

Dairy-Identical Cheese



When was the last time that you ate a grilled cheese sandwich? Do you remember the taste of the perfectly melted cheese in the middle of the crispy, grilled bread? Have you ever thought about the challenge of making grilled cheese for those who are eating a plant-based diet? These individuals have narrow options for this tasty treat as the flavor and texture of vegan cheese are not close to that of regular cheese. The current trend of diet shifts has created a need for dairy-identical products. These products can be made without cows. That sounds like a challenge, doesn't it?

For many years, humans have used selective breeding to create organisms that have desired characteristics. A drawback of this process is that it does not allow traits to be transferred from a plant to an animal or vice versa. Research during the last 100 years has revealed the link between traits and the genetic sequence that codes for them. This knowledge has allowed for the development of a tool known as recombinant DNA. The technique allows scientists to change the DNA of bacteria, plants, yeast, fungi and animals. This can be done by adding the genetic message from another organism.

The first molecule created using this process was made in 1973.

DNA contains the code for building proteins in all living things. Casein and whey are two proteins found in cow's milk. Knowing the DNA sequence that codes for these proteins in cows offers a way to produce dairy proteins without animals. Scientists can insert the cow DNA instructions into bacteria or yeast. These altered organisms produce casein and whey through the process of fermentation.

In order to start fermentation, engineered organisms, such as yeast or bacteria, are fed plant sugars like glucose and galactose. This leads to enhanced growth. During growth, the altered organisms produce casein and whey along with the proteins they would normally produce. These products are discharged into the growth solution. They are then harvested by isolating them from cells, sugars and other parts of the growth solution. After the proteins are gathered, plant fats, water, vitamins and minerals are added to produce dairy-free products. These engineered products include cheese, milk and ice cream.

A company called Perfect Day® has begun selling ice cream made with animal-free dairy proteins. Shoppers indicate that the ice cream tastes and feels identical to regular ice cream made from cow's milk. This is great news for those who want to eat a plant-based diet and who were unhappy with the strange texture of previous versions of plant-based dairy products. Science to the rescue! ✧✧

