

# THE SCIENCE OF

# ICE CREAM

**D**o you scream for ice cream? If you do, you are not alone – millions of people around the world are wild about this cool confection, and scientists are finding ways to make this delicious treat tastier and healthier. Read on to find out why the science behind ice cream is just as cool!

## Emperor Nero's Secret Treat?

Legend has it that a creative chef first created ice cream when Emperor Nero (A.D. 37-68) demanded an icy treat for dessert. Snow was fetched from snowcapped mountains and combined with fruit juices to create the delectable treat, and the emperor liked it so much that he forbade the chef to divulge the recipe.

### Food Scientist

Want to study your cake and eat it too? Well, then food science is for you! Food scientists study every aspect of commercially-sold food, including how it is manufactured, packaged and stored. Food scientists also research ways to prevent food-borne illnesses, conduct chemical testing and develop new food products for food companies.

Naturally, such an irresistible secret could not be kept secret for long and ice cream soon became popular among the masses. Over time, the recipe evolved to include milk, egg yolks, sugar and flavourings – and voilà! Modern ice cream as we know it was invented!

## The Ice Cream Factory

Ice cream may have been invented during Emperor Nero's reign, but it only became popular during the 20th century when refrigeration became cheaper, making it possible for the masses to afford the treat. Nowadays, ice cream is literally churned out from factories in massive quantities and shipped in refrigerated containers to every part of the world!

*I want my ice cream!*

## The Most Popular Ice Cream Flavours

1. Vanilla, 29%
2. Chocolate, 8.9%
3. Butter pecan, 5.3%
4. Strawberry, 5.3%
5. Neapolitan, 4.2%
6. Chocolate chip, 3.9%
7. French vanilla, 3.8%
8. Cookies and cream, 3.6%
9. Vanilla fudge ripple, 2.6%
10. Praline pecan, 1.7%
11. Cherry, 1.6%
12. Chocolate almond, 1.6%
13. Coffee, 1.6%
14. Rocky road, 1.5%
15. Chocolate marshmallow, 1.3%
- All others, 23.7%



Source: International Ice Cream Association, 888 16th St., Washington, D.C., 20006.



## In the beginning ...

Ice cream starts out life as a mixture of milk, egg yolks and sugar. The mixture is blended in a giant blender and then **pasteurised** to ensure that all harmful bacteria are killed. Next, the mixture undergoes **homogenisation**, a process that breaks up fat globules into tiny molecules. Then, the homogenous mixture is ready for the most exciting stage of the ice cream making process – flavouring!

## What's Your Flavour?

There are literally thousands of ice cream flavours to choose from especially when food scientists get creative! At ice cream factories, a new flavour is first tested and evaluated by food tasters.

Once it gets the green light from the tasters, it is carefully measured out and added to the ice cream mixture to ensure that the flavour remains consistent for every tub of ice cream. Lastly, air

### Pasteurisation

In the past, drinking milk was like playing Russian roulette with your health, until a 19<sup>th</sup> century French scientist changed all that. Louis Pasteur (1882–1895) discovered that harmful microorganisms present in food made people sick. He then invented a simple method to kill off the germs. This process is known as pasteurisation and simply calls for food to be heated at high temperatures before being consumed. Other foods that undergo pasteurisation are cheese, canned foods, juice and beer.

is whipped into the mixture and everything is churned to get that velvety ice cream texture. This is a crucial step because without air, the mixture would simply be frozen ice! The result of all this hard work is divine, luscious ice cream that is fit for an emperor!

## Hmm ... There's Something Fishy About This Ice Cream

For years, ice cream manufacturers have known that the amount of fat affects the taste of ice cream, that is, low-fat ice cream simply doesn't taste as good as regular ice cream. But thanks to the ocean pout (Macrozoarces americanus), low-fat ice cream can taste just as luxurious as regular ice cream!

### Homogenisation

Why is it that milk, which contains some fat, doesn't separate into a water and oil mixture when allowed to stand? This is because commercially sold milk has been homogenised – a process that pumps milk through a small opening at high pressure, breaking the fat molecules into tiny, even molecules. These fat molecules stay suspended in the mixture instead of floating to the surface, resulting in a homogenous milk mixture!

The ocean pout is an Arctic Ocean fish with a unique quality – it produces an 'anti-freeze' protein that prevents tissue damage in extreme cold, allowing the animal to survive the Arctic's freezing temperatures. What does this have to do with ice cream, you ask?



### Tuna Fish Ice Cream?

Fancy some fried pork ice cream? How about some tuna fish ice cream? If you do, then head down to Heladeria Coromoto in Venezuela, where you can check out the famed ice cream shop's 800 other bizarre ice cream flavours, including the ever popular spaghetti and cheese ice cream!



Well, scientists theorised that adding this 'anti-freeze' protein to ice cream would prevent ice crystals from forming, resulting in a smoother, creamier ice cream, even when the ice cream is made with less fat. And they were right! The protein is obtained by cloning the 'anti-freeze' protein in the laboratory, rather than harvesting it directly from the ocean pout, making this the world's first genetically modified ice cream. The result is a scrumptious low-fat ice cream that thankfully, tastes nothing like fish!

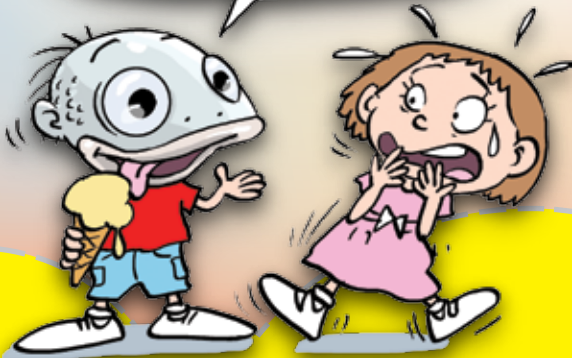
## Too Good To Be True?

Scientists are finding new ways to improve the quality of the food we eat, going as far as modifying plant genetic code to produce tastier fruit, and injecting cows with growth hormones to increase milk production. But is this going too far? Would humans later develop complications such as allergies and diseases from eating genetically modified (GM) food over a long period of time? No one knows yet because GM food hasn't been around long enough for scientists to study its long-term health effects.

What is your opinion on GM foods? Do you think it is a good idea to substitute high-fat ice cream with genetically modified low-fat ice cream?



*I wonder if there are any side effects of eating ice cream with ocean pout protein?*



**Lactose Intolerance**  
 Does your tummy rumble after eating ice cream? If it does, then you may be lactose intolerant – a condition that results from an inability to digest lactose, a sugar present in dairy products. This is due to the body's lack of lactase, an enzyme responsible for digesting lactose. Lactose intolerant people usually experience stomach cramps and diarrhoea after eating dairy products. Visit [http://www.kidshealth.org/kid/health\\_problems/allergiesimmune/lactose.html](http://www.kidshealth.org/kid/health_problems/allergiesimmune/lactose.html) for more information on how to manage lactose intolerance.

## I Scream For Ice Cream Contest

Answer the simple question below to win a fabulous hamper from BIC! Send your answers in the coupon to: YG 306 / Ice Cream Wonder Contest Panpac Education Private Limited, Times Centre, 1 New Industrial Road, Singapore 536196 OR you can drop off your entry at your primary school bookshop! **Closing date: 31 October 2006**

**Name any three foods that undergo pasteurisation.**

Answer: \_\_\_\_\_

Name: \_\_\_\_\_ Sex: M / F Age: \_\_\_\_\_

Address: \_\_\_\_\_

Tel. No.: \_\_\_\_\_

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