

CORRELATION BETWEEN WATER ACTIVITY AND WEIGHT LOSS OF RAW SAUSAGE

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Water activity and continuously measured weight loss of raw sausage have been investigated. Raw sausage of Salami type (calibre 80mm and 60mm) with different sugar content has been produced. Characteristic parameters have been measured during the maturing process. A high correlation between water content, water activity (a_w) and weight loss in percent (x) have been found. A correlation model ($a_w = a \cdot b^{-x}$) is presented which allows on-line calculation of the water activity. The initial water activity and the weight loss must be known. With this model, the water activity could be determined with an accuracy of $\pm 0.3\%$ to $\pm 1\%$. The results are the basis for further investigations in this field. They allow the monitoring of a maturing process of raw sausage with continuous measurement of weight loss. Continuous measurement of weight loss in a climate chamber can be achieved with the developed equipment. Robust sensors and easy handling characterize the system.

RESULTS AND DISCUSSION

In Figure 2 the weight losses and a_w values of raw sausage of calibers 60 and 80 are shown. The data taken from trail A show a higher weight loss and higher a_w value reduction for calibre 60 than for calibre 80. The maximum weight losses after 9 days of calibre 80 and calibre 60 are 8.3% and 11.75% respectively.

Using the results of four trails, a correlation model for the a_w values has been determined. It is an exponential function:

$$a_w = a \cdot b^{-x}$$

with a being the initial value of a_w and b being a correlation coefficient. b depends on the humidity gradient, the temperature, the pH value and the accuracy of the measurement devices.

Weight measurement

Practical experience has shown that the continuous weight measurement recording and control of the NESS/BIZERBZ weight equipment are robust and reliable.

a_w -value measurement

The continuous a_w value measurement has proven difficult and not robust enough for practical purposes. Several sensors have failed. Therefore, an on-line control with a_w values is not recommended. Discontinuous a_w value measurement, however, was found reliable.

Correlation, meaning of b , limitations

For the salami produced, a good correlation between a_w value and weight loss has been found. The functional dependency is an exponential function with 2 parameters: the initial a_w value and a base coefficient between 0.995 and 0.999. This base coefficient can depend on the process and the product.

CONCLUSIONS -- APPLICATIONS

Compared with time dependent control of the chamber climate, the weight loss dependent control has the advantage of using a direct, maturing correlated variable. This allows for a precise, maturing-dependent control of the production.

Using the correlation between weight loss and a_w value for a product, with base value b determined once and measured initial a_w value, the momentaneous a_w value can be calculated and controlled.

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