

# WHEN MOST PEOPLE HEAR THE WORD “RESEARCH”...



RESEARCH: THE ANSWER  
TO YOUR WONDERINGS...





# Step One: Understand what you're dealing with!

- Ask yourself “What am I really talking about?”
  - ▣ Read a general news or informational article about the topic (this is the ONE time I would recommend Wikipedia!)
  - ▣ Network! Ask someone with more expertise about the topic in general
    - Jot down key words, phrases, concepts or ideas that can be springboards for further research.
  
- My question: Do different bacteria cause different biological or chemical reactions in the creation of yogurt?

# Yogurt

From Wikipedia, the free encyclopedia

*For other uses, see [Yogurt \(disambiguation\)](#).*

**Yogurt**, **yoghurt**, or **yoghourt** (/ˈjoʊɡɜːrt/ or /ˈjoʊɡɛt/; from Turkish: *yoğurt*; other spellings listed below) is a food produced by **bacterial fermentation** of milk.

The bacteria used to make yogurt are known as **"yogurt cultures"**. Fermentation of **lactose** by these bacteria produces **lactic acid** which acts on milk protein to give yogurt its texture and characteristic tang.<sup>[1]</sup> Cow's milk is commonly available worldwide, and, as such, is the milk most commonly used to make yogurt. Milk from water buffalo, goats, ewes, mares, camels, and yaks is also used to produce yogurt where available locally. Milk used may be **homogenized** or not (milk distributed in many parts of the world is **homogenized**); both types may be used, with substantially different results.

Yogurt is produced using a culture of ***Lactobacillus delbrueckii* subsp. *bulgaricus*** and ***Streptococcus thermophilus*** bacteria. In addition, other **lactobacilli** and **bifidobacteria** are also sometimes added during or after culturing yogurt. Some countries require yogurt to contain a certain amount of colony-forming units of bacteria; in China, for example, the requirement for the number of lactobacillus bacteria is at least  $1 \times 10^6$  CFA per gram per milliliter.<sup>[2]</sup> To produce yogurt, milk is first heated, usually to about 85 °C (185 °F), to **denature** the milk proteins so that they set together rather than form curds. After heating, the milk is allowed to cool to about 45 °C (113 °F).<sup>[3]</sup> The bacterial culture is mixed in, and a temperature of 45 °C (113 °F) is maintained for four to seven hours to allow fermentation.

As we read, look for key words or ideas that might be good starting points for further research.

## Step Two: Generate Mini Research Questions

- Using the key words or ideas you found, generate 5-8 mini research questions that will give you important background knowledge.
  - ▣ Avoid “Yes/No” or single answer questions.
    - ▣ (That’s looking things up, not researching.)



# Step Two: Generate Mini Research Questions

Question Word	Fill Your Keywords (or Variations on Your Keywords) into the Blank	Possible Questions for Background Research
Why	Why does _____ happen? Why does _____ _____?	<ul style="list-style-type: none"> <li>• Why does bacterial fermentation happen?</li> <li>• <del>Why does milk proteins happen?</del></li> </ul>
How	How does _____ happen? How does _____ work? How does _____ detect _____? How does one measure _____? How do we use _____?	<ul style="list-style-type: none"> <li>• How does the bacteria cause fermentation?</li> <li>• How does one measure the difference of fermentation</li> </ul>
Who	Who needs _____? Who discovered _____? Who invented _____?	<ul style="list-style-type: none"> <li>• Who discovered the process of bacterial fermentation to create yogurt?</li> <li>• Who needs to ingest the yogurt cultures?</li> </ul>
What	What causes _____ to increase (or decrease)? What is the composition of _____? What are the properties and characteristics of _____? What is the relationship between _____ and _____? What do we use _____ for?	<ul style="list-style-type: none"> <li>• What is the composition of milk?</li> <li>• What do we use bacteria for (specifically lactobacilli)?</li> <li>• What level of bacteria in food is safe?</li> <li>• What is the relationship between lactose/lactic acid and fermentation?</li> </ul>
When	When does _____ cause _____? When was _____ discovered or invented?	<ul style="list-style-type: none"> <li>• When was bacterial fermentation discovered?</li> </ul>
Where	Where does _____ occur?	

## Key Words/Ideas

- Bacterial fermentation
- Yogurt cultures
- Lactose/lactic acid/milk proteins
- Lactobacilli
- Bifidobacteria
- Streptococcus thermophilus