Nutrition Sportive: Colloque des entraineurs triathlon

NUTRITION PERFORMANCE

Catherine Naulleau Dt.P. M.Sc.
Nutritionniste du sport
Novembre 2015

Nutrition Performance
2325 rue Centre, suite 205
Montréal QC H3K 1J6
info@nutritionperformance.ca

RÉSUMÉ ET DOCUMENTS:
nutritionperformance.ca/documents

Aujourd'hui...

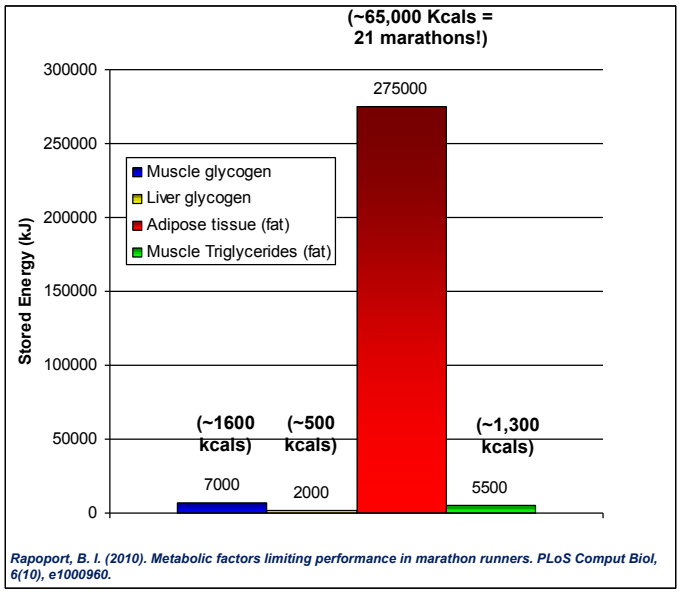
NUTRITION PERFORMANCE

- Retour sur les substrats énergétiques à l'effort : un peu de physiologie de l'exercice
- Quoi manger **avant, pendant et après** l'entraînement
- Hydratation et produits énergétiques (gels, barres, etc.)
- Surcharge de glycogène: Préparation à la compétition
- Troubles gastro-intestinaux chez les sports d'endurance

Questions et commentaires bienvenus tout au long de la présentation.

Réserves énergétiques d'un athlète ~ 70 kg

Basé sur présentation de Trent Stellingwerff



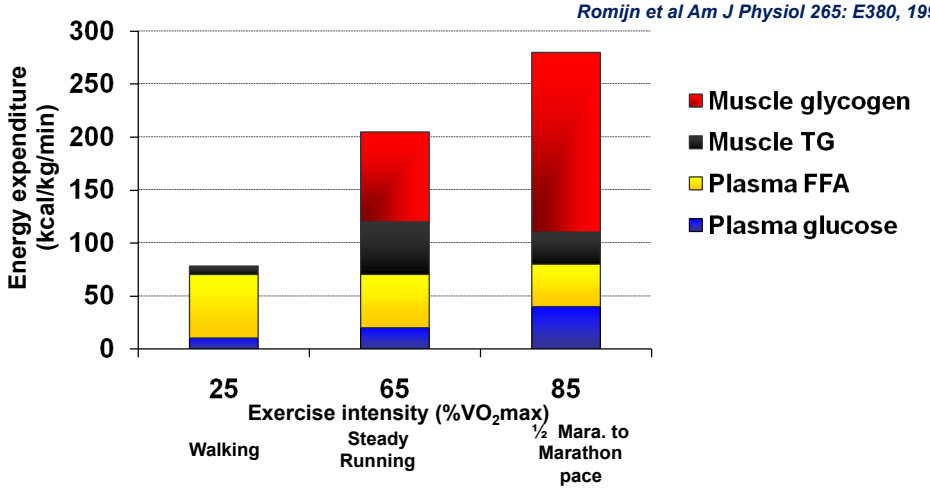
Rapoport, B. I. (2010). Metabolic factors limiting performance in marathon runners. PLoS Comput Biol, 6(10), e1000960.

Energy required for 65kg to run a marathon: ~3000 to 3500 kcals

Substrats énergétiques selon l'intensité de l'effort

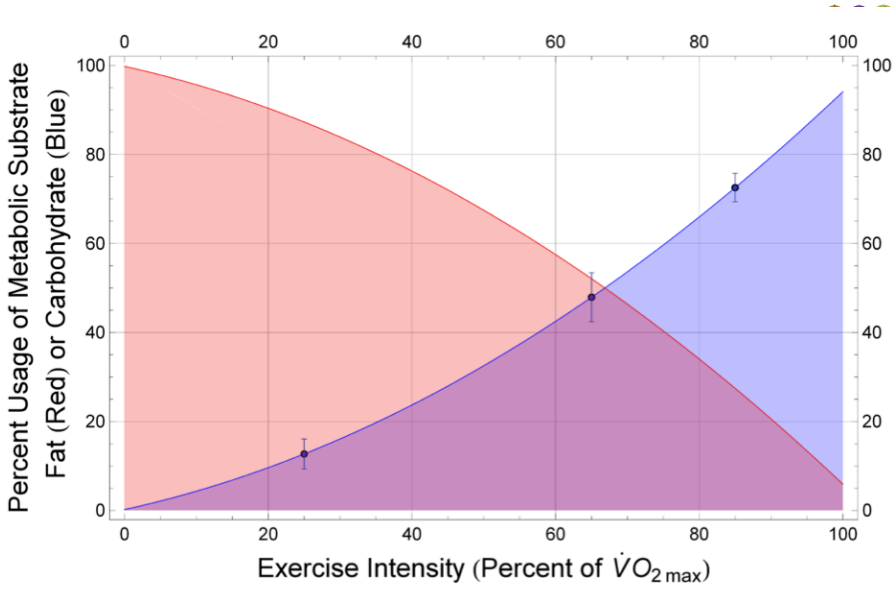
Basé sur présentation de Trent Stellingwerff

Romijn et al Am J Physiol 265: E380, 1993



Bosch et al Eur. J. Appl. Physiol. 61: 68-72, 1990.
O'Brien et al MSSE 25: 1009-1017, 1993.

Catherine Naulleau Dt.P. M.Sc.
catherine@nutritionperformance.ca
514-925-PERF (7373)



Rapoport 2010

ALIMENTATION ET HYDRATATION AVANT, PENDANT ET APRÈS L'EFFORT

Catherine Naulleau Dt.P. M.Sc.
catherine@nutritionperformance.ca
514-925-PERF (7373)

Avant l'entrainement

Manger pour se sentir bien, avoir de l'énergie et ne pas ressentir la faim
Alimentation riche en glucides (complexes) >>
Se donner au moins 1h30 pour digérer un repas >>
Boire au moins 500ml d'eau (1 bouteille/1 bidon) >>

GROSSES portions de viandes et de graisses
Aliments TRÈS SUCRÉS et la CAFÉINE >>
S'entraîner le ventre vide… >>
Aliments ÉPICÉS ou RICHES EN FIBRES

ALIMENTS À ÉVITER

Aliments gazogènes et pouvant causer des rapports durant l'effort:
Ail, oignons, échalotes, concombres, tomates, poivrons verts, brocoli, chou-fleur, légumineuses, aliments épicés (piments forts, curry, mets indiens).

Aliments gras, en grande quantité:
Huiles, vinaigrettes, mayonnaise, saucisses, fromage gras, noix, bacon.

Trop longs à digérer:
Hamburger, frites, grosse portion de viande, poutine, pizza grasse, macaroni au fromage, pâtes sauce Alfredo.

Catherine Naulleau Dt.P. M.Sc.
catherine@nutritionperformance.ca
514-925-PERF (7373)

PENDANT L'EFFORT

Est-ce que tu bois assez ?

Visé 5-7 ml / kg / heure	Optimal 10 ml / kg / heure	Idéal 12 ml / kg / heure
~ 350 mL/h	~ 500-700 mL/h	~ 800+ mL/h

250 mL 600 mL 750 mL

Sodium mg/L de sueur	Potassium mg/L de sueur	Calcium mg/L de sueur	Magnésium mg/L de sueur
600-1000	150-300	50	25

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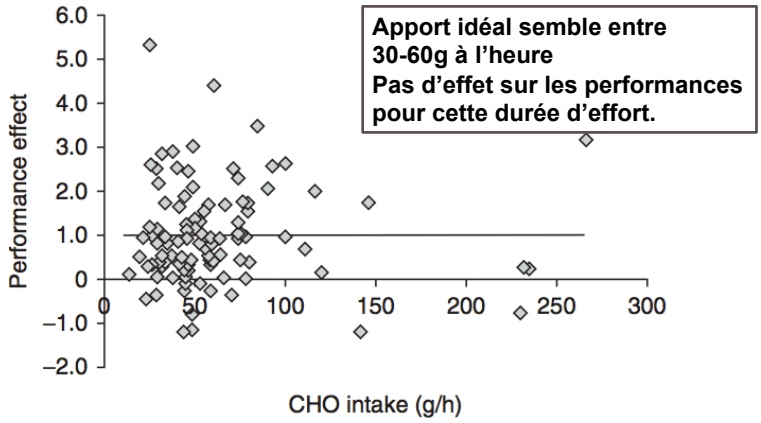
514-925-PERF (7373)

Carbohydrates and performance endurance efforts 2-3h



Apport idéal semble entre 30-60g à l'heure
Pas d'effet sur les performances pour cette durée d'effort.

Karelis et al. 2006

Pourquoi 60g/h ?

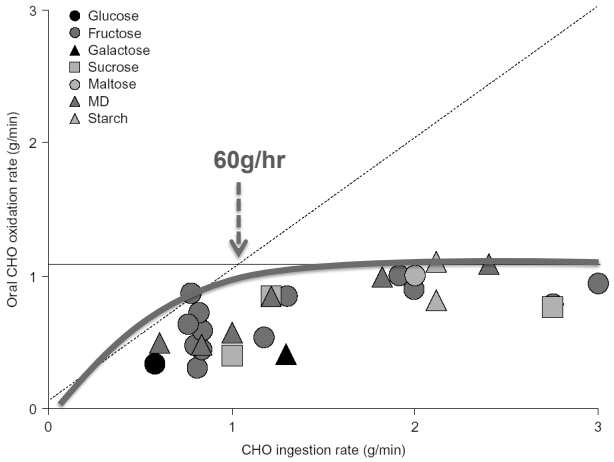


Fig. 3. Peak oxidation rates of oral carbohydrates (CHOs) are depicted against the CHO ingestion rate of different types of CHO. Fructose and galactose appear to be oxidised at relatively low rates whereas glucose, sucrose, maltose, maltodextrins and soluble starch seem to be oxidised at relatively high rates. The horizontal line depicts the absolute maximum for oral CHO oxidation. The dotted line represents the line of identity, where CHO ingestion equals CHO oxidation.

Jeukendrup et al, 2000. Sport Medicine, 29(6), 407-424.

Catherine Naulleau Dt.P. M.Sc.
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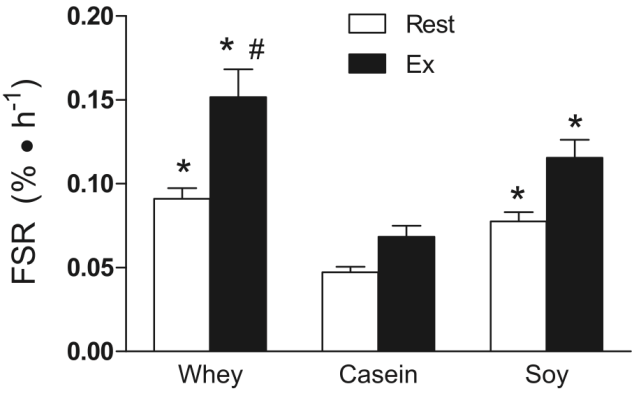
514-925-PERF (7373)

30g de glucides, ça représente quoi ?

1 barre Fruitsource	3 biscuits aux figues
1 banane	2 grosses dattes
1 cuillère (30g) de boisson sportive	1 gel énergétique -20-25g
4-5 jujubes énergétiques	1 petite barre Fruit2 ou Fruit3

Synthèse de protéines

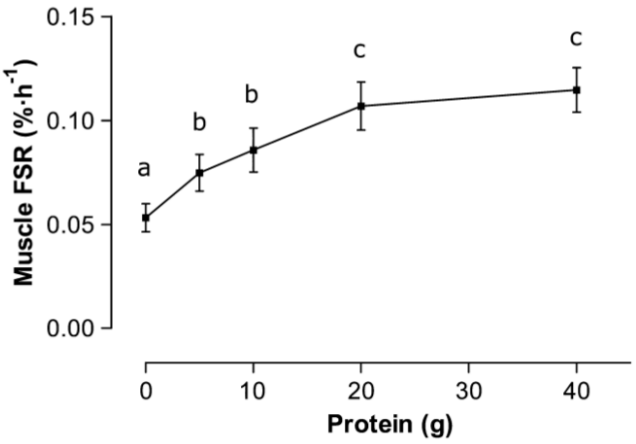
- Types de protéines:



J Appl Physiol, Tang 2009

Catherine Naulleau Dt.P. M.Sc.
catherine@nutritionperformance.ca
514-925-PERF (7373)

Protéines – 20g post-exercice



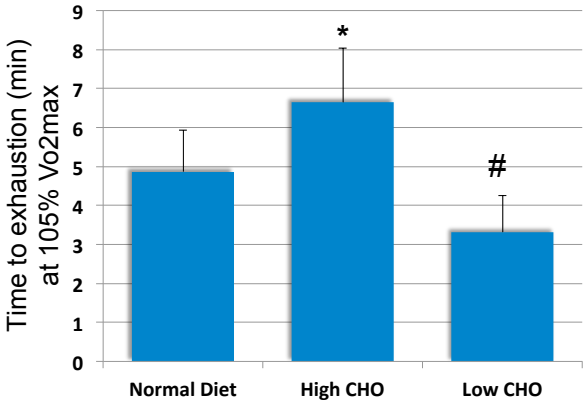
Am J Clin Nutr, Moore 2009

LA SURCHARGE DE GLYCOGÈNE: PRÉPARATION À LA COMPÉTITION

Catherine Naulleau Dt.P. M.Sc.
catherine@nutritionperformance.ca
514-925-PERF (7373)

Glycogène et performances à haute intensité

6 males undertook
3 dietary conditions for
2.5 days preceding
TTE tests
Normal Diet (3.9g CHO/kg/day)
High CHO (6.1g CHO/kg/day)
Low CHO (0.3g CHO/kg/day)



Maughan RJ, and Poole DC. The effects of a glycogen-loading regimen on the capacity to perform anaerobic exercise. Eur J Appl Physiol Occup Physiol 46: 211-219, 1981.

Surcharge de glycogène

7 à 10g/kg de poids de glucides
2 à 3 jours avant l'épreuve

~ 500 à 700g / jour !

Distance sprint = nécessaire?

Distance olympique = oui!

LEADING ARTICLE

Carbohydrate-Loading and Exercise Performance
An Update

John A. Hawley, Elske J. Schabort, Timothy D. Noakes and Steven C. Dennis

Sports Science Institute of South Africa, incorporating the Liberty Life Chair of Exercise and Sports Science, the Medical Research Council and the University of Cape Town Bioenergetics of Exercise Research Unit, Department of Physiology, University of Cape Town Medical School, Cape Town, South Africa

Summary

This review suggests that there is little or no effect of elevating pre-exercise muscle glycogen contents above normal resting values on a single exhaustive bout of high-intensity exercise lasting less than 5 minutes. Nor is there any benefit of increasing starting muscle glycogen content on moderate-intensity running or cycling lasting 60 to 90 minutes. In such exercise substantial quantities of glycogen remain in the working muscles at the end of exercise. However, elevated starting muscle glycogen content will postpone fatigue by >20% in endurance events lasting more than 90 minutes. During this type of exercise, exhaustion usually coincides with critically low (25 mmol/kg wet weight) muscle glycogen contents, suggesting the supply of energy from glycogen utilisation cannot be replaced by an increased oxidation of blood glucose. Glycogen supercompensation may also improve endurance performance in which a set distance is covered as quickly as possible. In such exercise, high carbohydrate diets have been reported to improve performance by 2 to 3%.

The concept that the performance of strenuous [>70% of maximal oxygen uptake (VO_{2max})] exercise could be influenced by the preceding diet is not new. Some 50 years ago Christensen and Hansen[1] reported that endurance capacity was impaired when individuals consumed a carbohydrate- (CHO) restricted diet prior to exercise, but was improved after the consumption of a diet high in CHO. It was in the late 1960s that Swedish investigators first described an extreme regimen involving exercise to exhaustion, a period of restricted CHO intake and subsequent consumption of large quantities of dietary CHO, to increase or 'supercompensate' the stores of muscle and liver glycogen prior to exercise.[2,3] Such a regimen was shown to significantly elevate muscle glycogen content and prolong submaximal (75% VO_{2max}) exercise time to exhaustion compared with individuals who ingested their habitual or a low CHO diet.[3] Since this investigation and other early studies,[4,5] Sherman et al.[6] have proposed a so-called 'modified regimen' for glycogen supercompensation which does not require the athlete to exercise to exhaustion or restrict CHO intake in the week immediately prior to a competition. Now it is widely accepted that several days of an increased CHO intake in association with a reduction in exercise will supercompensate glycogen content in those muscles frequently active in training.

Although CHO-loading was thought to benefit

Hawley 1997; Sports Med

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514-925-PERF (7373)

VITAMINES ET MINÉRAUX

CALCIUM 1000 mg/jour

FER 8 mg/jour (H)
18 mg/jour (F)**

B12 2.5 mg/jour (H-F)

VitD 1000 UI/jour (H-F)

TROUBLES GI

- 30-50% des athlètes de sports d'endurance
- Diminution du flux sanguin à l'intestin – redirection vers les muscles actifs
- Impact avec "rebondissement" de la course à pied et la position de vélo (écrasement des intestins).

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Impact des FODMAP?

AVANT LES COMPÉTITIONS:
- Réduire toutes les fibres (légumes crus, all bran et cie)
- Réduire les produits laitiers (lactose)
- Gluten ?

INTESTINS = CENTRE DES ÉMOTIONS:
- Anxiété, stress
- Sommeil et récupération

Impact des FODMAP?

Fermentable Oligosaccarides- Di- Mono- and Polyols

Table 1. FODMAP carbohydrates and their richest food sources.

FODMAP	Richest food sources
Fructo-oligosaccharides (fructans)	Wheat, rye, onions, garlic, artichokes
Galacto-oligosaccharides (GOS)	Legumes
Lactose	Milk
Fructose	Honey, apples, pears, watermelon, mango
Sorbitol	Apples, pears, stone fruits, sugar-free mints/gums
Mannitol	Mushrooms, cauliflower, sugar-free mints/gums

Ther Adv Gastroenterol (2012) 5(4) 261–268
DOI: 10.1177/ 1756283X11436241

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QUESTIONS

Catherine Naulleau
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