

# pH-Telemetry testing

Determining the cariogenic and erosive properties of foods





## What is pH-Telemetry testing?

*The “toothfriendly” properties of foods and other products are determined by standardized in vivo pH-telemetry tests conducted by accredited test facilities. A product is considered “toothfriendly” if it lacks a significant cariogenic and erosive potential in healthy people under usual conditions of use (in vivo).*

### Evaluation of cariogenic potential

The cariogenic potential of a product is evaluated by measuring plaque-pH in vivo during and for thirty minutes after consumption of the product using an indwelling pH electrode. Using this method, the product is tested in healthy volunteers which have a 3-7 day old plaque on the electrode which is mounted in a removable, restorative dental device, is surrounded by human enamel, and is facing the sound interdental surface of an adjacent, natural tooth.

The plaque pH curve of a test product is the result of at least two measured pH-values per minute. A product is considered to lack a significant cariogenic potential if it does not depress the pH of the interden-

tal plaque below 5.7 by bacterial fermentation, neither during consumption nor during a period of 30 minutes following consumption. The pH curve must clearly show the time of consumption of the test product and the 30-minute period following consumption. bacterial fermentation, neither during consumption nor during a period of 30 minutes following consumption. The pH curve must clearly show the time of consumption of the test product and the 30-minute period following consumption.

The proper functioning of the plaque-pH-measuring equipment and the plaque metabolism must be checked in each test by rinsing with 10 ml sucrose solution (10%) or by the consumption of a sugar-containing analogue of the test product. This positive control

# pH-Telemetry testing

must depress plaque pH to values below 5.

## Evaluation of erosive potential

Products suspected of having an erosive potential on dental hard tissue by virtue of their acidic components must be tested as follows. An aqueous solution of the product is made (1 g/15 ml distilled water) and its pH is measured. If the pH-value is below 5.7 or if it is impossible to make an aqueous solution of the product, the following in vivo test must be performed. Parallel or in addition to the measurement of interdental plaque pH, the pH of oral fluid is recorded during and for at least 15 minutes after consumption of the product using a clean (i.e., plaque-free) electrode. This electrode must either be placed on the buccal surface of either the maxillary canine or first premolar, or it is facing an interproximal space (i.e., is identical with the electrode used for plaque-pH measurement).

For the in vivo test, each product must be tested in at least one volunteer. The results of the measurements must be adequately documented. A product is regarded as not presenting a significant erosive potential if the interdental plaque pH does not fall below 5.7, and the acid exposure of the plaque-free electrode does not exceed  $40 \mu\text{mol H}^+ \times \text{min}$ , established by calculating the area under the curve [acid concentration (in micromols  $\text{H}^+$ )  $\times$  time (in minutes)]. (This value is equivalent to the exposure to a solution of pH 5 for 4 minutes).

## Accredited test stations

Currently there are two accredited test laboratories determining the cariogenic and erosive properties of foods worldwide; University of Zurich and University of Witten/Herdecke.

To test your products, please contact Toothfriendly International and submit your recipe for free pre-screening to avoid unnecessary testing costs.

### Switzerland

Prof. Dr. Thomas Attin  
Zentrum für Zahn-, Mund-, und Kieferheilkunde  
University of Zurich  
Plattenstr. 11  
8028 Zürich, Switzerland

### Germany

Prof. Dr. Stefan Zimmer  
Department of Operative and Preventive Dentistry  
University Witten/Herdecke  
Alfred-Herrhausen-Str. 050  
58448 Witten, Germany



Figure 1. Dental device containing the indwelling pH electrode.

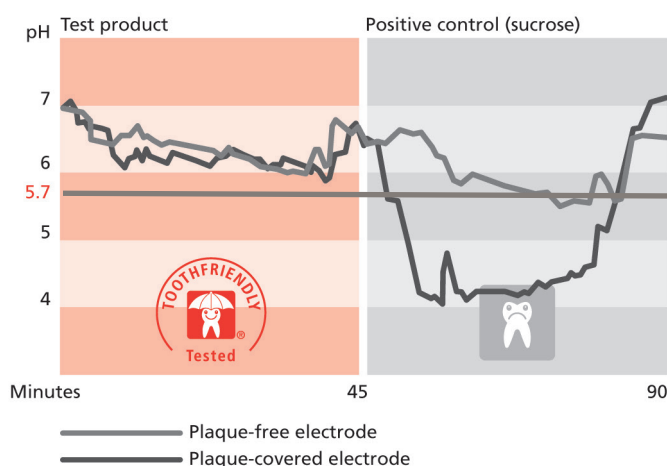


Figure 2. The plaque-pH level is measured during and for 30 minutes after the consumption of a test product. If the product does not depress the plaque-pH below 5.7, it is considered "toothfriendly".

## Toothfriendly labelling

The Toothfriendly label is a registered certification mark which may be used only on food products which have been shown to be toothfriendly, i.e. non-cariogenic and non-erosive, in a standardized pH-telemetry test. The testing requirement guarantees that the Toothfriendly label appears only on products of consistent high quality in terms of dental safety. The Toothfriendly label is governed by Toothfriendly International, a non-profit association with seat in Switzerland. More information about the trademark use can be found at: [www.toothfriendly.org](http://www.toothfriendly.org)