

# **Difference between buckwheat and banana in ability to improve sports performance**

2019 Group 11-01

Jayden Ng Yuan Hoe (2P114)  
Chong Jian Chuan Marx (2P205)  
Yang Heran (2O133)

Hwa Chong Institution (High School)

## **Abstract**

The problem is that there are some athletes who are allergic to fruits. These athletes are thus unable to reap the many benefits that come with consuming fruits. The benefits include being able to have a greater supercompensation, having more energy to run faster, etc. An idea was thought of to go around this problem, which was to replace fruits with other foods that also boosts sports performance. The decision to choose buckwheat as our test food is due to the fact that buckwheat contains many nutrients almost similar to that of fruits that athletes eat. As athletes also mostly consume banana before their exercise, this led us to decide to compare the differences between buckwheat and banana in ability to improve sports performance. No one has done this comparison before. The “bleep test” was chosen to conduct the experiments as the bleep test can be carried out almost everywhere with extremely minimal equipment. The bleep test is a multi-stage fitness test used to measure cardiovascular fitness and maximum oxygen uptake (VO<sub>2</sub> max). It is an accurate test of one’s fitness level.

## **Introduction**

Around 0.1-1.2% of the population has banana allergy. Around 45% of people who suffer from latex allergies also suffer from banana allergies. It was also proven that as much as 6% of the population had latex allergy. Banana is commonly used in sports to improve athlete’s performances (Sylvie Tremblay, 2018), containing nutrients such as Potassium and Manganese. Each banana also consists of around 30g of carbohydrates which athletes use to their advantage, consuming them to attain more energy during their workouts (Kiki Michelle, 2019).

One similar experiment used a sports drinks, a 6% carbohydrate drink, in comparison with bananas to see how it affected sports performance through 75km of cycling by trained cyclists. The study found that the carbohydrates in bananas work as well as sports drinks to fuel athletes and help them recover after exertion.

Another experiment, though not intended to find an alternative for allergies, also experiments and searches for new ways to improve sports performance. One of these experiments tested the effects of green beans on improving sports performance using mice over a period of one month. The results of the experiment showed that green bean sports drinks were better than commercial sports drinks. Green beans sports drinks also had good effects on biochemical parameters associated with fatigue and delayed physical fatigue as well.

Another experiment compared the effectiveness of gels, sports drinks and gummies in a marathon by breaking down the properties and analyzing different studies. It finally came to the conclusion that all of them have their different advantages and disadvantages.

### Solution design

The “Bleep Test” is a multi-stage fitness test used to measure cardiovascular fitness and maximum oxygen uptake (VO2 max). The test is carried out using two markers placed at a distance of 20m away from each other. A “Bleep Test” recording was retrieved from YouTube and used for the experiment. (Hamawie, S, 2013, February 10).

When the recording is played, the test subject has to run from marker to marker before the next beep sounds. The time given for the test subject to run from marker to marker will gradually decrease. The “Bleep Test” ends when the test subject is no longer able to keep up with the recording or completes all 21 levels in the “Bleep Test”. Participants consumed either 250g of banana, buckwheat or water 3 hours before the test is carried out. Participants were grouped into 3 groups according to their official 2.4km timings. The 30 test subjects were all secondary two boys. All groups had a mix of participants with similar abilities, with no group being too strong. The average 2.4km time of all the members in each group was constant across all three groups. Each of the groups was then chosen to consume either buckwheat, banana or water.

Control, Banana and Buckwheat

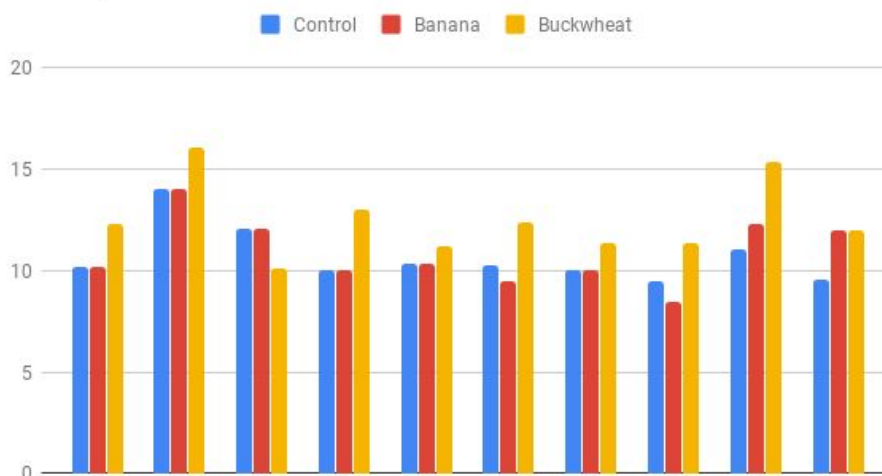


Figure 1: Distribution of Participants Based On Respective 2.4km Timing.

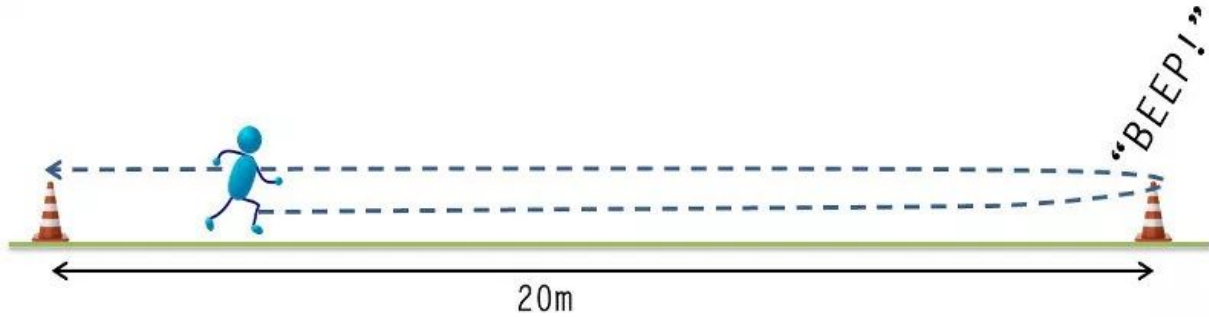


Figure 2: Depiction of “Bleep Test”. (Dene, Dean, & Stamatopoulos, K. 2016, February 09).

**topendsports.com** **Beep Test Recording Sheet**

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Conditions: \_\_\_\_\_

Level 1 1 2 3 4 5 6 7

Level 2 1 2 3 4 5 6 7 8

Level 3 1 2 3 4 5 6 7 8

Level 4 1 2 3 4 5 6 7 8 9

Level 5 1 2 3 4 5 6 7 8 9

Level 6 1 2 3 4 5 6 7 8 9 10

Level 7 1 2 3 4 5 6 7 8 9 10

Level 8 1 2 3 4 5 6 7 8 9 10 11

Level 9 1 2 3 4 5 6 7 8 9 10 11

Level 10 1 2 3 4 5 6 7 8 9 10 11

Level 11 1 2 3 4 5 6 7 8 9 10 11 12

Level 12 1 2 3 4 5 6 7 8 9 10 11 12

Level 13 1 2 3 4 5 6 7 8 9 10 11 12 13

Level 14 1 2 3 4 5 6 7 8 9 10 11 12 13

Level 15 1 2 3 4 5 6 7 8 9 10 11 12 13

Level 16 1 2 3 4 5 6 7 8 9 10 11 12 13 14

Level 17 1 2 3 4 5 6 7 8 9 10 11 12 13 14

Level 18 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Level 19 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Level 20 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Level 21 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

\* circle the level reached for each participant, and write their name next to that line.  
© topendsports.com for detailed instructions for conducting the beep test, see <http://www.topendsports.com/testing/tests/20mshuttle.htm>

Figure 3: Sample of “Bleep Test” Recording Sheet Used

## Results and discussion

Based on the participants’ respective beep test result, the level they were able to attain before they stopped were recorded and were processed through a VO<sub>2</sub> max calculator. The group with the highest VO<sub>2</sub> max will have had the most oxygen uptake, which means they had the most cardiovascular fitness. The results are as follows. The control group had an average VO<sub>2</sub> max

of 20.5 The buckwheat group had an average VO2 max of 21.52 The banana group had an average VO2 max of 22.44

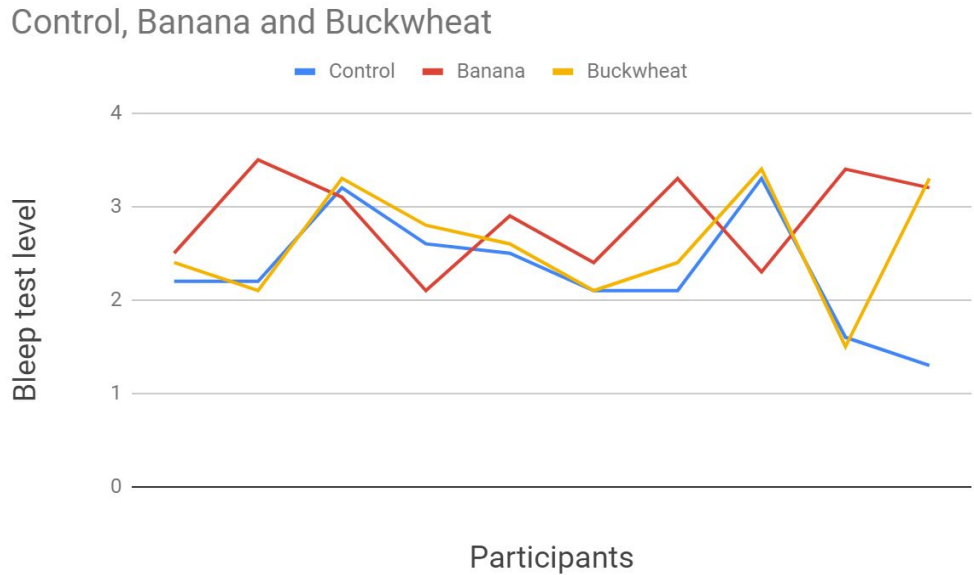


Figure 4: Results of “Bleep Test” Based On Respective Groupings.

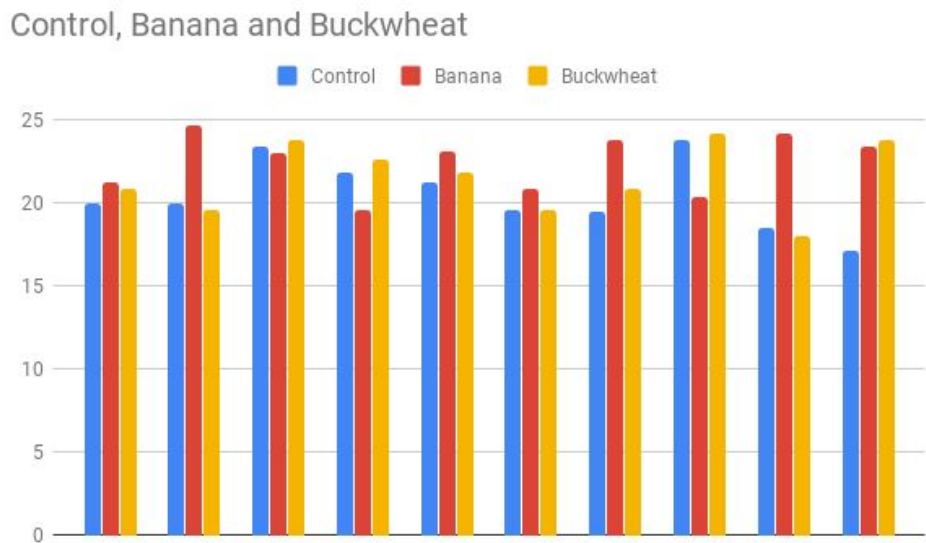


Figure 5: Results of Participants Based On Respective Groupings in Vo2 Max.

The results gathered show that consumption of banana is more effective than consumption of buckwheat before sports, as banana aids sports performance the most. As predicted,

consumption of both banana and buckwheat before sports will aid sports performance more than the consumption of water.

The solution design, the “Bleep Test”, worked well and was effective. This is mainly due to the fact that the bleep test is the second most effective way of measuring a person’s VO2 max, the first being a controlled lab test, which is expensive and impractical. The bleep test can be carried out anywhere that is at least 20 metres long, as requires nothing more than internet access, to play the audio from YouTube, and writing material to take down the participants’ results. However, since the bleep test is not held in a controlled lab environment, external factors such as wind and/or rough ground may have affected the experiments.

## **Conclusion**

The findings lead to the conclusion that consumption of banana before sports will aid sports performance more than consumption of buckwheat or water. Even though the difference might be trivial, even a bit of difference will translate to significant improvement over a longer course like a marathon. However, should one be allergic to bananas, our experiments proved that buckwheat can also be taken to improve sports performance, although not as much as banana. The limitations of our solution design are that the results obtained may be affected by external, uncontrollable factors such as wind, weather or the effort that participants put in during their run.

## **Acknowledgements**

We would like to extend our deepest gratitude to the following individuals, without whom the project would never have been possible.

Our mentor and teacher-in-charge for our CCA, cross-country, Mr Lim Teck Huat, for being there for us when we needed him. He was always very prompt and quick to help us and would always make time for us.

Our CCA coach, Mr Steven Quek, for proposing the idea of this project to us. Without him, we would not be doing this project. Mr Quek was also helpful and would assist us when we needed help.

Our participants, for taking time off to help us with our experiment. Without their selflessness, this project would never be completed.

## References

- Banana Intolerance & Allergy | Signs & Symptoms. (n.d.). Retrieved from <https://www.yorktest.com/could-you-have-a-banana-allergy-or-intolerance/>
- Chao, E. (2017, January 12). The Living Hell of a Latex Allergy. Retrieved from [https://www.vice.com/en\\_us/article/wnd9xm/the-living-hell-of-a-latex-allergy](https://www.vice.com/en_us/article/wnd9xm/the-living-hell-of-a-latex-allergy)
- Tremblay, S. (2018, November 27). Benefit of Eating a Banana for Sports. Retrieved from <https://healthyeating.sfgate.com/benefit-eating-banana-sports-2447.html>
- Michelle, K. (2019, January 10). Why Are Bananas Good for Athletes? Retrieved from <https://healthfully.com/419220-why-do-athletes-eat-bananas.html>
- Nieman, D. C., Gillitt, N. D., Henson, D. A., Sha, W., Shanely, R. A., Knab, A. M., . . . Jin, F. (2012, May 17). Bananas as an Energy Source during Exercise: A Metabolomics Approach. Retrieved from <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0037479>
- Qi, L., & Ying, L. (2015, October 19). The Research on the Impact of Green Beans Sports Drinks on Relieving Fatigue in Sports Training. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4774396/>
- Gels, Sports Drinks & Gummies: Which is Best for Marathon Fueling. (2018, February 01). Retrieved from <https://runnersconnect.net/energy-sources-for-running-a-marathon/>
- Hamawie, S. (2013, February 10). The Beep Test audio Full. Retrieved from [https://www.youtube.com/watch?v=e0U\\_yQITBks](https://www.youtube.com/watch?v=e0U_yQITBks)
- Dene, Dean, & Stamatopoulos, K. (2016, February 09). The Beep Test – A Comprehensive Guide. Retrieved from <http://www.5-a-side.com/fitness/the-beep-test-a-comprehensive-guide/>

