

Fuelling with Carbohydrate – During Exercise and Competition																																						
Goals of Intra-Exercise Nutrition		Guidelines and Considerations																																				
<ul style="list-style-type: none"> Meet the demands of exercise Enhance performance Avoid “bonking” especially in longer duration events (glycogen depletion) 		<ul style="list-style-type: none"> Intake guidelines are independent of body mass and dependent on exercise intensity and duration Intake increases proportional to exercise intensity and duration Maximum glucose absorption is approximately 60 grams per hour Select foods with transportable carbohydrates → glucose and fructose → to absorb more than 60 grams per hour The gastrointestinal tract is trainable → practice race day nutrition in training 																																				
Food Characteristics and Practical Application of Sports Gels																																						
<ul style="list-style-type: none"> Easily absorbable carbohydrates → glucose and fructose Convenience and practicality → sports foods e.g. carbohydrate gels Sports drinks should have a 6 to 8% concentration of carbohydrate (6 – 8 g/100mL) A gel containing a total of 30g of carbohydrates per serve with a 2:1 glucose to fructose ratio contains 20g of glucose and 10g of fructose To consume 90g of carbohydrates per hour, you would need to consume a total of 3 gels within the hour → equates to 60g glucose and 30g fructose per hour 	<div> <div> Different Types of Carbohydrate and Their Absorption Rates </div> <table border="1"> <caption>Data points estimated from the graph</caption> <thead> <tr> <th>Time (minutes)</th> <th>Glucose (g/min)</th> <th>Glucose + Fructose (g/min)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0.0</td> <td>0.0</td> </tr> <tr> <td>15</td> <td>0.2</td> <td>0.4</td> </tr> <tr> <td>30</td> <td>0.5</td> <td>1.0</td> </tr> <tr> <td>45</td> <td>0.9</td> <td>1.4</td> </tr> <tr> <td>60</td> <td>0.9</td> <td>1.4</td> </tr> <tr> <td>>60</td> <td>0.9</td> <td>1.4</td> </tr> </tbody> </table> </div>	Time (minutes)	Glucose (g/min)	Glucose + Fructose (g/min)	0	0.0	0.0	15	0.2	0.4	30	0.5	1.0	45	0.9	1.4	60	0.9	1.4	>60	0.9	1.4	<div> <div>Decision making table for intra-activity fuelling requirements</div> <table> <tr> <th>Duration</th><th>Activity Example</th><th>Carbohydrate Guidelines</th></tr> <tr> <td>< 45 minutes</td><td>Race or continuous training effort</td><td>Not required</td></tr> <tr> <td>45 – 75 minutes</td><td>Non-continuous training (e.g., intermittent interval training)</td><td>Mouth rinse (e.g., sports drink)</td></tr> <tr> <td>1.0 – 2.5 hours</td><td>Race, endurance training, and non-continuous training</td><td>30 – 60 grams per hour (glucose or glucose-fructose mix) (1)</td></tr> <tr> <td>> 2.5 hours</td><td>Race long continuous training effort</td><td>90 grams per hour (2:1 glucose: fructose) i.e., 60g glucose and 30g fructose per hour</td></tr> </table> </div>	Duration	Activity Example	Carbohydrate Guidelines	< 45 minutes	Race or continuous training effort	Not required	45 – 75 minutes	Non-continuous training (e.g., intermittent interval training)	Mouth rinse (e.g., sports drink)	1.0 – 2.5 hours	Race, endurance training, and non-continuous training	30 – 60 grams per hour (glucose or glucose-fructose mix) (1)	> 2.5 hours	Race long continuous training effort	90 grams per hour (2:1 glucose: fructose) i.e., 60g glucose and 30g fructose per hour
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Examples Foods (Serving Size/Carbohydrate Content per Serve)		Intra-Exercise Carbohydrate Calculator																																				
<ul style="list-style-type: none"> Carbohydrates in this category are often sports foods Maltodextrin (glucose) is a common ingredient in sports foods <div> <div> <div> Sports Drink 600mL/35.6 g (5.9% carbohydrate solution) </div> </div> <div> <div> Sports Gel 45g/29.8g Maltodextrin (Glucose) only </div> </div> <div> <div> Sports Gel 51g/30g 2:1 Glucose:Fructose ratio </div> </div> </div>		<ul style="list-style-type: none"> Use the following links or scan the QR code to access a calculator to determine the amount of carbohydrate to consume before exercise! Use the carbohydrate content of the example foods included here to correlate with your recommended amount <div> <div>Calculator Home Page: https://asluggett.github.io/Sport-Nutrition/</div> <div> During -Exercise Carbohydrate Calculator: https://asluggett.github.io/Sport-Nutrition/intra_nutritional_calculator.html </div> </div>																																				

- Burke LM, Hawley JA, Wong SHS, Jeukendrup AE. Carbohydrates for training and competition. J Sports Sci. 2011;29(1):S17-S27.
- Podlogar T, Wallis GA. New Horizons in Carbohydrate Research and Application for Endurance Athletes. Sports Medicine. 2022;52(1):5-23.