

Evidence-Based Fueling Recommendations During Endurance Exercise

Primary concerns when optimizing fueling during endurance activity:

1. Maintaining adequate hydration via intake of fluids
 - a. Goal is to minimize weight loss from fluid loss; performance has been shown to decline with as little as 2% of body weight loss
2. Maintain adequate electrolyte balance, particularly sodium balance
 - a. Electrolytes are lost via sweat, and a loss of too much electrolytes can lead to disturbances in the balance of fluids between the intracellular (inside cells) and extracellular (outside cells) spaces
 - b. hyponatremia is typically the most severe consequence of inadequate electrolyte intake in combination with drinking too much plain water
3. Consuming adequate carbohydrate to maintain glucose availability for exercise
 - a. The body only stores so much carbohydrate in the form of glycogen in the liver and muscle; during prolonged endurance exercise, carbohydrate stores can run out if exogenous carbohydrates are not consumed during activity, ultimately impairing performance

Sports nutrition recommendations during training & racing:

Timing	Nutrition Strategy
Pre-Exercise	<ul style="list-style-type: none">- Drink sufficiently between exercise sessions and throughout each day so that urine is pale-yellow, particularly in the morning- Consume regular meals/snacks throughout the day (every 2-3 hours)
During Exercise	
<i>Sessions <1 hour</i>	<ul style="list-style-type: none">- 12-32 oz of plain water
<i>Sessions >1 hour</i>	<ul style="list-style-type: none">- 12-32 oz/hour of plain water or carbohydrate/electrolyte drink<ul style="list-style-type: none"><i>Don't rely on thirst as an indicator to drink fluids; aim to avoid the sensation of thirst and drink regularly even if not thirsty</i>- 60-90 grams of carbohydrates (240-360 calories) per hour starting <u>after</u> 60-90 min of exercise<ul style="list-style-type: none"><i>Aim for easy to digest and simple foods (gels, sports gummies, carbohydrates-based energy bars, banana, dried fruit, etc.)</i>- start with ~300-600 grams of sodium per hour, but adjust intake over time to suit needs based on losses in sweat
Post-Exercise	<ul style="list-style-type: none">- 16-24 oz plain water or carbohydrate/electrolyte drink for each pound of body weight lost during exercise (you can establish this by weighing yourself before and after)- Eat a meal/snack within 60 min of training session or race<ul style="list-style-type: none"><i>Aim to consume ~20 grams of protein and ~80 grams of carbohydrates</i>

Recommended readings:

1. [Thomas DT, Erdman KA, Burke LM. Position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine: nutrition and athletic performance. Journal of the Academy of Nutrition and Dietetics. 2016 Mar 1;116\(3\)](#)
2. [Vitale K, Getzin A. Nutrition and supplement update for the endurance athlete: review and recommendations. Nutrients. 2019 Jun;11\(6\):1289.](#)