

Media release: NZ Blackcurrant Culinary Advisory Service

NZ Blackcurrant Farming Scientist May Have Found an Answer for Endurance Sports Muscle Cramp and Fatigue.

A Canterbury blackcurrant farmer cum practicing science consultant, Jane Lancaster, might have uncovered a cure for lactic acid muscle cramp and a way for endurance athletes to improve performance.

Jane Lancaster has just concluded a study on the proven health benefits of Blackcurrants. The NZ Blackcurrant Cooperative asked Jane to review international scientific evidence from clinical trials using Blackcurrants. The objective was to understand how an extract of NZ Blackcurrants was so successful in Japan where they are consumed in a health supplement to reduce dark rings under the eyes for young Japanese women.

Frozen NZ Blackcurrants haven't traditionally been available to New Zealand consumers but in a joint venture between the Blackcurrants Cooperative and Nelson-based Sujon berryfruits, frozen Blackcurrants are now available as a food in New Zealand. The Japanese health supplement is made from New Zealand Blackcurrants.

“We are looking for consumer values relevant to New Zealanders,” says Bill Floyd from the NZ Blackcurrant Culinary Advisory Service. “There’s a huge amount of folklore about Blackcurrants but we wanted to base our claims on real, irrefutable scientific evidence. And if research showed promise but no guarantees we wanted to make sure we said that as well. The Vitamin C issue for one Blackcurrant marketer recently means we needed to be doubly sure of everything we said when we launched the new product in the market.”

“When we looked for someone to do the work we realised that Jane was perfect,” says Floyd. “She’s an international peer reviewer for major scientific publications and understands the definition of robust proof and critical analysis. She’s a world renowned food scientist. And she’s a NZ Blackcurrant farmer in partnership with her husband, a former plant breeder.”

“Jane looked at all research using Blackcurrants and anthocyanins where clinical trials proved effectiveness on humans and where the trials used randomized, double-blind placebo controlled tests: results based on this method are what are used to prove medicines for major health issues,” says Floyd.

“I was intrigued by the Japanese focus on using Blackcurrants to make the eyes more beautiful,” says Lancaster. “The excellent research done by the Japanese showed that the cause is primarily from a special class of antioxidants in Blackcurrants called anthocyanins. These are what makes the Blackcurrants skin and juice that incredibly rich black-purple-red colour. And because of the NZ climate and type of varieties grown, NZ Blackcurrants have the highest levels of these antioxidants than those grown elsewhere,” says Lancaster.

“But although the study started looking at eye beauty, the research showed some other values which could be far more important for the NZ lifestyle.” says Lancaster. The studies showed that taking an ordinary serving of Blackcurrants (say the equivalent of two dessertspoonfuls) dramatically improved blood circulation by as much as a factor of 40% and led to reduced muscle stiffness, cramp and fatigue symptoms. This is because the anthocyanins improve blood circulation in stressed muscle tissue. In the tests this was measured on forearms and shoulders, but the effect, a relaxation of blood vessels, applies across the body. Continuous muscle contraction shrinks blood vessels in the muscle group concerned and stifles the body’s ability to remove metabolites such as lactic acid. And muscle stiffness, pain and cramping can result. This lactic acid buildup is what defeats most endurance athletes.”

“The idea that taking a pleasant shooter glass of a totally natural, drug-free Blackcurrant smoothie will reduce that buildup, is quite exciting,” says Floyd. “We’ll now look at initiating collaborative research with, for example, a sports fitness centre,” says Floyd. We have the scientific evidence and it’s a matter of giving people for example, a Blackcurrants fruit smoothie and monitoring performance. The clinical trials show that the benefits start about an hour after taking the Blackcurrants and last for another 3 hours. So a serving twice a day at breakfast and lunch would be the aim. And not that we want to favour any sports group, but given that the Blackcurrant industry is totally centred in Crusader country (Canterbury and Nelson) we like the idea of the Red and Blacks proving the idea with their own unique Black currants!”

For further information:

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Attached: Full review of scientific papers prepared by Jane Lancaster under a research grant funded by the NZ Blackcurrant Cooperative.

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Blackcurrants and anthocyanin clinical trials

Summary

The results of three clinical trials with blackcurrant extracts containing anthocyanins are summarised. The results were obtained from randomised double blind placebo controlled cross over clinical trials published in peer reviewed journals. Clinical trials represent a higher level of proof for an effect than either animal models or *in vitro* studies. These reports cover most of the clinical trial work with blackcurrant extracts.

Extracts from blackcurrants and other berry fruit have been shown to increase blood flow with the following range of statistically significant physical outcomes:

- Vasodilation of blood vessels
- Reduced muscle stiffening under repetitive work
- Reduced eye visual fatigue.

A fourth clinical trial used grape and berry extracts on fibromyalgia (chronic musculo skeletal pain). This was also a double blind placebo controlled cross over study. The statistically significant outcomes were:

- Reduced fatigue
- Reduced sleep disturbance
- Increased general health.

All four trials indicate positive outcomes from increased blood flow to muscles and skin.

The amounts of blackcurrant ingested for the trials correspond to an average daily serving.

Blackcurrant extracts contain a range of polyphenolic compounds, including anthocyanins, and it is likely that all these compounds will have health effects.

Effects of blackcurrant intake on peripheral blood circulation during typing work in humans (1)

This was a randomised double blind placebo controlled cross over study. Study size was 10. Blackcurrant powder was prepared from liquid concentrate. The powder had an anthocyanin concentration of 10%.

There were two parts to the study 1) the effect of blackcurrants on peripheral circulation during rest, and 2) during typing work.

Blackcurrant effects during rest

- Subjects ingested 17 mg powder capsule/kg subject weight for the resting study
- Measured
 - Anthocyanin content in plasma
 - Forearm blood flow
 - Muscle oxygen consumption
 - Total hemoglobin and oxygenated hemoglobin
 - Electromyography of the right trapezius muscle.
- Results
 - Anthocyanin content of plasma reached maximum after 1 hour, decreased to 50% by 4 hours.
 - Forearm blood flow increased significantly (about 40%) compared to placebo.
 - No effect on muscle oxygen consumption.

Blackcurrant effects during typing

- Subjects ingested 7.7 mg powder capsule/kg subject weight
- Measured
 - Total hemoglobin and oxygenated hemoglobin
 - Electromyography of the right trapezius muscle.
- Results
 - Total hemoglobin was significantly higher (about 40%) in the blackcurrant intake group.
 - Oxygenated hemoglobin was significantly higher in the blackcurrant intake group.
 - Significant stiffening of the trapezius muscle during typing in the placebo but not the blackcurrant intake group. However, final stiffness not significantly different between the two.
 - No effect on blood pressure, heart rate, subjective pain and typing performance.

When the circulation is disturbed by compression of the blood vessels resulting from continuous muscle contraction removal of metabolites such as lactic acid becomes insufficient and leads to development of muscle stiffness. The study shows a vasodilatory effect of blackcurrants.

Blackcurrants may reduce muscle stiffness by increasing peripheral blood flow and reducing muscle fatigue. Additional laboratory studies with animal models have shown direct effects of anthocyanins on improving blood peripheral circulation (not referenced below).

Effect of blackcurrants on dark adaptation and visual fatigue (2)

This was a double blind placebo controlled cross over study. Study size was 12. Subjects ingested up to 135,270 and 540 mg blackcurrant powder for the dark adaptation test and 50 mg equivalent blackcurrant powder for the transient refractive alteration test.

- Measured
 - Dark adaptation threshold
 - Video display terminal (VDT) transient refractive alteration

- Visual fatigue (asthenopia)
- Results
 - Dark adaptation was significantly improved at the highest level of 540 mg blackcurrant powder (50 mg anthocyanin);
 - There were no significant effects on VDT transient refractive alteration;
 - Visual fatigue was significantly reduced with blackcurrant treatment;
 - Lower back fatigue was significantly reduced with blackcurrant treatment.

The effects are considered to be mediated by increased blood flow in the peripheral circulation.

Effect of blackcurrants on blood flow (3)

This study used four healthy women with daily subjective symptoms of chill (age 22 to 34) who used 50mg as blackcurrant anthocyanin.

After soaking the right hand in cold water of 10 degrees centigrade for one minute, images were taken of the hand using thermography and blood flow volume measured every minute (up to 30 minutes) until the hand returned to resting level. Body temperature did not return to normal after 15 minutes without blackcurrant consumption. In contrast, however, body temperature began to return to normal 10 minutes after blackcurrant consumption.

Effect of anthocyanins on fibromyalgia (4)

Fibromyalgia is a condition of chronic widespread musculo-skeletal pain, particularly in the neck and shoulders, knees and elbows, and lower back.

This was a double blind placebo controlled cross over study of four treatment periods of 12 weeks each. Study size was 10. Subjects ingested 40, 80 or 120 mg anthocyanin per day, from a proprietary product based on extracts of grape seeds, and berries.

- Measured
 - Severity of pain symptoms
 - Fatigue and sleep disturbance
 - Patients assessment of treatment
 - General health questionnaire.
- Results
 - There was a very significant effect (at 1% level) on reduction in sleep disturbance, as assessed by subject's diary record.
 - There was a significant improvement in the general health questionnaire.
 - There was a significant improvement in the severity of fatigue (at 1% level) as assessed by the investigator.
 - The best treatment was 80 mg/day.

It was concluded that anthocyanins were beneficial for people suffering from this difficult chronic condition.

Berry equivalence

The above studies reported amounts of blackcurrant extract ingested that were between 50-80 mg anthocyanin in about 500 mg powder.

There are a range of values for the anthocyanin content of NZ berries. However, 6mg anthocyanin /g fresh weight would be an average. A berry is about 1 g.
Thus 500 mg total powder corresponds to about 13 berries for the anthocyanin.

References

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