

Effect of pH Neutral

pH Neutral is a phosphate buffer with very high buffer capacity, capable of bringing even strong acid and alkali to a neutral pH level (see figure 1 and 2, showing titration of strong acid and alkali, respectively, with pH Neutral compared to 0.9 % sodium chloride solution and water). Measurement of buffer capacity is performed in a beaker. Such results cannot directly be transferred to what happens in the real world. As pH Neutral is a first aid product for eye burns, we cannot test the effect of the product in real situations.

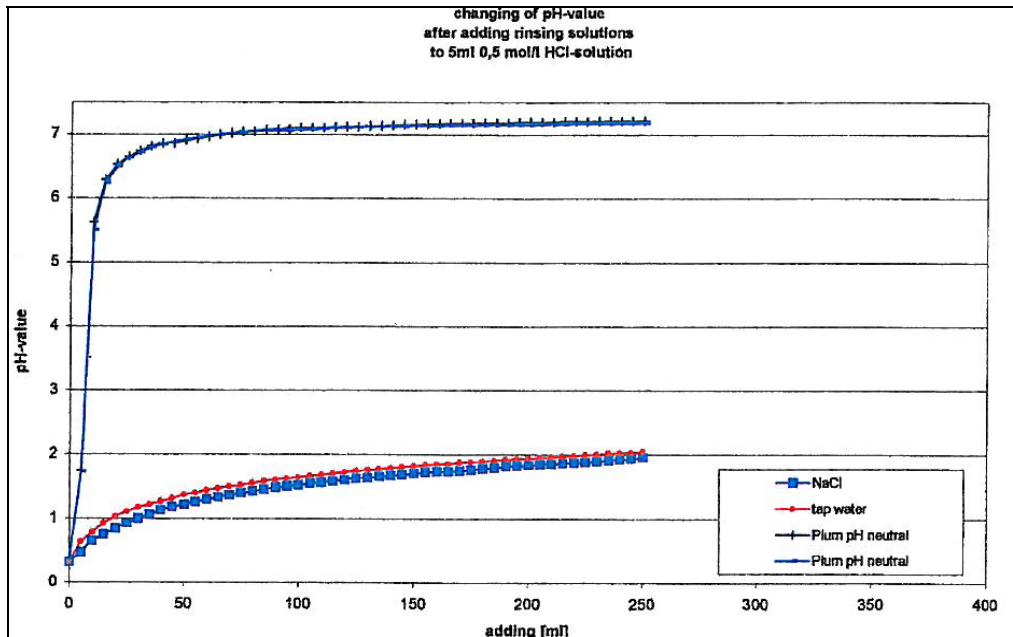


Figure 1. Titration of a strong acidic solution with pH Neutral, tap water and 0.9 % sodium chloride solution (the titrations are performed by Professor Norbert Schrage, ACTO e.V. in cooperation with the eye clinic RWTH Aachen, Germany, 2005)

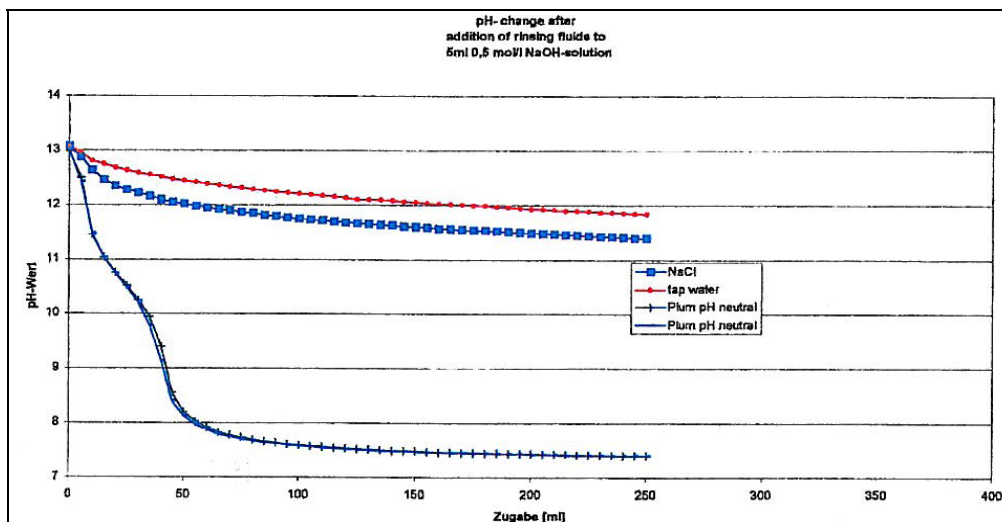


Figure 2. Titration of a strong alkaline solution with pH Neutral, tap water and 0.9 % sodium chloride solution (the titrations are performed by Professor Norbert Schrage, ACTO e.V. in cooperation with the eye clinic RWTH Aachen, Germany, 2005)

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To document the effect of pH Neutral in a better way than by titration, Plum has performed a so-called *ex vivo* experiment. *Ex vivo* is somewhere in between *in vitro* (experiments performed outside living organisms, meaning in laboratories in beakers) and *in vivo* experiments (experiments performed inside living organisms, meaning animal test). *Ex vivo* experiments are performed on dead animals or parts of dead animals which are held artificially alive. It sounds a bit macabre, but the thought of *ex vivo* experiments is actually very attractive, as the main goal is to reduce the number of animal experiments.

An *ex vivo* experiment, based on dead rabbits, has tested the effect of pH Neutral. Eyes of rabbits are very usable for eye injury tests as the eyes are big and protruding. The method is developed by Professor Norbert Schrage, ACTO in cooperation with the eye clinic RWTH in Aachen, Germany. In the experiment the so-called intraocular pH is measured through a small pH electrode, which is placed behind the cornea. Hereby you are able to investigate, whether irrigation of the eye with different irrigation solutions is able to improve the intraocular pH level. The result of the test on pH Neutral is shown in figure 3, which should be compared to figure 4 showing the same investigation only with 0.9 % sodium chloride as irrigation solution.

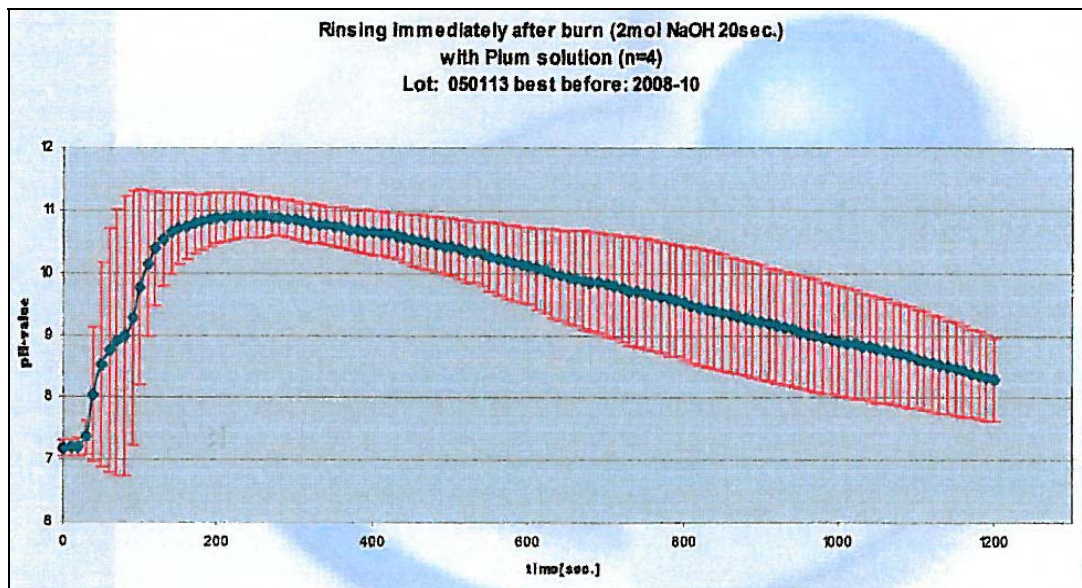


Figure 3. Irrigation test with pH Neutral. pH Neutral has an effect on the intraocular pH level. Four corneas were tested (the experiment is performed by Professor Norbert Schrage, ACTO e.V. in cooperation with the eye clinic RWTH Aachen, Germany, 2005)

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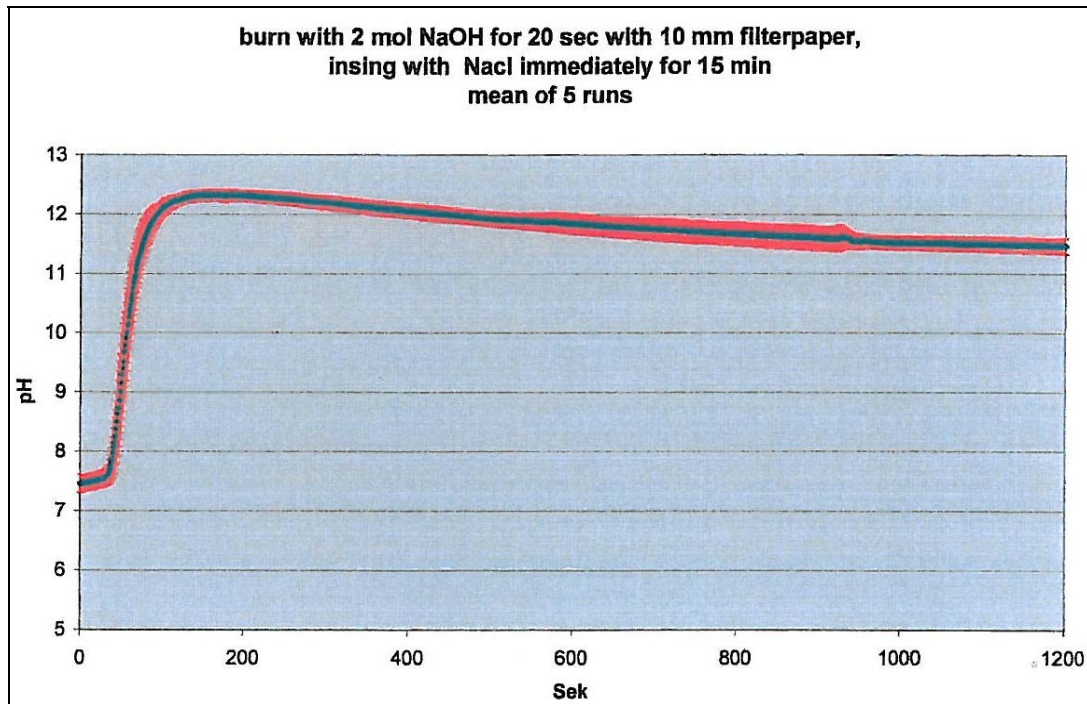


Figure 4. Irrigation test on 0.9 % sodium chloride solution. As shown the sodium chloride does not at all have the same effect on the intraocular pH level (the experiment is performed by Professor Norbert Schrage, ACTO e.V. in cooperation with the eye clinic RWTH Aachen, Germany, 2005)

It shows that the high buffer capacity of pH Neutral is able to influence the pH level in and behind the cornea in connection with eye burns.

The conclusion from the performed *in vitro* and *ex vivo* experiments on pH Neutral clearly shows the great buffer capacity of the product.