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10. Other topics of meat science and technology **‹P10-026›**

Meat and plant-based burgers water dynamics

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Objectives: Juiciness contributes to eating quality and plays a key role in meat and plant-based products texture [1;2]. Therefore, it is fundamental to analyze the water dynamics from the raw to the cooked product that reaches the consumer's mouth. The dynamics could be also useful to obtain plant-based products that are increasingly like meat [2]. The objective of this work was to study water dynamics in meat and commercial plant-based burgers using instrumental analytical techniques.

Materials and Methods: The study was performed on one meat (MT) and two commercial plant-based products (CE, CB) for a total of 66 burgers. CE was a pre-cooked product Water dynamics was measured using 5 parameters: total moisture content (*TMC*); fluid and fat loss (FFL), fluid to the mouth (*FTM*), cooking water loss (*CWL)* and Meat Cooking Shrinkage (*MCS*). The CWL differs from FFL because the latter measures not only water but also other components (fat, protein, etc.) lost during cooking. So, the difference between the two parameters provides an estimate of the fat lost during cooking and no longer available in the consumer's mouth. The parameters were calculated as follows:

*TMC (%) = (RW-DW)/RW*100* *FFL (%) = (RW-CW)/RW*100*

*FTM (%) = (CW-DW)/RW*100* *CWL (%) = TMC-FTM*

RW= raw weight; DW= dried weight; CW= cooked weight.

MCS measures the shrinkage of the burgers after cooking according to Barbera and Tassone, 2006 [3]. This parameter was calculated as follows:

*MCS (%) = (AR-AC)/AR*100*

AR=area of the raw sample; AC=area of the cooked sample.

Data were analyzed by ANOVA in SAS software (version 9.4; SAS Institute Inc., Cary, NC).

Results and Discussion: The TMC was similar for MT and CB (60.8% and 60.1%, respectively), while CE was significantly lower (55.2%).

Cooking significantly affected CWL. The highest value (18.6%) was recorded in MT, the lowest in CE (9.1%), while CB (14.3%) was in the middle.

MT and CB showed a significantly higher FFL (26.3% and 18.5%, respectively). The fat and the other components, dripped out from the burger, were clearly visible on the cooking plate.

The two plant based products had a greater water holding capacity in comparison with the animal based protein product. In fact, FTM values were significantly higher in CE (46%) and CB (45.8%) than in MT (42.2%), so the amount of fluid available in the mouth was significantly different. This result is not in accordance with that obtained by other authors [4;5]. In fact, sensory analyses have demonstrated the lower juiciness of plant-based burgers in comparison with animal based.

In our study, the results obtained with the MCS can help to understand the different perceptions of 'juiciness' by consumers. MT lost more water than the plant-based burgers, but the significantly higher shrinkage observed in MT burger (24% vs 11% and 7.1% of CB and CE, respectively) resulted in a higher amount of water per volume unit which may enhance the perception of juiciness.

Conclusions: Instrumental analytical techniques were applied to compare the water dynamics in meat and plant-based burgers. Preliminary knowledge on the water dynamics and mobility in the two products were obtained, and differences between the products were observed. Further research is underway to validate the developed method and to understand the mechanisms underlying the different water dynamics in the two types of products: meat or plant-based burgers.

References:

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