

## Sports Confectionery

### Supplement Overview

- > Highly concentrated source of carbohydrate (75–90% or 75–90 g/100 g) in a chewy jelly bean/jube form that is easily consumed and quickly digested.
- > Provided in pouches or packets containing individual pieces to enable easy transport and consumption while undertaking exercise.
- > Provides an alternative or additive source of carbohydrate to sports drinks, bars and gels. Particularly suited for situations where consumption of smaller serves of carbohydrate can be managed at frequent intervals.
- > New products are appearing in this range to boost the variants of flavour, size and consistency of individual pieces, type/mixture of carbohydrates, the consistency or texture of the jelly and the addition of other “active ingredients”. Other ingredients commonly found in sports confectionery include electrolytes and caffeine. Note, however that many products are similar to everyday jelly confectionery.
- > For situations which require a high rate of delivery to the muscle of newly ingested carbohydrates, sports confectionery containing “multiple transportable carbohydrates” - a blend of carbohydrates such as glucose and fructose which are absorbed from the intestine via different transporter molecules. The purpose of such mixtures is to bypass the usual limitation on gut uptake of glucose-based sugars which occurs at rates of ~ 60 g/h. Studies have shown that when carbohydrates are consumed at high rates (> 60 g/h) during exercise to meet new guidelines for prolonged strenuous events, they are more effective than glucose-based products in maintaining gut comfort, promoting muscle carbohydrate oxidation and enhancing performance (see Jeukendrup, 2010).

### Products and protocols

- > Sports confectionery provides a compact and portable source of carbohydrate which can be easily consumed at various intervals before or during exercise to assist with meeting carbohydrate intake targets.
- > Sports confectionery should be consumed with water or other dilute fluids, which can separately address hydration needs for the activity. This fluid intake will also reduce the net carbohydrate concentration to reduce the risk of gut upsets.
- > It is noted that early sports nutrition guidelines warned against consuming concentrated forms of carbohydrate during exercise. However, recent studies have shown that sports gels consumed with water during moderate intensity exercise are well tolerated and provide a similar pattern of carbohydrate delivery and oxidation by the muscle to sports drinks. This is likely to be the case for sports confectionery (see Sports Gel fact sheet).

## Sports Confectionery

**Table 1: Nutritional composition of a range of commonly found sports confectionery**

Product	Size of packet/ pouch	Flavours	Energy (kJ)	Carb (g)	Sodium (mg)	Comments
PowerBar Gel Blasts	60g (9 gel blasts)	Raspberry, Lemon, Strawberry Banana, Orange, Cola	798-834	45-46	30	Some flavours contain caffeine – Strawberry Banana (40mg per pack), Cola (75mg per pack)
Gu Chomps	60g (8 pieces)	Strawberry, Blueberry Pomegranate, Orange, Peach Tea, Cranberry Apple, Watermelon	756	46	100	Some flavours contain caffeine – Strawberry and Cranberry Apple (40mg per pack), Peach Tea (80mg per pack)
Jelly Belly Sports Beans	28g	Berry, Orange, Fruit Punch, Lemon Lime, Assorted, Extreme Cherry, Extreme Watermelon, Extreme Pomegranate, Extreme Assorted	420	25	80	Some flavours contain caffeine – Extreme Cherry, Extreme Watermelon, Extreme Pomegranate, Extreme Assorted (50mg per pack)
Lucozade Jelly Beans	30g	Orange & Raspberry	473	28	Trace	
Sharkies Organic Energy Sports Chews	45g	Berry Blast, Citrus Squeeze, Fruit Splash, Watermelon Scream	586	36	110	
Generic Jelly Confectionery	25g (~10 beans or 5 jellies)	Assorted mix	398	24	20	

### Situations for Use in Sport

- > Provides easily consumed carbohydrates to allow the athlete to meet fuel targets for their sporting activities (see Table 2)
- > Suitable for use in the same situations as sports gels, but offers more flexibility with timing of intake since individual pieces can be consumed at more frequent intervals. This may have advantages in promoting additional benefits from the “mouth sensing” effect during exercise. Mouth sensing refers to the exposure of receptors in the mouth/oral cavity to carbohydrate which creates a favourable response in the brain and central nervous system (CNS), decreasing the perception of effort and improving pacing strategies
- > Compact fuel source for endurance athletes or team sport athletes during exercise lasting longer than 90 minutes, especially when high rates of carbohydrate intake or the need for a portable carbohydrate source is advantageous (i.e. cycling, triathlon, running).
- > Compact carbohydrate source to provide smaller amounts of carbohydrate during high intensity exercise lasting ~ 1 hour without the need for intake of large volumes of fluid.
- > Low fibre and compact carbohydrate source for pre-event fuelling by athletes who are unable to tolerate regular foods and fluids or who require a low residue diet for competition in weight restricted sports.

# Sports Confectionery

**Table 2: Guidelines for carbohydrate intake during sporting activities (taken from Burke et al. 2010)**

Type of sport/exercise	Duration	Carbohydrate target	Comments
Brief exercise	< 45 min	Not needed	
Sustained high-intensity exercise	45-75 min	Small amounts including mouth rinse (swilling in mouth)	<ul style="list-style-type: none"> <li>&gt; A range of drinks and sports products can provide easily consumed carbohydrate</li> <li>&gt; The main benefit from carbohydrate use in these events comes from interaction with the brain and CNS. To achieve optimal benefit, the athlete may need to organise their event nutrition strategy to allow frequent “mouth sensing” with a significant duration of mouth contact (e.g. 10 s)</li> </ul>
Endurance exercise including “stop and start” sports	1-2.5 h	30-60 g/h	<ul style="list-style-type: none"> <li>&gt; Opportunities to consume foods and drinks vary according to the rules and nature of each sport.</li> <li>&gt; A range of everyday dietary choices and specialised sports products ranging in form from liquid to solid may be useful</li> <li>&gt; The athlete should practice to find a refuelling plan that suits their individual goals including hydration needs and gut comfort</li> <li>&gt; The benefits of carbohydrate intake strategies in these events are likely to be achieved both in the muscle (fuel) and CNS (perception of effort)</li> </ul>
Ultra-endurance events	>2.5-3 h	Up to 90 g/h	<ul style="list-style-type: none"> <li>&gt; As above</li> <li>&gt; Higher intakes of carbohydrate are associated with better performance.</li> <li>&gt; Products providing multiple transportable carbohydrates (glucose:fructose mixtures) will achieve high rates of oxidation of carbohydrate consumed during exercise</li> <li>&gt; The benefits of carbohydrate intake strategies in these events are likely to be achieved both in the muscle (fuel) and CNS (perception of effort)</li> </ul>

## Concerns Associated with Supplement Use

- > The need for the use of sports gels, like sports drinks, at every training session or event should be carefully considered.
  - Excessive use within a session or at every session may lead to over consumption of energy intake and over-reliance on low-nutrient carbohydrate sources.
  - The optimal training program may include the periodisation of workouts in which there is “low carbohydrate availability” (i.e. the session is undertaken with low muscle glycogen stores and/or after an overnight fast). This strategy may increase some of the important adaptive responses to exercise. Therefore, on some occasions, an athlete may deliberately not choose to consume carbohydrate during the session or during the first part of a session
- > Sports confectionery should be used for the specific conditions for which they are intended rather than as a general snack. Sports confectionery is an expensive alternative to general jelly confectionery, or to regular food and fluid choices. This may be warranted if there is a benefit associated with a specific consistency or other “active ingredients” (e.g. caffeine, electrolytes).
- > Athletes should practise the use of sports confectionery during training sessions if they are intended for use during competition.

## Sports Confectionery

- > Although most athletes tolerate sports confectionery well, it is likely that a small number of athletes will suffer from significant gastrointestinal issues and may need an individualised protocol. Sports confectionery should always be consumed with adequate fluid to meet hydration needs and to improve gastrointestinal tolerance.
- > Individuals with fructose malabsorption or FODMAP intolerance should be aware of the fructose content of sports confectionery containing multiple transportable carbohydrates.
- > The consumption of carbohydrate during exercise, especially during prolonged sessions and where frequent “mouth sensing” is used, presents a risk for dental erosion. The conflict between optimal sports nutrition practice and dental health recommendations is recognised and should be addressed by promoting good dental care at other times. After a session where carbohydrate is frequently consumed, the restoration of tooth enamel may be assisted by
  - consuming dairy products or chew sugar free gum as soon as possible
  - avoiding brushing teeth for at least 30 minutes

### Further reading

Burke LM, Hawley JA, Wong SH, Jeukendrup AE. Carbohydrates for training and competition. *J Sports Sci.* 2011 Jun 8:1-11.

This Fact Sheet was prepared by AIS Sports Nutrition as part of the Sports Supplement Framework ([www.ausport.gov.au/ais/nutrition/supplements](http://www.ausport.gov.au/ais/nutrition/supplements)). Note that a Fact Sheet with additional information on this topic is available for Members of the Sports Supplement Framework via the Clearinghouse.

The Sports Supplement Framework has been designed to provide a framework for NSO athletes and specific Sports Supplement Programs may be available to NSO athletes through their NSO. All attempts are made to stay abreast of scientific knowledge and of WADA issues related to anti-doping. It is recommended that other athletes and groups should seek independent advice before using any supplement, and that all athletes consult the WADA List of Prohibited Substances and Methods before making decisions about the use of supplement products.

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