



## A Review on *Ficus deltoidea* Medicinal Properties and Its Potential Use as Ergogenic Aids in Athletes

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**Abstract** – Ergogenic aids usage by athletes is a common scenario that can be seen in any level of athletes and any types of sports nowadays. Ergogenic aids can range from drugs, food, hormone, mechanical aid and herbs. Traditionally, ergogenic aids can be classified into categories namely: physiological, psychological, mechanical, pharmacological and nutrition. Despite all these classification, all ergogenic aids had one common purpose, which is to improve physical performance. Herbs consumption as ergogenic aids had been practiced since years ago by athletes as either nutritional or pharmacological aids. Using herbs as physical performance booster has gained popularity since it was claimed safer and natural. One of local herb that gets attention as energy booster is *Ficus deltoidea* (Mas Cotek). *Ficus deltoidea* had been used traditionally to restore energy. Few studies had reveal that *Ficus deltoidea* had medicinal properties such anti-nociceptive, antioxidant, wound healing enhancer and blood glucose regulation properties. There is no direct study on *Ficus deltoidea* as energy booster or ergogenic aids, but this medicinal value might be beneficial to increase athlete's physical performance. Ergogenic aids, especially those that been produce using herbs, rarely have scientific evidence to determine its effectiveness, safety, dosage and mechanism of action. Ergogenic aids were normally marketed with claims and report as their reference, not scientific evidence. The most frequent claim used by traders is that ergogenic aids can increase and sustain body's energy. This review will discuss on how ergogenic aids might help athletes to increase their physical performance and possibility of using *Ficus deltoidea* as ergogenic aids based on its medicinal properties.

**Keywords:** energy booster, ergogenic aids, *Ficus deltoidea*

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### Introduction

Herbs and natural product had been given serious attention as supplement to increase energy either in athletes or layman. A lots of claims of using herbs as supplement or ergogenic aid was not base on scientific finding. Scientific study design such as controlled double –blind study is essential for researcher to fairly evaluate the potential use of certain herbs as supplement and its possible adverse effect. Properly design study might also determine the quality and quantity of certain herbs that beneficial as supplement for user. This might help to enhance the process to commercialize the herb as supplement product since consumer nowadays is keen to know the effectiveness of the herbs.

Herbs have been used to increase physical performance for centuries, usually for warrior and combatant. Ancient Greeks was reported to consume sesame seeds before a fight and Australian aborigines chewed pituri plant for anti-fatigue effects (Williams 1974). For athletes, certain herbs were theorized to possess ergogenic effect through various ways such as increasing energy, modify body composition and reduce anxiety. Theory of how herbs might increase energy ranged from

enhancing energy production, influencing energy metabolic pathway, increased mitochondrial density and haemoglobin concentration (William and Branch 2002).

Increase in demands for popular local herbs such as *Tongkat Ali*, *Kacip Fatimah* and *Misai Kucing* had proven that local traditional herbs had potential to be commercialised as modern health supplement with proper scientific evidence (Huda Farhana et al., 2007). Increase in demand for these herbs had cause increase in price and insufficient in supply. This situation leads to exploration into other local traditional herbs such as *Mas Cotek* to be use as health supplement with sufficient scientific study and evidence. *Ficus deltoidea* or Mas Cotek was claimed to have health benefit and some research had demonstrate that this herbs has medicinal properties. This review will discuss on how ergogenic aids might work on athletes and the possibilities of using *Ficus deltoidea* as ergogenic aids based on their medicinal properties.

### **Ergogenic aids**

The traditional practice to improve once ability and performance is by adhering to systematic and structured training. This approach was proven to give result, but it is time consuming and the level of increment was varied between individuals. Thus ergogenic aids was then come to picture to help athletes to boost their performance.

Ergogenic aids can be defined as any substances that purposely ingested in order to increase once physical performance. For athletes and seriously active personnel today, using dietary supplement containing non-prescription plant extract, vitamins, minerals enzymes and hormonal products had been a common practice (William D. McArdle, 2005). There are few concerns regarding ergogenic aids usage in athletes. The most discussed issue is whether the substance really effective in increasing athlete's performance. The second issue is whether it is allowed by the governing body of the sport and lastly the safety of using the substance (Maughan, 1999).

Since most of the ergogenic aids normally classified as food and supplement, regulation is not as strict as medication. One of the example food been used as ergogenic aids is the practice of carbohydrate loading. It is a combination of specific dietary regime and exercise to produce significant glycogen storage in the muscle prior to tournament (William D. McArdle, 2005).

Caffeine is among the most well-known ergogenic aids for human. A part from been taken in beverage such as in coffee and tea, while caffeine tablets also available for serious user. Caffeine was reported to increase elite and well trained athlete's endurance. The ergogenic effect of caffeine was most likely the results from facilitated use of fat as an exercise fuel, thus reserved the limited glycogen storage. Another proposed mechanism for caffeine ergogenic affect is by acting as stimulant in central nervous system that modify the perception of effort and fatigue (Maughan, 1999; William D. McArdle, 2005).

Herbs usage in athletes is normally based on their specific cultures and inherited folk medicine practice in their respective community. The knowledge and preference on using specific herbs was pass down from their previous generation and usually been applied as medication (Winterstein and Storrs 2001). In athletes, specific herbs were normally used for specific purposes. For examples, Ginseng, Guarana, Asian ginseng and Ephedra was used as energy booster or stimulant, Evening primrose oil was prescribe for inflammation and St. John's wort was used to treat depression (Winterstein and Storrs 2001). Huang qi (*Astragalus membranaceus*) was known for improving immune system by increasing white blood cells count (Kundrat 2005).

### **Classification of ergogenic aids**

Sports ergogenic aids can be in form of substance that we consume or technique that we apply. In order to classify ergogenic aids, they can be differentiating by the type of the substances or the technique.

### *Pharmacological ergogenic aids*

There are drugs that been used in legitimate medical condition that been reported to have ergogenic effect. These drugs are been used to treat illness and sometimes been consumed by athletes due to believe that it will boost their performance. Many pharmacological agents did not possess ergogenic effect, but are banned for their health threatening reason (Jack H.Wilmore 2004). The examples of pharmacological ergogenic aids are amphetamines,  $\beta$ -blockers, caffeine, cocaine, marijuana and diuretic drugs.

### *Hormonal ergogenic aids*

Numerous types of hormones played their role in our body function. Hormones were naturally synthesized by our body to meet the demand of physiological process such as tissue building. Synthetic hormones were use as ergogenic effect to enhance body physiological process. The examples of hormonal ergogenic aids are anabolic steroid, human growth hormones and oral contraceptive medication(Jack H.Wilmore 2004). Generally, anabolic steroids and growth hormones can help in increasing muscle mass and strength.

### *Physiological ergogenic aids*

Physiological ergogenic aids is basically to increase the naturally existing substance in our body. This beneficial substance such as oxygen usually exists in our body and become limiting factors during exercise due to their high demand in energy processing(Jack H.Wilmore 2004). Blood doping and erythropoietin is practice to increase red blood cells, thus will increase oxygen transportation capacity. While oxygen supplementation (breathing pure oxygen), was applied to increase the amount of oxygen been inhaled (Jack H.Wilmore 2004).

### *Nutritional ergogenic aids*

Daily food intake recommendation consists of all food component and nutrient. But for athletes, manipulation of this nutrition or food component might give them ergogenic effect to improve their performance. This manipulation can be done by increasing certain nutrient intake such as branched-chained amino acids, L-carnitine and creatine. These nutrients occur naturally in human food intake, but for ergogenic purpose, it was taken as supplement (Jack H.Wilmore 2004). Another manipulation in nutrient intake that possesses ergogenic effect is carbohydrate loading. This specific technique will increase energy storage and supply during desired time especially during endurance exercise (Hawley, Schabort et al. 1997).

### *Psychological ergogenic aids*

Physical performance can be elevated by psychological ergogenic aids. There are few hypotheses on how psychological ergogenic aids might, such as psychological ergogenic aids may deceit the fatigue feeling thus athletes will perform better. Athletes can benefit from psychological aids where it can arouse or relaxed their feeling (Bigliassi, Estanislau et al. 2013). Examples of psychological ergogenic aids are imagery technique and use of music (Holowchak 2000).

### **Placebo effect of ergogenic aids**

Placebo effect can be defined as the body response to the substance used base on our expectation, not the pure effect of the substance itself. This kind of situation mainly been seen in product or substance that been used base on personal claim only, without scientific evidence. This effect was mainly due to psychological effect to the body. Psychological status cause placebo effect in the way that substance user will believe that the substance that been used can increased their performance and thus they will work harder than their usual. Even though placebo effect is from psychological origin, the physical effect is real and can be measured. This effect proves that our psychological and mental state had effect on performance. Placebo effect is a great challenge for researcher to determine whether any substance that been used had positive ergogenic effect (Jack H.Wilmore, 2004). Among the method to eliminate placebo effect in research is by include placebo group in research and using double blind method in human testing to prevent bias (William D. McArdle, 2005).

### **Prohibition of ergogenic aids use**

It is well known that certain substance that been used by athletes is prohibited and banned. The list of the banned substance is long and keeps on adding. The arguments of why certain substances must be banned rely on the basis of fairness and danger. Substance that give unfair advantages to the user are normally been prohibited. This can be seen in blood doping practice by cycling. The most common reason for any substance to be banned is that it possesses danger to user. An example of substance that harms its user is anabolic steroid (Lavin, 1987).

### **Summary**

Ergogenic aids can be work in any pathways with a sole purpose, which is to increase physical performance of athletes. With diverse choice of ergogenic aids, issues such as legality, safety, financial, and effectiveness must be taken into consideration in selecting appropriate ergogenic aids for athletes.

### **Ficus deltoidea and its traditional medicine**

*Ficus deltoidea* is a native plant in South East Asia from the family of Moraceae. In Malaysia, the plant was commonly known as Mas Cotek, Serapat Angin and Telinga Beruk. There are few variants of *Ficus deltoidea* available, but there are two most common variants that are widely used, namely *Ficus deltoidea* var. *angustifolia* (male plant) and *Ficus deltoidea* var. *deltoidea* (female plant)(Mohammad, Wei, & Bakar, 2012).

Almost all part of this plant been utilised in traditional medicine. The fruit is chewed to relieved headache, toothache and cold. The root and leaves was grinded and been applied externally to treat wound and soreness. It also been reported that the whole plant decoction had been used as herbal drink to strengthen up uterus after childbirth in women. It is also believe that this drink help in increase blood circulation, regain energy and improve sex desire (Sulaiman et al., 2008a).

Continuous usage of *Ficus deltoidea* in traditional medicine shows that it might have health benefit. Scientific study might be useful to evaluate the effectiveness of this herb usage, either as medicine or as ergogenic aids for athletes.

### **Medicinal properties of *Ficus deltoidea***

A study on anti-nociceptive properties of *Ficus deltoidea* three different rat's model of nociception which are abdominal writhing, formalin and hot-plate test revealed that *Ficus deltoidea* leaves aqueous extract contains pharmacologically active constituents which possess anti-nociceptive activity. Rat's formalin test shows that *Ficus deltoidea* had anti-nociceptive effect via both peripheral and central nervous system. It was suggested that the endogenous opioid system is involved in its analgesic mechanism of action (Sulaiman et al., 2008a). Analgesic substances such as aspirin and NSAID are usually used by athlete to overcome pain or soreness that cause by rough sport such as football and rugby. Analgesic can be considered as ergogenic aids since pain was known to affect physical performance.

Aqueous extract of *Ficus deltoidea* leaf also possesses anti-inflammatory activity against acute and chronic inflammatory responses and against pain-associated inflammatory response (Zakaria, Hussain, Mohamad, Abdullah, & Sulaiman, 2012). In athletes, muscle inflammation is a performance inhibiting factor. Inflammation is the body response to cellular injury and can be characterize by the present of pain, swelling, redness, heat and may lead to loss of function. During exercise, reactive oxygen species (ROS) formation can lead to tissue and muscle inflammation(Cannon and Blumberg 2000). Major contributor of ROS during exercise was from mitochondrial since oxygen consumption was increased due to increase in energy production (Halliwell and Gutteridge 2015).*Ficus deltoidea* was also known for its antioxidant properties. It was reported that leave and fruit extract of *Ficus deltoidea* show antioxidant properties and contain vitamin C, polyphenol, flavonoid and phenolic acid. It was also reported that 85% of the total antioxidant activity of the aqueous *Ficus deltoidea* infusion was attributable to the flavan-3-ol monomers and proanthocyanidins (Hakiman and Maziah 2009; Omar, Mullen et al. 2011; Misbah, Aziz et al. 2013).

Aqueous extract of *Ficus deltoidea* also been studied for anti-ulcer properties. It was show that certain dose of *Ficus deltoidea* can reduce the size of stomach ulcer in rats (Husin, 2010). Stomach ulcer recovery process requires the reconstitution of epithelial and connective tissue. These processes involve cellular proliferation, migration and differentiation (Beckert, Class et al. 2004). Cell proliferation and differentiation are characters that also possess by anabolic process in the body. This might be an insight that *Ficus deltoidea* may possess anabolic effect that can promote tissue growth and speed up tissue injury recovery.

Compound analysis show that ficus species generally contained flavonoids,  $\alpha$ -tocopherol, steroids, triterpenoids and alkaloids (Abdullah et al., 2009). This actives compound play important role in many human physiological function. Flavonoids, a phenolic substance, was known for its antioxidant properties (Middleton, Kandaswami et al. 2000; Pietta 2000). For  $\alpha$ -tocopherol, this active form of vitamin E acts as antioxidant too. A part from that,  $\alpha$ -tocopherol was also report to possess anti-inflammatory effect in rats model (Silva, Portari et al. 2016).

Aqueous and ethanolic extraction of *Ficus deltoidea* also been studied for infertility effect in diabetic rats model. It had been demonstrated both extraction method can normalized testosterone level in diabetic rats (Nurdiana et al., 2017; Samsulrizal et al., 2011). In athletes, testosterone depletion can be observed in overtraining athletes. A part from its function in anabolic and androgenic process, testosterone depletion might also change athlete mental and perception status since testosterone also can affect sense of agency and promote the feel of better future in athletes (Van Der Westhuizen, Moore et al. 2017).

Osteoarthritis is associated with inflammation and degeneration of cartilage that will affect joints. A study in animal model of osteoarthritis shows that *Ficus deltoidea* extract can significantly reduce the cartilage loss. The effect might be due anti-inflammatory property possess by *Ficus deltoidea* (Tantowi et al., 2016).

Mohd Khir (2010) evaluates the characteristic of anti-pyretic for ethanol, hexane and aqueous extract of *Ficus deltoidea* leaves. Pyrexia model was induced in *Sprague Dawley* rats using Brewer yeast suspension injection. It was found that only 50mg/kg aqueous extract demonstrate temporary anti-pyretic effect while 100 and 200mg/kg dosage produce no anti-pyretic effect. It was also reported that both ethanol and hexane extract of *Ficus deltoidea* did not exhibit anti-pyretic effect. Increase in body temperature will affect physical performance since some body function can't work properly (Mohd Khir, 2010). Hyperthermia developed during prolong exercise was known to exerts adverse effect on muscle metabolism and can lead to limitation in muscle endurance (Kozlowski, Brzezinska et al. 1985).

The most abundant active compound that found in *Ficus deltoidea* are flavanoid, namely vitexin and isovitexin had anti-diabetic properties. An experiment on normal and diabetic induced mice show that these compound help to normalize rats blood glucose without causing hypoglycemic (Choo et al., 2012). Oral glucose tolerance test show that *Ficus deltoidea* can improve blood glucose tolerance in both diabetic and normal rats (Adam et al., 2007; Adam et al., 2011). Blood glucose normalization will indirectly help in energy usage and storage. *Ficus deltoidea* mode of action was suggested through enhancement of glucose uptake into the muscle and reduction of hepatic gluconeogenesis (Adam et al., 2007). Enhancement of glucose uptake by the muscle is hypothesis to increase glucose availability during intense sport activity and replenish muscle glycogen content.

Combination of *Ficus deltoidea* and vitexin supplementation can improve learning ability in diabetic rats. The improvement is believed to be associated with reduction of oxidative stress and positive changes in the brain topography. Reduction in brain sugar level might be an important factor that mediates the changes (Nurdiana et al., 2017).

*Ficus deltoidea* had been reported to contain essential mineral that help in body function. Among mineral that can be found in *Ficus deltoidea* are magnesium, potassium, iron, manganese, sodium and zinc. Sodium and potassium are important in nerve stimulation and muscle contraction while iron play important part in haemoglobin and myoglobin production (Mohammad et al., 2012).

*Ficus deltoidea* also had been used traditionally to treat infection. A study using crude extract of *Ficus deltoidea* on few clinically important microbes show that it can be used to treat infection. It was found that the crude extract activities were best on Gram positive (*Staphylococcus aureus*) followed by the fungal and lastly the Gram negative strains (Samah et al., 2012). *Ficus deltoidea* extract at different concentration also found to inhibit the growth of few bacteria such as *Edwardsiella tarda*, *Escherichia coli*, *Flavobacterium sp.*, *Pseudomonas aeruginosa*, *Vibrio cholera*, *Aeromonas hydrophila*, *Klebsiella sp.*, *Salmonella sp.*, *Vibrio alginolyticus* and *Vibrio parahaemolyticus* (Seong Wei, Wee, Yong Fu Siong, & Syamsumir, 2011).

Numerous medicinal properties that been reported possess by *Ficus deltoidea* show that this herbs has a potential to be use as performance supplement in athletes. The main effect might be due the ability of *Ficus deltoidea* extract to regulate blood glucose and increase testosterone level. Indirect effect such as anti-nociceptive and anti-inflammatory also can contribute to physical performance by preventing injury or adverse effects due to exercises.

#### ***Ficus deltoidea* toxicity study**

An acute and subchronic study was conducted to evaluate the safety and toxicity profile of aqueous extract of *Ficus deltoidea* based on hematological, biochemical and target organ toxicity studies by in vivo method and also genotoxicity and cytotoxicity effect by in vitro methodology. The dosage that been tested are 3 g/kg in acute toxicity test, 100, 300, 600 mg/kg in 90 days subchronic toxicity test. It was found that administration of aqueous extract of *Ficus deltoidea* was considered safe based on its effect on in vivo and in vitro studies (Mohd Saaya, 2010).

*Ficus deltoidea* aqueous extract liver and kidney toxicity was studied in an acute and subacute test method in rats. The dosage that been used are 1000, 2000, 4000, 8000 mg/kg. Acute test was done for 48 hours, while subacute test was run for 14 days. None of the rats was died during the test, this mean that LD50 is greater than 8000 mg/kg. Serum AST and ALT also did not show any significant changes. There was increase in serum creatinine in subacute test. But the kidney histology shows no sign of nephrotoxicity (Wan Jamaludin, 2010; Yaw, 2010). Subchronic studies also show that *Ficus deltoidea* had induce increase in serum urea, in dose dependent manner. But there was no other sign of toxicity other than that (Farsi et al., 2013). *Ficus deltoidea* aqueous extract is considered safe to both liver and kidney.

Based on previous study and continuous usage of *Ficus deltoidea* in traditional medicine, it can be said that there was no significant adverse effect show by *Ficus deltoidea*. There was no clear adverse effect of *Ficus deltoidea* even at high concentration in animal model studies, mostly using rats. Translating animal studies to human usage is quit challenging. Differences in biological features such as basal metabolic rate, circulation rate, blood volume and circulating plasma protein has to be take into consideration when prescribing the *Ficus deltoidea* for human usage (Reagan-Shaw, Nihal et al. 2008).

#### **Current products derive from *Ficus deltoidea***

Continuous demand in *Ficus deltoidea* products was due to its medicinal value and inherited usage in traditional medicine. With the advancement in technologies and changes in lifestyle, *Ficus deltoidea* was turn into new form of health products. According from a survey conducted by Forest Research Institute of Malaysia (FRIM) in 2007, there is variety of health products were derived from *Ficus deltoidea*. Among the products are tea, massage oil, extract powder, pill, capsule, coffee and cordial juice (Huda Farhana et al., 2007). A part from these general usage products, *Ficus deltoidea* was also been used to produce herbal energy drink. This drink was claimed to delayed fatigue and increase

energy (Harian, 21 Oct 2016). Production of energy drinks using *Ficus deltoidea* indicate that the effect of this herb on energy level was widely known and accepted.

### **Physical performance and fitness**

Competitive sports always demand for athletes to push their performance to the limit and give the best. Physical performance can be described as the state of physical function to complete either simple or complex task. In athletes, physical performance can be determined on how well they can perform their task such as running, jumping and swimming during game or competition. There are few factors that contribute to physical performance such as physical fitness, skill, technique and tactic. This paper is focus on physical fitness since it is where ergogenic aids have important role.

### **Physical fitness**

Term such as health and physical fitness might be commonly used in daily communication, but their difference can be confusing. According to WHO, health can be define as ‘a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity’ (WHO, 1948). Physical fitness can be termed as ‘the ability to carry out daily activity with vigour and alertness without fatigue, with ample energy to enjoy leisure activity and react to unforeseen emergencies’ (Caspersen et al., 1985). Both health and physical fitness have their components. Other components for health are social, mental, emotional and spiritual health. While for physical fitness, there are five basic components, namely: cardiorespiratory endurance, muscular strength, muscular endurance, flexibility and body composition (Greenberg et al., 2004).

#### *Cardiorespiratory fitness*

Briefly, cardiorespiratory fitness can be defined as the ability to supply and use oxygen over a period of time and in sufficient amount (Greenberg et al., 2004). The highest rate of oxygen can be taken up and used by working muscle during high intensity exercise was termed as Maximum Oxygen Uptake ( $VO_2max$ )(Bassett Jr & Howley, 2000). Every physical activity and exercise requires oxygen in order to produce energy in sustainable manner. Oxygen transportation system is a combination of cardiovascular and respiratory system.

Cardiovascular system plays a number of important roles in the body functions and during exercise. Cardiovascular system delivers nutrients and oxygen, remove carbon dioxide and metabolic waste, transport hormones from endocrine glands to the target site, maintaining body temperature and blood pH. To accomplish all these functions, several components are required, which are: the heart, blood vessels and blood (H.Wilmore & Costill, 2004b). Respiratory system was normally referred to the process of breathing and blood gas changes at the lungs and working muscle.

Increase in cardiorespiratory fitness expresses the improvement in maximal capacity of the cardiorespiratory system to take up and utilize oxygen during exercise (Laukkanen et al., 2002). Increase in this function can be a contribution from parameters such as heart size, stroke volume, blood volume, haemoglobin concentration, cardiac output, maximal pulmonary ventilation and pulmonary diffusion (Bassett Jr & Howley, 2000; H.Wilmore & Costill, 2004c). Improve in cardiorespiratory fitness also lead to few metabolic adaptations in the body. Lactate threshold will increase which mean that the athletes can exercise at higher pace before blood lactate accumulation occur. Athletes also will develop tolerance to higher lactate level before fatigue compared to sedentary counterpart. Another adaptation that can occur is increase in maximum oxygen uptake due to increase in oxygen delivery and utilization at the working muscle (H.Wilmore & Costill, 2004c).

#### *Muscular strength and endurance*

There are different definitions that can describe muscular strength. Strength can be defined as the maximum force a muscle or a group of muscle can produce at one time. Physiologically, strength also can be described as output capabilities of motor system (Enoka, 1988). Muscular endurance can be described as the ability of muscle to repeatedly producing constant force.

Improve in muscle strength can be caused by few pathways. Muscular strength also can be improved without increase in muscular size by increasing muscle fibre tensile strength. Another pathway to increase muscular strength is by neural adaptation following strength training (Enoka, 1988). Increase in muscle size or hypertrophy can increase muscular strength due to increase in muscle mass. Increase in muscle strength is not necessarily will improve other body function such as speed and endurance (Storer et al., 2008).

#### *Flexibility*

Flexibility is the degree which a limb can be moved gracefully and efficiently. It also can be described as range of motion around a joint. Flexibility is important for every movement to ensure efficiency and safety of it. Athletes with poor flexibility are prone to injury, pain and poor performance (Greenberg et al., 2004). Flexibility ability is different between individual. Among factors that affect flexibility are age, gender and size of muscle around joint. Flexibility of joint can be improved through stretching programme. Regular stretching can permanently lengthen ligament and tendon (Greenberg et al., 2004).

#### *Body composition*

Athletes need more data on their body rather than just weight and height. Body composition is referring to chemical composition of the body. According to chemical model of the body, human body is built from fat, protein, carbohydrate, water and mineral. In anatomical view, body composition was divided into muscle, adipose tissue, organ, bone and other (e.g: body fluid) (H.Wilmore & Costill, 2004a).

Desirable body composition and size among athletes are different according to their event. Athletes that involve in contact sport such as football and rugby may prefer bigger body while gymnast and marathoner might prefer smaller and lighter body. For athletes, fat-free mass is more important parameter rather than whole body weight. Fat-free mass is referring to all body component except fat (H.Wilmore & Costill, 2004a).

For certain sports that divided athletes into their body weight categories such as *silat*, karate, weight lifting and boxing, control in body composition is crucial to define their best categories. Higher fat-free mass will benefit their strength and power while high body fat mass is negatively affected locomotor performance, lower limbs muscular power and strength endurance (Franchini et al., 2007; Marinho et al., 2011; Marinho et al., 2016).

#### **Summary**

Physical fitness comprises of components that will contribute to athletic performance, but the importance of each component is not equal in different sport. For example, muscle strength is much more important in weight lifter athlete compared to shooting athletes who value more on mental focus and relaxation. On the other hand, shooter still needs a fair level of muscle strength to prevent early fatigue that will shatter their mental focus.

#### **Conclusion**

Ergogenic aids had been used for century and most probably will last forever as long as sports itself exist. Ergogenic aids can boost athletics performance and at the same time will harm its users if it is not properly regulated and govern. For athletes, extreme cautions must be practiced if athletes want to use ergogenic aid to prevent harmful effect and to avoid using banned substance. *Ficus deltoidea* was shown to elevate testosterone level in diabetic rats. Testosterone was known to possess anabolic properties where it promotes skeletal muscle hypertrophy. With all medicinal properties possess by *Ficus deltoidea* and no significant toxicity effect was reported, this herb has potential to be used as ergogenic aids by athletes.

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