

Press release 11/2009

19 June 2009

Page 1 of 2

Scientific breakthrough is marked at Carlsberg

These days mark the 100 year anniversary of a scientific breakthrough at the Carlsberg Laboratory in Copenhagen providing better quality and safety of products for consumers – the so called pH scale.

A strange name for invention, but the pH still has a significant impact – and world wide.

The scale is widely used within science and food manufacturing assuring both consumer safety and product quality by using the pH measurement to confirm that the product is safe for consumption. For modern brewing techniques the development was a leap forward. When the pH value is measured during beer production, the process of the fermentation can be monitored and ultimately ensure that beer production is in order. Additionally, the pH value also affects the shelf life of beer. The pH value is also vital in the production of insulin, in farming, knowing the pH of soil is extremely important when determining the soil quality where crops are grown, and when baking bread the addition of acid to the dough actually has a beneficial influence on the finished bread just to mention a few examples.

In 1909 the Head of the Chemistry Department at the Carlsberg Laboratory, Professor S.P.L. Sørensen, developed the pH scale during his pioneering research into proteins, amino acids and enzymes - the basis of today's protein chemistry. The conception of the pH scale provided a revolutionary standard measurement for determining whether a solution is acidic or alkaline. Before the pH scale, the only parameter to measure acid levels were vague terms such as "good", "bad" or "slightly more than last time". Several scientists had worked on the subject around the turn of the century, but S.P.L.Sørensen's was the first systematic definition.

Today, Professor Jens Ø Duus, Head of the Carlsberg Laboratory, describes the impact of S.P.L. Sørensen's research: "S.P.L Sørensen was capable of systematically creating a whole new concept by the exact definition of the pH scale, enabling us to produce a high quality product. In fact our founder J.C. Jacobsen was a firm believer in telling about his work and in competing in an open manner which he believed was the best way to improve yourself. He believed that our society would only become wiser and more prosperous if we shared information with one another, a belief still very much reflected in the way Carlsberg operates today, and which was also reflected in the development of pH, which was freely given to science, and is now used world-wide by everyone", says Professor Jens Ø Duus.

The 100th anniversary for pH will be marked at Carlsberg and at the International congress "The Centenary" at the Italian Chemical Society in September 2009.

<http://www.chimica.unipd.it/the-centenary>

Facts:

How does the pH scale actually work?

S.P.L. Sørensen developed the pH scale during his pioneering research into proteins, amino acids and enzymes - the basis of today's protein chemistry. Basically meaning 'the potential of hydrogen', the scale provides a simple and universal measurement of the amount of hydrogen ions in a solution, which affects its acidity and how it reacts chemically.

Why is it written pH?

pH is short for "potential Hydrogen". The pH value shows the acid content of a solution. The lower the number the more acidic. S.P.L. Sørensen used a negative logarithm of the hydrogen concentration to create a scale from 0-14, where a pH of less than 7 is an acid, 7 is neutral and higher than 7 is an alkali. So water has a pH of 7, lemon juice 2.4 and bleach 12.5. The pH of beer is between 4.1 and 4.6.

Who uses pH these days?

The applications of the pH scale are countless, ranging from foodstuffs and cosmetics to chemicals and pharmaceuticals. Just about every liquid has had its pH measured at some time to determine how it will react and interact with living organisms.

What is the purpose of the Carlsberg Foundation and the Carlsberg Laboratory?

One of the statutes stipulated by J.C. Jacobsen was that the Carlsberg Foundation should run the Carlsberg Laboratory. His wish was to create a laboratory where one could develop the best and complete methods for better understanding the brewing process from a scientific point of view. Today all research at Carlsberg is performed at the Carlsberg Research Center, which houses Carlsberg Group Research, consisting of two departments: Applied Research and the Carlsberg Laboratory, working closely together. Today approximately 100 full-time employees, from all over the world work there and contribute to the advancement and understanding of the brewing processes to the advantage of Carlsberg and society.

For picture downloads go to: www.carlsberggroup.com/media/PressKits/Pages/ph.aspx

Contacts:

Head of Carlsberg Laboratory: Professor Jens Ø Duus, +45 33 27 52 07

The Carlsberg Group is one of the leading brewery groups in the world, with a large portfolio of beer and soft drinks brands. Its flagship brand – Carlsberg – is one of the fastest growing and best-known beer brands in the world. More than 45,000 people work for the Carlsberg Group, and its products are sold in more than 150 markets. In 2008 the Carlsberg Group sold more than 120 million hectolitres of beer, which is about 100 million bottles of beer a day.

Find out more at www.carlsberggroup.com.