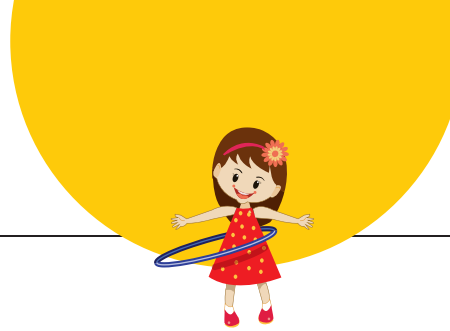




Milk meets microbes

The humble curd on your plate has a surprising connection to the science behind medicines and vaccines



VIDYA MUTHULAKSHMI
MANICKAVASAGAM

On a bright sunny afternoon, Tina returned home hungry after playing with her friends. As she entered her home, she was greeted with the aroma of hot *aloo parathas* and *dahi*. As she munched the yummy *parathas* and the tangy curd, a question popped into her mind. “I have seen my parents add a spoonful of curd to a bowl of warm milk. But how does it magically turn the whole bowl

into curd?” Have you ever wondered about that too?

In the kitchen

Milk is made up of fats, sugar, and protein. The main sugar in milk is called lactose. The single spoonful of curd has millions of friendly bacteria. This spoonful is called the inoculum or the starter culture because it starts the curd-making process. Once the inoculum is mixed into warm milk, the bacteria start eating the lactose. They eat, grow, make millions of new bacteria, and produce lactic acid at the

same time. But only if the environment is comfortable for them. That is why the bowl of milk has to be kept at room temperature.

As the bacteria keep growing, more lactic acid is produced. This gives curd its sour, tangy taste. The acid changes the shape of the protein in milk. So, the milk curdles to get that fluffy and creamy texture. The bacteria continue to grow as long as the conditions are right. That is why freshly set curd becomes sour if it is left outside for too long. We place the curd in the refrigerator so that the colder temperature slows the growth of the bacteria, helping it stay fresh longer.

The process whereby bacteria eat sugars to create a new product is called fermentation. Curd is just one example of fermentation. This process also helps make cheese, idlis, bread, and even chocolate.

At the lab

Scientists use the same process to make medicines and vaccines. Just like growing friendly bacteria in small vessels, they add selected microorganisms or cells as inoculum in large vessels called bioreactors. Just as the bacteria in curd make lactic acid, these cells lead to important products like medicines and vaccines.

Tina smiled as she finished the last bite of her *paratha*. Who knew that the same process that made her favourite curd also helps make life-saving vaccines?

Try this: Ask an adult to show you how curd is set at home. Can you identify the inoculum, the food for the bacteria, and the temperature they need? You have just spotted three components of fermentation