Short Communication

The Role of Cherries in Health, Exercise and Disease

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Abstract

Montmorency tart cherries continue to attract interest across a broad spectrum of health, disease and exercise paradigms. There is significant work suggesting that cherries contain powerful anti-inflammatories and anti-oxidants that can alleviate pain, inflammation, and strength loss and this has been demonstrated in a variety of experimental models. Of particular interest is the ability of Montmorency tart cherries to alleviate pain and strength loss following strenuous exercise. While much type of fruits and berries has been evaluated, the data from studies using cherries is more convincing and consistent. This article provides a brief overview of some of the relevant literature in this emerging field of interest.

INTRODUCTION

There continues to be heightened interest in the use of fruits and vegetables (functional foods), and in particular cherries (and other dark fruits) to treat a range of ailments ranging from sleep disorders [1] to arthritis [2] to muscle damage and soreness [3] to improved cognitive function in Alzheimer’s mouse models [4]. This interest has initiated research investigations into other ‘fruit juices’ and their potential abilities to combat disease and pain. These functional foods include beet root juice [5], pomegranate juice [6], green tea [7], blueberries [8] and cherries [3,9]. Naturally, when so many products are involved the findings are equivocal with regard to efficacy. However, one product in particular, Montmorency tart cherries has shown remarkably consistent and positive findings across a range of experimental protocols. These protocols have included exercise models, disease states, and even sleep study models.

In 2006, Connolly et al. [3] first reported that cherries could reduce the pain and strength loss that followed eccentric exercise resulting in muscle damage. Interestingly, earlier work by the same authors [10] had questioned the efficacy of many dietary practices, vitamin supplementation, and other herbs, in the treatment of delayed onset muscle soreness (DOMS). And while their work in 2006 was originally met with some skepticism, their work in 2006 was originally met with some skepticism, their findings have been replicated in a variety of settings using similar and expanded experimental models. In 2009, Ducharme et al. [11] reported a decrease in muscle damage variables in exercising horses when supplemented with tart cherry juice. Howatson et al. [12] reported efficacy in treating DOMS in marathon runners, as did Kuehl et al. [13]. The aforementioned findings all used exercise models where muscle damage was either deliberately induced using an eccentric model or occurred naturally through strenuous or excessive exercise. However, numerous reports using non exercising models also exist. Schumacher et al. [2] reported reduced WOMAC scores (Western Ontario Mc Master Osteoarthritis Index) in arthritis patients when they supplemented with a proprietary cherry juice. Traustadottir et al [14] reported decreased oxidative stress using an arm occlusion model in elderly subjects supplementing with tart cherry juice. And in an interesting deviation from a ‘muscle model’, Pigeon et al. [1] reported improved sleep quality in patients with insomnia following tart cherry juice supplementation. All the aforementioned studies used the same proprietary tart cherry juice blend from the same company.

Many explanations for the efficacy of cherry juice supplementation acknowledge the anti-inflammatory and/or anti-oxidant properties of Montmorency tart cherries. Data from Howatson et al [15] reports ORAC (oxygen radical absorbance capacity) values of tart cherries at more than twice any other measured fruit (and these included many berries and other forms of cherries). Interestingly, the next highest ORAC score reported in a fruit was found in black cherry juice. Cherries contain a very high number of compounds (many still unidentified), however, it seems reasonable to believe that the mechanism for any benefit is related to either an anti-inflammatory property or an anti-oxidant property, or both. In support of this theory, in vitro work by Seeram et al [16] reports cherry anthocyanins as powerful, naturally occurring COX1 (cyclooxygenase) and COX 2 inhibitors, and additional work by Bondesen [17] showed that the COX inhibition reducing activity of tart cherries was about 38% in comparison to prescribed NSAIDs (Naproxen) of @ 41%, which is quite striking.

It has repeatedly been shown that loss of muscle function occurs following strenuous eccentric exercise and/or when a subject has inflammatory disease (arthritis) and that this loss of
function is related to both inflammatory action and consequently, increased pain. In exercise models the DOMS markers of pain, swelling, inflammation, loss of strength, are all significantly changed in the 24-72 hours post exercise insult [10]. The work by Connolly et al.[3] showed reduced pain in the elbow flexors when a group consuming tart cherry juice was compared to a placebo group. These findings have been supported by others albeit in a distance running leg model [13]. Howatson [15] did also however refute these findings in a running model. Work by Schumacher et al. [2] reported symptom relief in patients with mild to moderate knee osteoarthritis, but the effect was comparable to a placebo. However, the same study did report lower hs CRP levels which were associated with reduced WOMAC scores, and this does use pain as a subscale. In another disease area, namely cognitive function, interesting work by Matchynski et al., [1] has shown improved cognitive function in mouse models when a supplement containing cherry extract was administered. This work continues to be developed. As one would expect, the positive findings of reduced muscle damage, decreased pain, improved Crp scores, etc., when supplementing with tart cherry juice has inevitably lead to multiple other investigations across a broad spectrum of protocols. Regardless, for the most part findings are consistent, and where inconsistencies do exist there are several possible explanations.

Firstly, not all cherries are the same. Quality control of growth practices, food handling and preparation, and ultimately processing clearly can play a role. Many of the studies reporting positive findings referenced in this article used a proprietary blend of naturally prepared/squeezed juice (not from concentrate) which was prepared by the same company. These studies include Connolly et al [3], Traustadottir et al [14], Pigeon et al [1] and Schumacher et al [2]. Other studies that have used a juice concentrate, or a synthesized pill have been less effective. An obvious question relates to the efficacy if one simply consumes the raw product as opposed to a pill or proprietary blend. Early work by Nair and colleagues showed similar findings but communicated that consumption of the equivalent of 50 tart cherries twice a day was challenging.

Secondly, various modes of exercise have been used to induce or elicit muscle damage. These have ranged from cycling to marathon running, to eccentric arm exercise models and even more naturally occurring conditions, such as osteoarthritis. The degree of damage in these models, and consequently, response to treatment is therefore, highly variable.

Thirdly, there appears to be little consistency in dosages used and minimal guidelines exist to address these inconsistencies. The early work by Connolly et al [3], Traustadottir et al [14] and Pigeon et al [1] used the equivalent 50 cherries per serving, twice a day. And for now that appears to be the only consistent amount that is effective.

Regardless of the variation in mode of exercise used, type of damage caused, and even dosage, there is strong evidence across experimental protocols for the efficacy of Montmorency tart cherries in the treatment of inflammation and pain. Anecdotal support is wide ranging in the popular literature in reference to the healing power of cherries in other disease states and ranges from gout to multiple sclerosis. Experimental trials continue in diverse areas and are needed. Research continues to expand into other ‘dark fruits’ including grapes, beets, blueberries, blackberries and pomegranate. However, what eludes us is a potential mechanism for these positive effects. The mechanism via which cherries protect against muscle damage and inflammation is unclear and most likely multi-factorial. To date no side effects have been reported either. None of the studies reviewed for this article indicate any gastro-intestinal complications, no blood sugar irregularities, or any other symptom. At this point consumption of Montmorency tart cherries does appear to be an elixir for health, exercise and function. Clearly more work is needed to determine potential mechanisms by which cherries act and to more clearly identify dosages and processing practices which best preserve the integrity of the fruit for maximum effect.

REFERENCES


