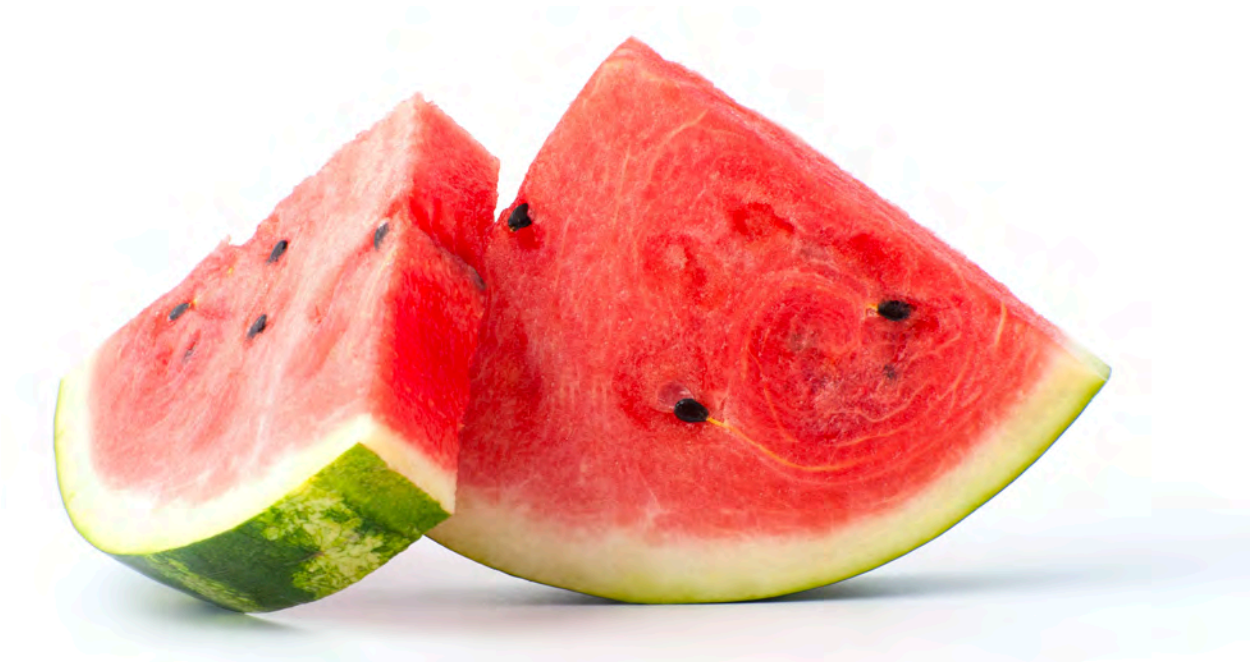

In this report, we highlight the nutrient density of TSAMMA Watermelon Juice and demonstrate its practical application in sports nutrition. TSAMMA a nutritional weapon to support an athlete's diet when used as a pre-workout and/or recovery drink.


## Nutrient Highlights of Watermelon Juice

Optimization of sports nutrition "fueling" should not necessarily focus just on macronutrients, but rather foods and beverages that aid performance and health. TSAMMA Watermelon Juice can help reduce micronutrient deficiencies, which will help athletes gain the benefit of a performance-promoting nutritional support strategy.

# Nutrient-Rich Carbohydrate Fuel

## Scientific Evidence of Watermelon Nutrition



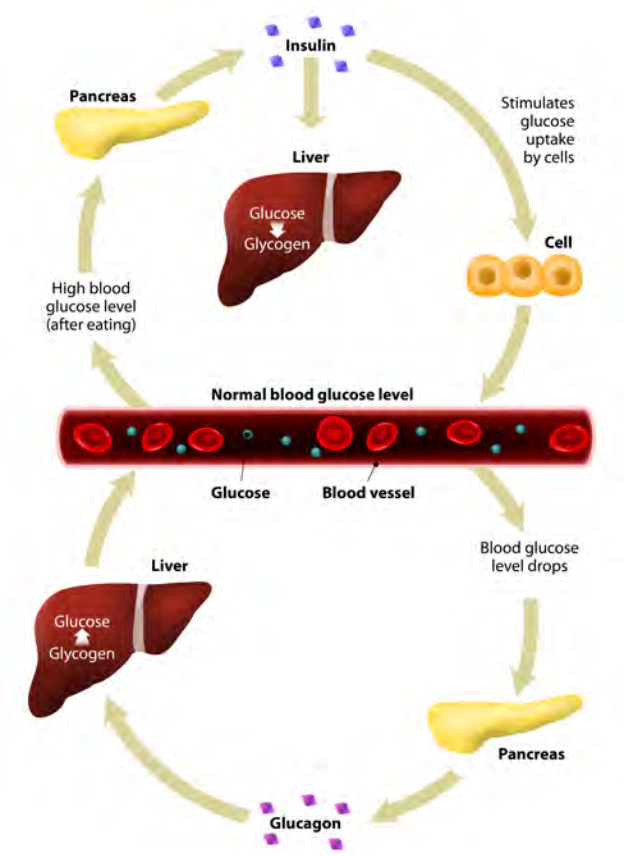
According to the Journal of Academy of Nutrition and Dietetics Position Stand on Nutrition and Athletic Performance, the guidelines on carbohydrate intake advise athletes to choose nutrient-rich carbohydrate sources to allow overall nutrient needs to be met.[1]

Watermelon juice is an example of a nutrient-rich carbohydrate source that contributes to overall nutritional needs of athletes. Used as a functional beverage, watermelon juice provides health benefits greater than basic calories, offering additional components that may lower risk for disease and promotes optimal health.

Not all carbohydrates are the same (e.g., glucose, fructose, galactose). Some carbohydrates are more advantageous than others. Natural foods, such as watermelon, have a glucose-to-fructose ratio of 1:1 for optimal effects, especially during exercise. A combination of glucose and fructose will also minimize gut distress.[2]

For athletes, fructose is considered functional[1,3]. After absorption, it goes to the liver where it's converted to substances that can be used as fuel: glucose, lactate, glycogen or fat.

Lactate is typically thought of as a waste product of muscle. The role of lactate changes when fructose is consumed because as a breakdown product of fructose (~25%) [4] it can be used as an energy source by muscle. [5] In fact, lactate is a preferred fuel source for exercising muscle. [5]




## Understanding Glycogen Stores

Low liver glycogen can reduce an athlete's capacity to exercise due to low blood sugar availability. Glycogen typically depletes after an overnight fast and lowers by 40-60% within 90 minutes of moderate-to-high intensity exercise.

Research has shown that fructose is very effective for restoring liver glycogen,[11] which gives relevance to fructose consumption during recovery.

Liver glycogen (~100 g, or 400 Calories) is useful for maintaining blood sugar balance during exercise, fasting (e.g., sleeping) and eating.

Much of sports nutrition emphasizes topping off muscle glycogen stores – with minimal consideration given to topping off liver glycogen.

Fructose doesn't create a demanding insulin response, which helps balance blood sugar levels. Subsequently, this is a suggested fueling strategy for those exercising with type I diabetes because the lower glucose and insulin responses provides convenience and safety (e.g., avoiding low blood sugar). [12]

As for performance, fruits and fruit juice have shown to help sustain endurance performance during endurance exercise.[13,14,15]

## Potassium

Potassium plays a vital role in exercise-induced fatigue because of its role in maintenance of the sodium-potassium pump. Potassium is stored inside cells, but following prolonged exercise, large amounts of potassium have been found outside cells due to high muscle activation, which could lead to cramping and fatigue.[16] The balance between sodium outside of cells and potassium inside of cells is key to optimal nerve function because potassium restores the nerve for the next nerve conduction. Lack of potassium slows nerve functioning and subsequent muscle movement. High potassium intake post-exercise helps restore the balance by shuttling potassium back into muscle cells, which helps maintain the efficiency of the sodium-potassium pump.

Potassium helps:

- Maintain fluid balance – enhancing hydration because it pulls water into cells.
- Lower blood pressure
- Direct carbohydrate to muscle
- Regulate the body's pH

Potassium also plays major roles in mitochondria (i.e., the powerhouse of the cell), through the mitochondrial potassium cycle. Mitochondria are critical in energy production, signaling and cell death, and their dysfunctions can result in neurodegenerative and mitochondrial diseases. [17] The roles of potassium in mitochondria include:

- Maintain volume to prevent swelling within and collapsing of the mitochondria
- Enhance gene expression needed for cell growth. [18]

The regulation of cell volume is critical to cell energy production and heart protection. [19]

The estimated minimum requirement for potassium is 2000 mg/day. [20] The 410 mg of potassium in TSAMMA – which is greater than a typical sports drink – may help with fluid management by lowering urine output. [21]

## L-Citrulline

L-citrulline, a non-protein amino acid made in the body, plays an important role in producing nitric oxide (NO), a small molecule that opens blood vessels so that muscle can receive more oxygen and nutrients and eliminate metabolic waste. Citrulline is converted to L-arginine (another amino acid), which produces NO. The potential role of citrulline as a sport performance benefit includes:

- Increasing nitric oxide [23]
- Lowering fatigue

- Reducing muscle soreness [23]
- Lowering blood pressure
- Increasing immunity

The verdict is still out on how much citrulline is needed, especially the dose and timing (e.g., before exercise, daily, etc.) Citrulline is typically provided as a dietary supplement (i.e., L-citrulline malate). Watermelon is the richest dietary source of citrulline. Therefore, watermelon serves as a parallel approach to increase citrulline intake because citrulline is provided in its natural state along with other nutrients that can increase citrulline bioavailability.

TSAMMA provides 600 mg of citrulline.

## Antioxidants

Fruit consumption supports carbohydrate needs for exercise, but with the added benefit of enhancing antioxidant capacity.

The oxidative balance is key for athletes during periods of stress that results from intense training.

Oxidative stress results from the imbalance of highly reactive oxygen species (ROS) – produced from the increase in metabolism and oxygen use during exercise - and antioxidants (substances that neutralize ROS). Too much oxidative stress can lead to muscle damage, lower immunity and fatigue. [24] However, a bit of oxidative stress is important because it helps signal for training adaptations.

Our body has its own antioxidant defense system, but antioxidants can also be supplied by the diet. Antioxidants in supplement form are popular among athletes, but too many antioxidants can actually hurt health and performance of athletes. [25] Therefore, the best nutritional approach is to consume wholesome food that contain antioxidants in their natural ratios and proportions.[26] This is highly important for athletes who are at greatest risk for poor antioxidant intakes, such as those who restrict calories or limit fruits, vegetables and whole grains. [27]

Watermelon may increase antioxidant capacity and lower oxidative stress pre- and post-exercise [28] due to the antioxidants vitamin C (29 mg), lycopene (18 mg), citrulline (600 mg) and beta-carotene.[, 30,31]

Lycopene is key for athletic performance, health and longevity. Lycopene may fight inflammation and oxidative stress following intense exercise.[, 32,33] Inflammation is central to upper respiratory symptoms in athletes, and an increase in antioxidants is associated in airway inflammation. A study found that an increase in lycopene (45 mg/ day) in those with asthma resulted in lowering airway inflammation. [34] Therefore, a lycopene-rich dietary source may reduce the risk for URTIs in athletes.

A study reported an improvement in metabolic health (lower cholesterol, inflammatory markers and waist circumference) in young, healthy females from consuming 32.5 mg of lycopene daily for two months. [35]

Lycopene also offers potential and promising anti-cancer properties. A recent meta-analysis found that higher lycopene intake (9-21 mg/day) was associated with a reduced risk for prostate cancer. [36]

Lycopene is typically associated with tomatoes, yet watermelon provides ~60% more lycopene than a tomato. [38] Lycopene may fight inflammation and oxidative stress following intense exercise.' But adults only consume 4.5-6.5 mg/day of lycopene [38] – and 75% of it isn't absorbed.

Natural antioxidants in watermelon work as a preventive modality in fighting oxidative stress from exercise.

## TSAMMA Juice Functional Sports Beverage

The theme of athletes who are fit, but unhealthy [39] is gaining momentum due to poor nutrition (e.g., highly refined carbohydrate only) that results in inflammation, [40] pain [41] and oxidative stress. This gradually leads to chronic inflammation and poor health outcomes. [43] In athletes, the typical Western diet combined with exercise stress contributes further to chronic inflammation.

Sports drinks are sugar-sweetened beverages that are overly – and unnecessarily – used in an athlete's diet. [44] The purpose of a sport drink is to: 1) hydrate; 2) provide carbohydrate for energy; and 3) replenish electrolytes lost in sweat.

TSAMMA fulfills the purpose of a sports drink (especially because sodium intake is covered in other parts of an athlete's diet) and offers palatability to enhance hydration behavior of athletes.

Studies have shown that performance times between watermelon and carbohydrate beverages are similar, which suggests that high-fructose fruit intake may support prolonged exercise to the same extent as a sports drink.[13,14]

The convenient nutritional profile and flavor of TSAMMA may help athletes adhere to hydration strategies.

Furthermore, TSAMMA Watermelon Juice is a healthful swap for athletes because it meets the criteria of a functional beverage:

- Nutrients beyond just calories and carbohydrate.
- Antioxidants and vitamins that lower the risk for disease.

- Health-promoting activities from vitamin C, vitamin A, lycopene and citrulline that promote optimal health.

According to the Academy of Nutrition and Dietetics, functional foods should be regularly consumed at effective levels in a balanced diet. [45]

# Practical Applications of Watermelon Juice

TSAMMA Watermelon Juice provides healthful attributes, flavor and convenience that are pivotal to different areas of sports nutrition. Below we discuss TSAMMA's practical application in sports nutrition that will help athletes improve overall diet quality:

**Pre-Workout: Acute Fueling Strategy**

Watermelon is a food-first approach for active fueling compared to sports drinks. Fruit with high water content can help athletes hydrate through fruit instead of water. [46,47] A flavored beverage has shown to encourage greater fluid consumption during exercise than plain water.' Watermelon is 91% water [48] - making it a practical solution compared to drinking 2 L of water or a sports drink.

Athlete morning readiness is highly dependent on their acute nutritional status. [49,50] The right amount of sweetness can motivate athletes to fuel and consume carbohydrate, [51] which will also help stimulate the brain. Fructose is sometimes included in small amounts in sports drinks to increase the palatability of the beverage and possibly enhance gastric emptying.

Athletes can reach fluid balance pre-exercise by drinking a fluid volume equal to ~2-4 ml/lb between 2-4 hours before exercise[23] (e.g., for a 150 lb athlete, this is one bottle of TSAMMA Watermelon Juice). 100% juice is an excellent choice for pre-exercise hydration, especially if it's nutrient dense.

## Provide an Appropriate Amount of Carbohydrate

Depending on the timing of the athlete's last meal, carbohydrate intake before an afternoon workout may be unnecessary. According to the Academy of Nutrition and Dietetics Position Stand on Nutrition and Athletic Performance, the guidelines for carbohydrate intake by athletes for pre-event fueling states when exercise quality or intensity is less important, carbohydrate intake may be chosen to suit energy goals, food preferences or food. Also, low glycemic index choices may provide a more sustained source of fuel for conditions where carbohydrate cannot be consumed during exercise.[1]

Juice as a liquid source of carbohydrate allows for quicker digestion to quickly get nutrients to muscle and provides gut tolerance for athletes who experience anxiety pre-competition.

Athletes who need a little energy boost can drink TSAMMA without worrying about weight management, especially on light training days.

The high water content and nutritional composition of TSAMMA is a benefit to athletes who desire a natural whole-food source for hydration and nutrition. It's an option that makes hydration more exciting than just plain water.

## Recovery from Training and Competition

Athletes don't hydrate enough, especially post-exercise. [52] Instead of touting a generalized message to increase fluid intake, providing a beverage mixture that contains glucose and fructose in their appropriate ratios helps to increase water absorption, which is due to faster carbohydrate absorption that occurs when glucose and fructose are together. [53] TSAMMA can encourage fluid consumption before and after exercise.

**Complement Food**

If total carbohydrate and caloric intake are sufficient, meals and snacks can come from different foods and fluids based on personal preferences.[, 54,55] Fructose adds the benefit of restoring liver glycogen.

The taste issues with protein powders is a hurdle in tackling the prioritization of protein in an athlete's diet. TSAMMA serves as a mixer to better customize protein drinks with a fruity flavor and nutrient profile to increase the nutrient density of a recovery drink.

**Fight Oxidative Stress**

Dietary antioxidants found their natural ratios (e.g., watermelon versus supplement) lend a protective approach to support training and managing oxidative stress in an athlete. The lycopene from watermelon serves as a concentrated source additional to vitamin C, citrulline and beta-carotene.

TSAMMA meets established guidelines as a recovery option that supplies carbohydrate, antioxidants, vitamins and minerals while offering a mixer for protein powder and serving as a fluid replacement beverage.

## Additional Considerations in Athletes

### Body Composition Management

The low calorie, but nutrient-dense TSAMMA fits into the weight management plan for athletes, especially those who need natural sweetness without hurting their appropriate daily caloric intake.

**Rethink Sodium Intake in Sport**

Prioritizing sodium in every nutritional component of an athlete's diet is unnecessary. A lack of sodium in TSAMMA is not a concern when looking at an athlete's diet holistically. A meal is sufficient in providing enough sodium and enhancing rehydration, [56] which makes a sodium-containing beverage unnecessary, especially post-workout. If necessary, a little extra salt added to meals can help when sodium losses are high. [57]

Replace the Post-Workout Trip to the Juice/Smoothie Shop
Athletes typically pick-up a post-workout juice or smoothie due to convenience – while prioritizing price. Yet, TSAMMA is a more strategic option:

- **Cost Effective**: $2.99 TSAMMA vs. $10/bottle juice at a retail store.

- **Nutrient Stability**: The foundation of a high quality juice is retention of nutritional components. Different processing methods – which can leave the consumer with less nutrients – differentiate juice and smoothie products. For example, vitamin C and lycopene in watermelon juice is better retained during high pressure food processing instead of thermal processing.

- **Sugar Content**: The lack of a Nutrition Fact labels on purchased drinks leads to a mystery of nutritional composition. Many juices/smoothies can provide more calories and a very high sugar content. This further supports TSAMMA as a weight management option.

# GAIN AN EDGE IN SPORTS PERFORMANCE

TSAMMA Watermelon Juice adds great value to a comprehensive eating plan by promoting progress in overall health and recovery. The perceived higher relative cost is the added value in health, convenience and authenticity.

TSAMMA Watermelon Juice provides a fresh, natural flavor that's easy to drink on-the-go as a pre-workout or recovery beverage.


TSAMMA Watermelon Juice offers a strong nutritional profile that fits into an athlete's nutritional plan for sport performance, health and longevity. Typically, an athlete's diet is energy-rich, but nutrient-poor. The contemporary sports nutrition paradigm is gradually shifting toward a more whole-some food approach because athletes realize the importance of choosing quality food and beverages to optimize performance and health.

## REFERENCES

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. J Acad Nutr Diet. 2016;116(3):501-528.

2. Jentjens RL, Achten J, Jeukendrup AE. High oxidation rates from combined carbohydrates ingested during exercise. Med Sci Sports Exerc. 2004;36:1551–1558.

3. Tappy L, Rosset R. Fructose metabolism from a functional perspective: Implications for athletes. Sports Med. 2017;47(Suppl 1):23-32.

4. Topping DL, Mayes PA. The concentration of fructose, glucose and lactate in the splanchnic blood vessels of rats absorbing fructose. Nutr Metab. 1971;13:331–8.

5. Lecoultre V, Benoit R, Carrel G, Schutz Y, Millet GP, Tappy L, et al. Fructose and glucose co-ingestion during prolonged exercise increases lactate and glucose fluxes and oxidation compared with an equimolar intake of glucose. Am J Clin Nutr. 2010;92(5):1071–9.

6. Brooks GA. Intra- and extra-cellular lactate shuttles. Med Sci Sports Exerc. 2000;32:790–9.

7. Cermak NM, van Loon LJ. The use of carbohydrates during exercise as an ergogenic aid. Sports Med. 2013;43:1139–1155.

8. Gonzalez JT, Fuchs CJ, Smith FE, Thelwall PE, Taylor R, Stevenson EJ, Trenell MI, Cermak NM, van Loon LJ. Ingestion of glucose or sucrose prevents liver but not

muscle glycogen depletion during prolonged endurance-type exercise in trained cyclists. Am J Physiol Endocrinol Metab. 2015;309,E1032–E1039.

9. Decombaz J, Jentjens R, Ith M, Scheurer E, Buehler T, Jeukendrup A, Boesch C. Fructose and galactose enhance postexercise human liver glycogen synthesis. Med Sci Sports Exerc. 2011;43: 1964–1971.

10. Moriarty K, McIntyre D, Bingham K, et al. Glycogen resynthesis in liver and muscle after exercise: measurement of the rate of resynthesis by 13C magnetic resonance spectroscopy. Magn Reson Mater Phy. 1994;2(3):429–32.

11. Cermak NM, van Loon LJ. The use of carbohydrates during exercise as an ergogenic aid. Sports Med. 2013; 43:1139-55.

12. Bally L, Kempf P, Zueger T, Speck C, Pasi N, Ciller C, Feller K, Loher H, Rosset R, Wilhelm M, et al. Metabolic effects of glucose-fructose co-ingestion compared to glucose alone during exercise in type 1 diabetes. Nutr J. 2017,9.

13. Too BW, Cicai S, Hockett KR, Applegate E, Davis BA, Casazza GA. Natural versus commercial carbohydrate supplementation and endurance running performance. J Int Soc Sports Nutr. 2012;9:27–35.

14. Nieman DC, Gillitt ND, Henson DA, Sha W, Shanely RA, Knab AM, Cialdella-Kam L, Jin F. Bananas as an energy source during exercise: A metabolomics approach. PLoS ONE. 2012;7: e37479.

15. Nieman DC, Gillitt ND, Sha W, Meaney MP, John C, Pappan KL, Kinchen JM. Metabolomics-based analysis of banana and pear ingestion on exercise performance and recovery. J Proteome Res. 2015;14:5367–5377.

16. Rose LI, Carroll DR, Lowe SL, Peterson EW, Cooper KH. Serum electrolyte changes after marathon running. J Appl Physiol. 1970 Oct;29(4):449-51.

17. Bednarczyk P. (2012). Potassium and mitochondria. Metal Ion in Stroke. Springer Series in Translational Stroke Research. Springer, New York, NY.

18. Garlid KD, Paucek P. Mitochondrial potassium transport: The K(+) cycle. Biochim Biophys Acta. 2003 Sep 30;1606(1-3)23-41.

19. Garlid KD, Dos Santos P, Xie ZJ, Costa AD, Paucek P. Mitochondrial potassium transport: The role of the mitochondrial ATP-sensitive K(+) channel in cardiac function and cardioprotection. Biochim Biophys Acta. 2003 Sep 30;1606(1-3):1-21.

20. Kreider RB, Wilborn CD, Taylor L, et al. ISSN exercise & sport nutrition review: research & recommendations. J Int Soc Sports Nutr. 2010;7:7.

21. Maughan RJ, Owen JH, Shirreffs SM, Leiper JB. Post-exercise rehydration in man: effects of electrolyte addition to ingested fluids. Eur J Appl Physiol Occup Physiol. 1994;69(3):209-215.

22. Bailey SJ, Blackwell JR, Williams E, et al. Two weeks of watermelon juice supplementation improves nitric oxide bioavailability but not endurance exercise performance in humans. Nitric Oxide. 2016;59:10-20.

23. Tarazona-Díaz MP, Alacid F, Carrasco M, Martínez I, Aguayo E. Watermelon Juice: Potential Functional Drink for Sore Muscle Relief in Athletes. J Agric Food Chem. 2013;61(31):7522-7528.

24. Finaud J, Lac G, Filaire E. Oxidative stress: Relationship with exercise and training. Sports Med. 2006;36(4):327–58.

25. Peternelj TT, Coombes JS. Antioxidant supplementation during exercise training: Beneficial or detrimental? Sports Med. 2011;41:1043–69.

26. Pingitore A, Lima GP, Mastorci F, et al. Exercise and oxidative stress: potential effects of antioxidant dietary strategies in sports. Nutrition. 2015;31:916–22.

27. Rosenbloom CA, Coleman EJ. Sports Nutrition: A Practice Manual for Professionals. Chicago, IL: Academy of Nutrition & Dietetics; 2012.

28. Shanely R, Nieman D, Perkins-Veazie P, et al. Comparison of watermelon and carbohydrate beverage on exercise-induced alterations in systemic inflammation, immune dysfunction, and plasma antioxidant capacity. Nutrients. 2016;8(8):518.

29. Stahl W, Sies H. Antioxidant activity of carotenoids. Mol Aspects Med. 2003;24:345–351.

30. Akashi K, Miyake C, Yokota A. Citrulline, a novel compatible solute in drought-tolerant wild watermelon leaves, is an efficient hydroxyl radical scavenger. FEBS Lett. 2001;508:438–442.

31. Edwards AJ, Vinyard BT, Wiley ER, Brown ED, Collins JK, Perkins-Veazie P, Baker RA, Clevidence BA. Consumption of watermelon juice increases plasma concentrations of lycopene and beta-carotene in humans. J Nutr. 2003;133:1043–1050.

32. Tsitsimpikou C, Kioukia-Fougia N, Tsarouhas K, et al. Administration of tomato juice ameliorates lactate dehydrogenase and creatinine kinase responses to anaerobic training. Food Chem Toxicol. 2013;61:9-13.

33. Harms-Ringdahl M, Jenssen D, Haghdoost S. Tomato juice intake suppressed serum concentration of 8-oxodG after extensive physical activity. Nutr J. 2012;11(1): 29.

34. Wood LG, Garg ML, Powell H, Gibson PG. Lycopene rich treatments modify noneosinophilic airway inflammation in asthma: Proof of concept. Free Radical Research. 2008;42(1):94–102.

35. Li YF, Chang YY, Huang HC, Wu YC, Yang MD, Chao PM. Tomato juice supplementation in young women reduces inflammatory adipokine levels independently of body fat reduction. Nutrition. 2015 May;31(5):696-696.

36. Chen P, Zhang W, Wang X, Zhao K, Negi DS, Zhuo L, Qi M, Wang X, Zhang X. Lycopene and risk of prostate cancer: A systematic review and meta-analysis. Medicine (Baltimore). 2015 Aug;94(33):e1260.

37. Liu W, Zhao S, Cheng Z, Wan X, Yan Z, King SR. Lycopene and citrulline contents in watermelon (Citrullus lanatus) fruit with different ploidy and changes during fruit development. USDA-NCC Carotenoid Database for. U S Foods. 1998.

38. Moran NE, Cichon MJ, Riedl KM, et al. Compartmental and noncompartmental modeling of 13C-lycopene absorption, isomerization, and distribution kinetics in healthy adults. Am J Clin Nutr. 2015;102(6):1436-1449.

39. Maffetone PB, Laursen PB. Athletes: Fit but unhealthy? Sports Med Open. 2016;2:24

40. Juanola-Falgarona M, Salas-Salvado J, Ibarrola-Jurado N, et al. Effect of the glycemic index of the diet on weight loss, modulation of satiety, inflammation, and other metabolic risk factors: a randomized controlled trial. Am J Clin Nutr. 2014;100(1):27–35.

41. Coleman LS. Stress repair mechanism activity explains inflammation and apoptosis. Adv Biosci Biotechnol. 2012;3:459–503.

42. Ruiz-Nunez B, Pruimboom L, Dijck-Brouwer DA, et al. Lifestyle and nutritional imbalances associated with western diseases: causes and consequences of chronic systemic low-grade inflammation in an evolutionary context. J Nutr Biochem. 2013;24(7):1183–201.

43. Wilcox G. Insulin and insulin resistance. Clin Biochem Rev / Aust Assoc Clin Biochem. 2005;26(2):19–39.

44. Jeukendrup A. A step towards personalized sports nutrition: carbohydrate intake during exercise. Sports Med. 2014;44 Suppl 1:S25–33.

45. Position of the American Dietetic Association. Functional foods. J Am Diet Assoc. 1999;99:1278–85.

46. Minehan MR, Riley MD, Burke LM. Effect of flavor and awareness of kilojoule content of drinks on preference and fluid balance in team sports. Int J Sports Nutr Exerc Metabol. 2002;12: 81– 92.

47. Passe DH, Horn M, Murray R. Effect of beverage palatability on voluntary fluid intake during exercise. Med Sci Sports Exerc. 1998;30: S156.

48. U.S. Department of Agriculture. USDA National Nutrient Database for Standard Reference, Release 27. Available online: http://www.ars.usda.gov/ba/bhnrc/ndl.

49. Shirreffs SM, Sawka MN. Fluid and electrolyte needs for training, competition, and recovery. J Sports Sci. 2011;29(suppl 1):S39-S46.

50. Garth AK, Burke LM. What do athletes drink during competitive sporting activities? Sports Med. 2013;43(7):539-564.

51. Casa DJ, Guskiewicz KM, Anderson SA, Courson RW, Heck JF, Jimenez CC, et al. National athletic trainers' association position statement: preventing sudden death in sports. J Athl Train. 2012;47(1):96–118.

52. Noakes TD, Adams BA, Myburgh KH, Greeff C, Lotz T, Nathan M. The danger of an inadequate water intake during prolonged exercise. A novel concept re-visited. Eur J Appl Physiol Occup Physiol. 1988;57(2):210-219.

53. Shi X, Passe DH. Water and solute absorption from carbohydrate-electrolyte solutions in the human proximal small intestine: a review and statistical analysis. Int J Sport Nutr Exerc Metabol. 2010;20(5):427–42.

54. Burke LM, Hawley JA, Wong SH, Jeukendrup AE. Carbohydrates for training and competition. J Sports Scis. 2011;29(suppl 1):S17-S27.

55. Burke LM, Kiens B, Ivy JL. Carbohydrates and fat for training and recovery. J Sports Sci. 2004;22(1):15-30.

56. Kenefick RW, Sawka MN. Hydration at the work site. J Am Coll Nutr. 2007;26(5 Suppl):597S-603S.

57. ACSM, Sawka M, Burke L, et al. Exercise and Fluid Replacement. Med Sci Sport Exerc. 2007;39(2):377-390.

58. Tola YB, Ramaswamy HS. Temperature and high pressure stability of lycopene and vitamin C of watermelon juice. Afr J Food Sci. 2015;9(5):351-358.

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