

Ashes and Abs: Testing Calcium in Gladiator Tonic

Activity 1: Answers sheet

1. Could a handful of ashes really match a glass of milk?

Use your experimental results to compare the calcium content in the ash tonic with milk or sports drinks. What did your data suggest?

Complete the table below with reference values or your results.

Sample	Calcium content	Equivalent to milk
Milk	120 mg/100 mL	–
Plant ashes	250 mg / g	≈ 208 mL milk

- Which contains more total calcium: milk or ash?
- Why is total calcium not enough to determine which is better for your bones?
- Is it better to get calcium from supplements or from natural foods? Justify your answer based on what you've learned.

Suggested answer

- In our experiment, 1 g of ash contained around 250 mg of calcium, which is similar to the amount of calcium in a glass of milk (≈200 mL).
- Ash contains more total calcium than milk.
- However, this does not mean it is better for your bones. What really matters is how much calcium your body can absorb. This is known as bioavailability.
- Generally, it is better to obtain calcium from natural foods, such as milk, cheese, or leafy green vegetables. These are safe, well-absorbed, and provide other important nutrients. Calcium supplements can be useful in special cases, but food sources are generally the healthiest and most effective choice.

Conclusion

Although ash contains as much calcium as milk, it's harder to absorb. Natural foods offer a safer source of calcium.

2. Is calcium from ashes as bioavailable as the calcium in milk?

Bioavailability describes how much of a nutrient your body can actually absorb and use. Even if some foods are rich in nutrients, your body may not be able to easily access them.

- What factors help or block calcium absorption in the body?
- (Hint: Think about vitamin D, other minerals, or the chemical form of the calcium.)
- Do you think your body can easily absorb calcium from ash? Why or why not?
- Does milk contain the same type of calcium as ash? Which one might be better absorbed and why?

Suggested answer

- Factors that help calcium absorption: vitamin D from sunlight, proteins, and lactose (the natural sugar in milk)
- Factors that block absorption: oxalates (found in spinach), excessive phosphorus, and caffeine
- Calcium in ash is mostly in the form of carbonate or oxide, which are less soluble and harder for the body to absorb.
- Calcium in milk is mainly in the form of phosphate. It comes together with proteins and lactose, which help the body absorb it more efficiently.

Conclusion

Although ash contains more total calcium, milk calcium is more bioavailable. This means that your body can more easily use it to keep your bones strong.

3. Strategies to improve calcium absorption

Before answering, you'll need to read the introduction text again carefully. Three subtle hints are hidden in the way gladiators ate, trained, and prepared their drink. These clues can help you understand how they might have improved calcium absorption.

Think of three possible strategies gladiators could have used to absorb more calcium from their diet.

Are any of these strategies still used today? Think of some examples.

Suggested answer

Hints from the text:

1. Sun exposure gives you vitamin D, which helps your body absorb calcium.
2. Adding vinegar to their drinks dissolves calcium, making it easier to absorb.
3. Physical training strengthens bones and helps the body use calcium.

Yes! To support healthy bones, we still rely on sunlight or vitamin D supplements, acidic sports drinks to aid mineral absorption, and regular exercise.

Conclusion

Even in ancient times, people unknowingly employed smart strategies to support calcium absorption. Today, science confirms that these strategies are still effective.

4. Would you drink an ash tonic after a workout?

- Would you try it once? Why or why not? Justify your opinion.
- How do you think ancient people saw this type of drink compared to how we see functional or natural foods today?

Suggested answer

We probably wouldn't drink an ash tonic today. There are safer and better-tasting ways to get calcium and recover from exercise. Still, we might try it once out of curiosity, just to experience what ancient gladiators used. For them, it was a trusted natural remedy believed to restore strength. Nowadays, we rely on energy drinks, protein shakes, and mineral waters for the same purpose.

Conclusion

What seems strange to us was common sense to them. Functional foods have changed, but the goal of faster recovery remains the same.

5. What parallels can you find between Roman nutrition and today's sports culture?

Think about supplements, recovery drinks, daily routines, rituals, and how athletes manage their public image. Can you find modern equivalents to the gladiator ash drink?

Suggested answer

The gladiator ash tonic can be compared to modern sports supplements and recovery drinks. Like ancient fighters, today's athletes follow strict diets, training routines, and recovery rituals. Both are surrounded by ideas of strength, endurance, and discipline. Nutrition has always been tied to public image. Roman gladiators were admired for their physique and toughness, and modern athletes often promote special diets or products as part of their personal brand. However, there's a key difference: today's sports nutrition is a multibillion-dollar industry, driven by not only science but also by powerful marketing and economic interests.

Conclusion

From ancient ash to protein shakes, performance foods have always influenced our perception of athletes. However, what we consume today is also shaped by what the market wants us to buy.