FINA-Yakult Nutrition for Aquatics

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Session Overview

General Principles

Swimming

Open water swimming

Periodization of energy needs

Fuelling swimming sessions

Body composition

Race day nutrition planning
“An effective nutrition plan is critical to success in all aquatic sport disciplines for athletes at every stage of their development.”
“A well-designed, periodized training program remains the fundamental cornerstone of peak performance outcomes, but this will mean little if nutrition needs are ignored.”
Individualized Nutrition Plan

The needs of athletes also vary through:

- Maturation
- During periods of high energy expenditure
- Taper
- Competition
- Post-competition recovery
General Principles

Periodization

match the phase and type of training

including concurrent endurance and resistance training, altitude, overload and taper
General Principles

Recovery Nutrition Plan

Post training or competition
Restoration of body energy
Promote adaptation to the exercise stimulus
Preparation for optimal performance in the next session
Body Mass Composition

Informed management of body mass and composition is key to ensuring that athletes achieve peak performance.
Recipe for Success

Aquatic athletes should consume a well-chosen diet with sufficient:

- Energy
- Macronutrients (CHO + protein)
- Micronutrients to maintain immune function and health (Vitamin D + iron)
Nutritional Supplements

The use of supplements does not compensate for poor food choices.

Contaminated supplements may cause a positive doping test.

A few evidence-based supplements may provide a performance benefit for some athletes with no risk to health, but the scientific evidence specific to aquatic sports is limited or absent.
Nutrition interventions that might mitigate the negative environmental effects include:

- adequate hydration
- carbohydrate, protein and iron intake while at altitude
- manipulation of fluid and carbohydrate intake during races according to the varying water and ambient temperatures
- careful food and fluid hygiene practices when travelling
Nutrition support in elite sport should be provided by qualified professionals

Education of the athlete support team, including coaches, health care providers, parents, and athletes themselves is a crucial step to improving nutrition practices.
Athletes should also be aware of the need for long-term dietary planning to ensure lifelong health and wellbeing and should recognise the pleasures of good food choices.
Swimming

Periodization of energy needs
Fuelling swimming sessions
Body composition
Race day nutrition planning
Swimming

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Swimming: Energy Periodization

LOWEST
Offseason
Taper
Injury
Body weight/FM reduction

Energy needs

HIGHEST
Heavy training
Growth/development
Training at altitude
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### Training / Competition Focus

#### General Prep
- **Training**
  - High training volume (~5 to 12+ hrs/wk) / lower training intensity
  - Emphasis on aerobic development
  - Mixed training modalities including resistance, core and cross-training
- **Nutrition**
  - High caloric intake to support training (~3500-5000 kcals/day for 70kg)
  - Support desired changes in body comp.
  - Recovery after training
    - Daily Macro. Target: ~8-12g CHO/kg BW/day
    - ~1.5-1.7g PRO/kg BW/day
    - ~1.5-2g FAT/kg BW/day

#### Specific Prep
- **Training**
  - Maintained to lower volume (~4 to 10+ hrs/wk) / higher training intensity
  - Emphasis on anaerobic development, race-specific pace and increasing competitions
  - Increased specialised training / altitude camps
- **Nutrition**
  - Nutrition to support high intensity training (~3000-4500 kcals/day for 70kg)
  - Specific support/recovery for key specialised training
    - Daily Macro. Target: ~7-10g CHO/kg BW/day
    - ~1.5-1.7g PRO/kg BW/day
    - ~1.5-2g FAT/kg BW/day

#### Taper / Competition
- **Training**
  - Lower volume (~3 to 8 hrs/wk) / high training quality/intensity
  - Emphasis on race-specific intensities and neural-muscular power
  - Increased targeted competitions
- **Nutrition**
  - Nutrition to support high intensity racing (~2800-4300 kcals/day for 70kg)
  - Avoiding weight-gain with decreased training volume during taper
    - Daily Macro. Target: ~7-10g CHO/kg BW/day
    - ~1.5-1.7g PRO/kg BW/day
    - ~0.8-1.2g FAT/kg BW/day

#### Transition
- **Training**
  - Volume and intensity very low to complete rest (~2 to 4 hrs/wk)
  - Physiological and psychological recovery to prevent over-reaching / training
- **Nutrition**
  - Nutrition for active to sedentary individuals (~2000-3000 kcals/day for 70kg)
  - Some minor weight gain expected
    - Daily Macro. Target: ~4-6g CHO/kg BW/day
    - ~0.8-1.2g PRO/kg BW/day
    - ~1-1.5g FAT/kg BW/day

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Swimming: Energy Periodization

Matching energy intake to requirement

**INCREASED ENERGY NEEDS**
- Increase number of meals
- Add CHO-rich snacks
- Consume energy containing fluids (juice, sports drink, flavored milk, smoothies)
- Take advantage of energy dense sports products
- Fortify meals with vegetable oils and nuts and/or add a liquid meal supplement

**REDUCED ENERGY NEEDS**
- Reduce intake of energy dense low-nutrient snacks
- Consume foods high in volume and fiber (e.g. vegetables, fruits)
- Select foods high in protein and low in fat (e.g. low fat dairy, filets of fish/chicken)
- Reduce portion sizes
- Avoid “eating to boredom”
Swimming

Periodization of energy needs
Fuelling swimming sessions
Body composition
Race day nutrition planning
“When it is important to train hard or with high intensity, daily carbohydrate intakes should match the fuel needs of training”
Swimming: Fuelling Sessions

Some sessions may be deliberately done with low CHO availability:

- Low carbohydrate availability may enhance aerobic adaptation.
- Informed application to avoid any negative effects.
Swimming: Fuelling Sessions

Easy swim session < 90 min

water to limit dehydration

< 2% of body weight
Swimming: Fuelling Sessions

Low carbohydrate availability sessions

Water

Consider caffeine and candy/oral mouthwash
Swimming: Fuelling Sessions

High intensity sessions, high carbohydrate availability

sports drink and/or gel providing 30 - 60g CHO/h

fluids to match to individual sweat rate
Considerations in setting daily carbohydrate intake targets for aquatic athletes (Burke, Cox, Shaw, Stellingwerff)

- **Energy requirements**
  - Lower, including energy deficit for weight loss
  - High, including needs for growth

- **Daily training/competition volume**
  - Low
  - High

- **Intensity of session**
  - Light, Skill, A1
  - VO2max, Tolerance, Speed Development, Competition

- **Goal of session**
  - Prolonged metabolic stress to induce aerobic adaptation
  - High quality training/optimal competition outcome

- **Lean Body Mass as percentage of BM**
  - Low
  - High

- **Feedback from experimentation**
  - May be unnecessarily over-fuelled
  - Often runs out of fuel in session

- **g carbohydrate / kg BM / day**
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10
Swimming

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Swimming: Body Composition

Body contours affect drag

Aesthetics / body image
Periodized body composition throughout the year

- Sum of 7 (mm)
- Quad Girth (cm)

Competition Phase
Practical approaches to periodized body comp

**Majority of training year**
- being 4 - 6% above race competition weight / % body fat is OK
- fully eating to handle training volume
- good wholesome nutrition the cornerstone, periodic treats are OK
- focus on recovery, less immune system problems

**Realizing ideal championship body comp (only a few months / year)**
- fully focus on very healthy food (no extra fat in diet, skip treats)
- Intensity of training, with slightly smaller meal portion sizes will strip off weight and result in ideal body comp
- Focus on smaller snacks that include fruit and some protein (milk, or protein shake)
Losing and/or Maintaining Weight

THE GOOD:
- long term plan for weight class
- slow reduction of weight over time
- decrease fat mass, not lean muscle mass

THE BAD:
- unrealistic weight goals
- constant state of energy deficit
- skipping meals totally
- not meeting minimum requirements for certain vitamins and/or minerals

THE UGLY:
- binging and purging
- eating disorders
- diuretics and/or laxatives
- deaths!
RELATIVE ENERGY DEFICIENCY IN SPORT (RED-S)

Underlying Cause:

Energy deficiency relative to the balance between the energy intake and the energy expenditure of:

- body functions
- physical activity of daily living
- sport activity
RELATIVE ENERGY DEFICIENCY IN SPORT (RED-S)

How does it happen?

- Disordered eating/eating disorders
- Overzealous weight/fat loss
- Failure of energy intake to match high energy expenditure
RED-S: Performance Consequences

- Decreased muscle strength
- Decreased endurance performance
- Increased injury risk
- Decreased training response
- Impaired judgement
- Decreased coordination
- Decreased concentration
- Irritability
- Depression
- Decreased glycogen stores
**Swimming: Body Composition**

**RED-S:** Performance Consequences

- **Change in 400 m swim velocity (m/s):**
  - Eumenorrheic: 8.2%
  - OVS: -9.8%

References:
**RED-S**: Health Consequences
Swimming

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## Swimming: Race Day Nutrition

**Fluid and fuel**  
**Ergogenic aid(s)**

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<th>Time</th>
<th>Breakfast</th>
<th>Warm-up</th>
<th>Heats</th>
<th>Heats (relay)</th>
<th>Lunch</th>
<th>Snack</th>
<th>Warm-up</th>
<th>Final</th>
<th>Final (relay)</th>
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**Type, amount and timing?**  
**What is available?**  
**What needs to be self-supplied?**
Open Water Swimming

Fuelling swimming sessions
Hydration
Race day nutrition planning
Fuelling swimming sessions

Hydration

Race day nutrition planning
OWS events create unique physiological challenges to:

- thermoregulation
- hydration status
- muscle fuel stores
OWS: Fuelling Sessions

<table>
<thead>
<tr>
<th>Duration of exercise</th>
<th>Amount of carbohydrate needed</th>
<th>Recommended type of carbohydrate</th>
<th>Additional recommendation</th>
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<td>30–75 minutes</td>
<td>Small amounts or mouth rinse</td>
<td>Single or multiple transportable carbohydrates</td>
<td>Nutritional training recommended</td>
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<tr>
<td>1–2 hours</td>
<td>30 g/hour</td>
<td>Single or multiple transportable carbohydrates</td>
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<tr>
<td>2–3 hours</td>
<td>60 g/hour</td>
<td>Single or multiple transportable carbohydrates</td>
<td>Nutritional training highly recommended</td>
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<tr>
<td>&gt; 2.5 hours</td>
<td>90 g/hour</td>
<td>ONLY multiple transportable carbohydrates</td>
<td>Nutritional training essential</td>
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Open Water Swimming

Fuelling swimming sessions

Hydration

Race day nutrition planning
Fluid needs during work-outs in water are lower than during dryland sessions.
Intensity and environmental factors effect the sweat rate of swimmers

Average 0.3-0.5 L/h may increase to 1.2 L/h racing in hot environment
Sodium containing beverages should be ingesting during the longer races and/or when sodium losses are expected to be high.
Temperature of ingested fluid can be regulated for thermoregulatory purposes.
Open Water Swimming

Fuelling swimming sessions
Hydration
Race day nutrition planning
OWS: Race day nutrition

Feeder practices
OWS: Race day nutrition

Athlete practices
Pre race hyper hydration may be considered when water temperature is expected to be high and opportunity for fluid intake is minimal.

10ml/kg of a high Na⁺ (~165 mmol/L) beverage]
OWS: Race day nutrition

5 km races

CHO mouthwash to enhance performance

candy in the oral cavity
10 km races

Multiple transportable CHO

up to 90 g/h

sports drink, gels, or foods

CHO feeding should to be practiced in training to improve GI tolerance and feeding technique
OWS: Race day nutrition

25 km races

Multiple transportable CHO
60-90 g/h

Be aware of flavour fatigue: take advantage of a wide range of salty and sweat foods/sports products
OWS: Race day nutrition

Recovery

Hydration and glycogen
Conclusion

“Sport-specific, individualized nutrition strategies can enhance performance in training and competition and help aquatic athletes to realize their potential”

Thank you for your attention!
Thank you!
FINA-Yakult Nutrition for Aquatics

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