<30 minute events	5-10oz every 15 minutes	N/A	N/A	N/A	N/A
<30-75 minute Events	5-10oz every 15 minutes	N/A	Rinse mouth with sports drink or use a hard candy. Most forms of carbs are tolerated.	N/A	N/A
1-2 hour events	5-10oz every 15 minutes	400-800mg sodium/liter of fluid/hour	Up to 30g/hour. Most forms of carbs are tolerated.	N/A	N/A
2-3 hour events	5-10oz every 15 minutes	400-800mg sodium/liter of fluid/hour	30 to 60g/hour. Focus on rapidly digested carbs (i.e. glucose, maltodextrin, or glucose + fructose).	20-25g	If fat is consumed, ensure <10% saturated and trans fats.
3+ hour events	5-10oz every 15 minutes	800mg sodium/Liter of fluid/hour	60-90g/hour. Focus on rapidly transportable carbs (i.e. glucose + fructose).	20-25g every 3 hrs	If fat is consumed, ensure <10% saturated and trans fats.
Within 60 minutes post event	During the 2-4 hours post-physical activity, replace 24oz fluid for every pound of weight lost during event.	Ensure ~400mg sodium/liter of fluids or salt your foods to optimize retention of post-training fluids.	Consume 1g/Kg. (i.e. ~60-90g carbs) Particularly important when recovery period is <8 hours.	20-25g	If fat is consumed, ensure <10% saturated and trans fats.