

# Synerplex Electrolytes

## *An Important Addition to Athletic Performance*

Balanced electrolytes are crucial to good health and normal cellular function.<sup>1</sup> Numerous works on the subject of electrolytes maintain that one or more of the electrolytes can be out of balance before we are made aware of it.<sup>2</sup> Synerplex™ electrolyte concentrates were created to prevent the homeostatic balance from straying too far, because according to one of the leading nutritional textbooks used in universities world wide: “The maintenance of body fluid and electrolytes is of vital importance for sound health and nutrition.”<sup>3</sup>

Historically, humankind has eaten foods and drank fluids rich in electrolytes. They boiled bones in soups to pull out the rich mineral content, they ate root vegetables that were grown in mineral rich soils and they drank waters from stream and wells that also were rich in trace mineral content. Over the past hundred or so years, due to the greater demand on our agricultural system, our soil has been depleted in many of the essential minerals. Our water supply is chlorinated, ozonated, and purified which, while safer, is virtually devoid of electrolytes.

Today, the typical American diet is low in mineral content, and what little there is tends to be unbalanced, especially sodium which is found in higher quantities than is generally recommended. A typical fast food meal may contain upwards of 1600 mgs of sodium with a disproportionately low amount of potassium. The balance between these two electrolytes is critical in maintaining proper hydration, especially in the high-performance athlete.

Modern sports drinks try to supply the athlete with sodium, potassium, and magnesium but do so without regard to proper physiologic balance. Here is an example of the various popular brands on the market today.

Brand	Sodium	Potassium	Ratio	Carbohydrates in grams per serving
Gatorade	110	25	4.4:1	53
Powerade	55	30	1.8:1	19
All Sport	55	55	1:1	21
Met-Rx	10	150	1:15	19
Cytomax	10	150	1:15	19
Ultra Fuel	0	100	-	50
Ultima	37	75	1:2	4
Carboplex	60	64	1:1	55
Accelerade	127	40	3.2:1	17
Synerplex™ Sport	64	137	1:2.1	0

Note that some are higher in sodium in proportion to potassium while others are higher in potassium. Because our diets are excessively high in sodium, we believe a 1:2 ratio is desirable. Only Ultima and Synerplex™ Sport are ideally balanced but Synerplex™ has a higher concentration than its competitor.

Some brands use simple sugars such as high-fructose corn syrup, fructose, sucrose, and glucose (Accelerade, All Sport, Gatorade, Cytomax, Met-Rx, PowerAde, and Ultra Fuel). Increases in simple carbohydrates reduce the breakdown of fat (pyruvate gluconeogenesis) in the tissues since the body has readily available sources, simple sugars. This continued process of having simple sugars post-exercise, has in a way locked in the fat sources due to the fact that the body does not have to go through gluconeogenesis. If complex carbs are ingested, the body now has the ability to regulate how much sugar is broken down to glycolysis. We avoid this problem by not using any sweeteners and only providing concentrated electrolyte salts.

Another main difference between Synerplex™ and the competition is our use of bicarbonate, chloride and sulfate ions in our formulation, something no other electrolyte does.

Bicarbonates have been shown to be beneficial in buffering lactic acid, converting it to lactate, which is then metabolized back to pyruvate.<sup>4</sup> Using straight sodium bicarbonate has had mixed results.<sup>5</sup> Synerplex™ is the only formula to use both sodium and potassium bicarbonate.

Chlorides, found in Synerplex™, are major components of stomach acid, which helps with the digestion of food and the absorption of nutrients, i.e. hydrochloric acid. They also help to transmit nerve impulses, or signals.<sup>6</sup> Chlorides are also important in maintaining serum osmolality and water balance.<sup>7</sup> Bicarbonates and chlorides have an inverse relationship which involves kidney regulation so when one rises the other is retained to keep the balance going.<sup>8</sup> Our formula keeps that balance while no other sports drink even takes it into account.

Phosphorus, an important electrolyte involved in ATP production<sup>9</sup> is a major component in Synerplex™ but not in many of the other formulas. Research has suggested that phosphate use may increase peripheral extraction of oxygen, attenuate anaerobic threshold, improve endurance exercise performance, and improve creatine phosphate synthesis.<sup>10</sup>

Magnesium is another important electrolyte rarely found in sports drinks. “Avoidance of magnesium depletion is important for the proper maintenance of carbohydrate metabolism and for optimizing body potassium balance...”<sup>11</sup> This important mineral is critical in the formation of ATP from creatine phosphokinase (CPK).<sup>12</sup> ATP is preferentially synthesized when magnesium levels are high.<sup>13</sup> It also participates in many high-energy phosphate transfer reactions which are important in many sports activities.<sup>14</sup>

Another important feature of Synerplex™ is its versatility. It can be mixed in almost any fluid from water to juice, or milk. Not only that, but it can be added to soups, stews, vegetables or anything that calls for salt and water. It is stable enough to cook with even to the point of boiling with no change in its structure.

Synerplex™ also has a taste component that allows the user to determine if their electrolytes are balanced or not. If, when taken with water, it tastes thick or heavy, then the user needs more. If it tastes thin or bitter, then they have too high of a concentration of electrolytes and need more plain water. If the drink tastes neutral, the user is balanced. The original research on this phenomenon was done in animals<sup>15</sup> but has proven itself over the years with users of the product.

Bottom line is that Synerplex™ is a versatile and effective means of rehydration as well as being the perfect way to balance an athlete's electrolytes without any chance of causing imbalances.

Visit the KTS website at: <http://www.kt-solutions.com> or call (775) 815-0867 to order, or for more information.

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- <sup>5</sup> Hyland PJ, MacConnie SE, and Meigs RA, The effect of sodium bicarbonate ingestion on work output during a 2,00 meter rowing ergometer time trial. *Medicine and Science in Sports and Exercise*, 1993; 25(5): S1086.
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- <sup>10</sup> Driskell, J. and I. Wolinsky (1999). *Macroelements, Water, and Electrolytes in Sports Nutrition*. Boca Raton, CRC Press.
- <sup>11</sup> Whang R, Electrolyte and water metabolism in sports activities, *Comp Ther*, 1998; 24(1), p. 6.
- <sup>12</sup> Garfinkle L, and Garfinkle D, Magnesium regulation of the glycolytic pathway and the enzymes involved. *Magnesium*, 1985; 60(4).
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