

## No 13: pH in cell cultures



[Back to overview](#)

Acid things tend to make you cheerful, according to the proverb. "Nonsense", thinks Susi. Susi was certainly bitter. Adi had been watching her for a few hours and noticed that his colleague again had her migraine. There was no sign of cheerfulness. Perhaps the reason was the claustrophobic feeling in their apartment. Or, that the normal phases of harvesting and regular change of medium had been prolonged. Adi also tended to suffer under these conditions when the laboratory personnel started experimenting with parameters.

He made a note to discuss this particular point with the laboratory head at the next opportunity. As a result of this conversation, a few days later some boxes were delivered to the laboratory. They contained micro-electrodes for pH measurement in the individual TECNOMOUSE apartments.

It was not just since his conversation with Adi that the laboratory head suspected pH as being the reason for the behaviour of his cell cultures. It is a well-known fact that Susi and Adi and their colleagues produce lactate and other waste products when working; in cases of higher cell densities and reduced replacement of medium, this can lead to acidification of the milieu. On the other hand, if there is an inadequate supply of CO<sub>2</sub>, the pH can be shifted clearly into the basic range.

The laboratory head knows well from the publications he has read that the pH optimum for Susi and Adi is 7.4, with a relatively narrow tolerance area of only  $\pm 0.03$  pH units. Complex measurement using the delivered micro-electrodes was intended to clarify whether and to what extent such deviations from the optimum occur and whether they can be correlated with changes in performance of the cell cultures involved.

Susi, however, was still somewhat upset. She was afraid that the micro-electrodes would interfere with the cleanliness of her apartment. However, the promise that antibiotics would be added to the nutrient medium during the measurement phase helped to placate her somewhat.

Adi could hardly wait for the results of the pH measurements. "Even at home you feel as if you are visiting and being constantly observed", he grumbled. Susi was also pleased to see the end of the measurement phase but she was also interested to hear the results.

The laboratory head presented both of them long print-outs and graphics and expressed his surprise at the results. "During the cultivation period, considerable fluctuation in pH occurred; in fact some were too far out of the range to be comfortable for you. These deviations occurred even in the case of regular harvesting shortly after inoculation. In the case of heavily occupied apartments and longer periods of cultivation these effects could even be exaggerated."

"Here you can see how your colleagues reacted to these fluctuations in pH.", he continued. "I have recorded both the wet and dry masses as well as vitality and cell density of the harvest as a function of pH".

Adi soon realised from examining the curves that at those times when he and his colleagues were suffering stress and didn't feel well, cell vitality and antibody production, factors that were of considerable importance to the laboratory head, decreased substantially. Such pH fluctuations in excess of the tolerance range were obviously clear stress factors and influenced performance negatively. Susi, Adi and the laboratory head now considered what had to be done. "In future, we must pay more attention to the CO<sub>2</sub> supply, medium change and harvesting intervals", said the laboratory head.

"All of these can be carried out highly successfully with TECNOMOUSE, an instrument that has set new standards in the regulation of gas supply and pump speeds during change of medium."

[Back to overview](#)