

Determination of the physical properties of boiled and poached chicken breast through TPA method

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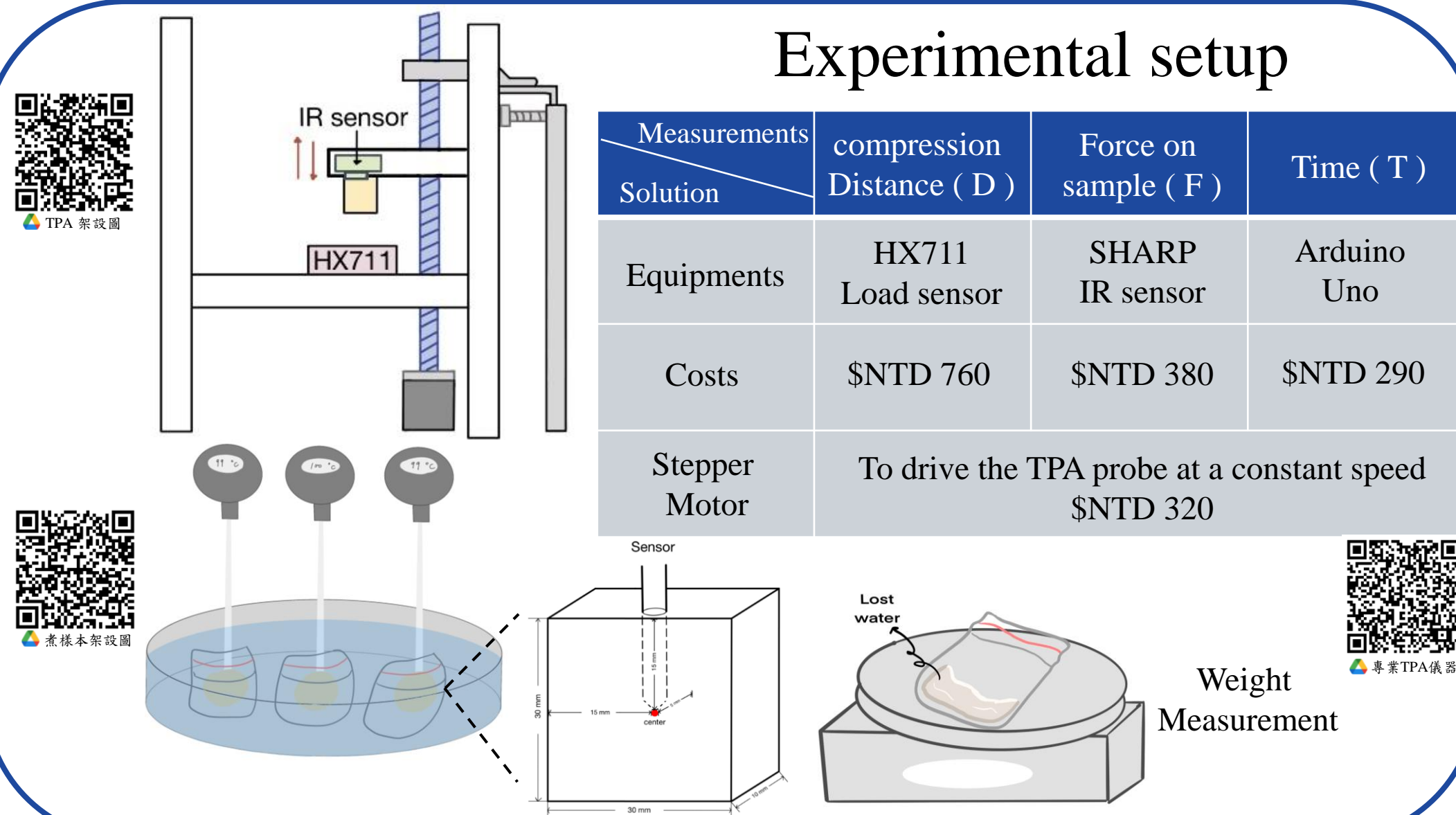
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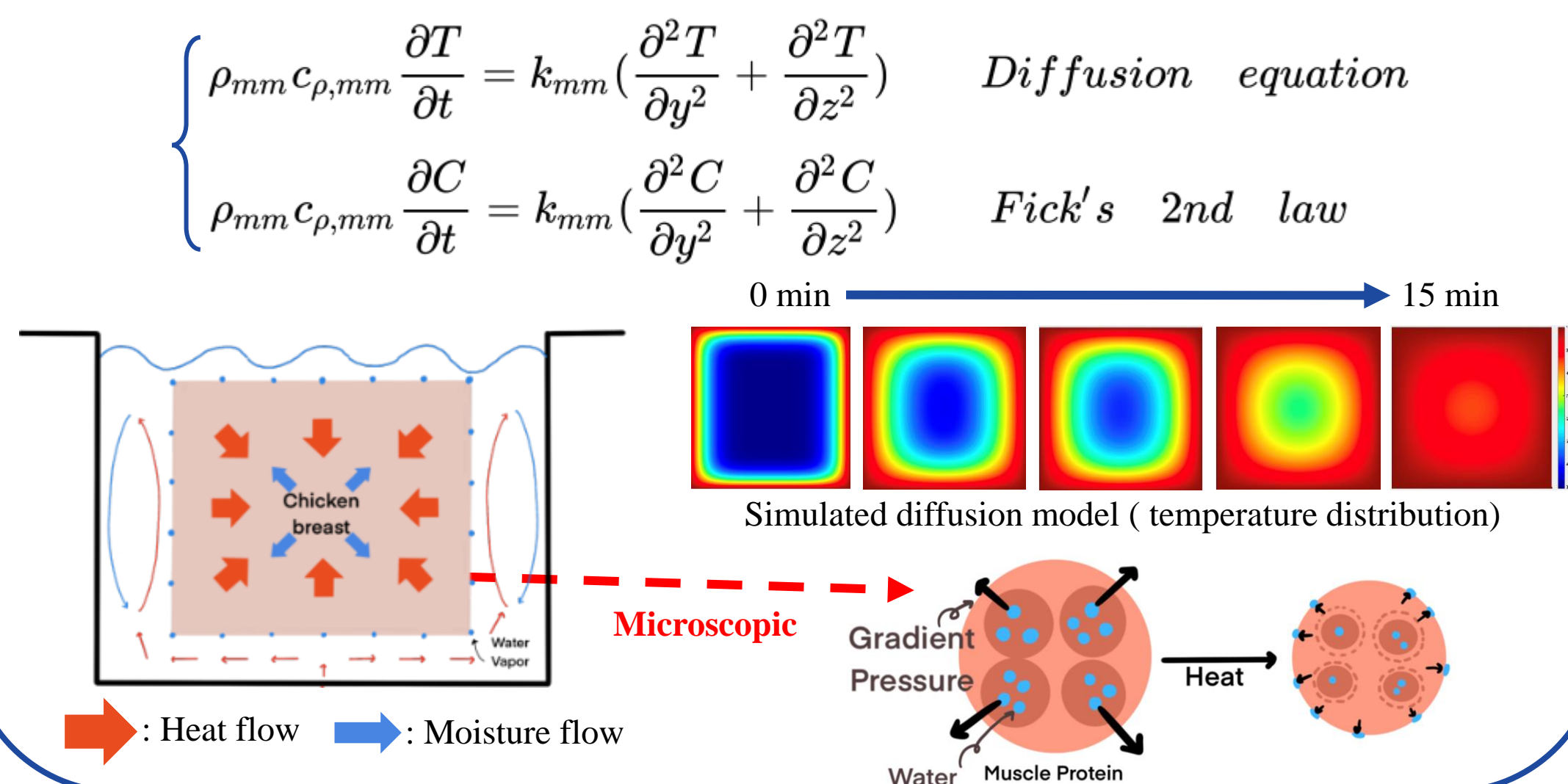
Abstract

The project experiment aims to explore the **tenderness differences** of chicken breasts under two common cooking methods : **boiling and poaching**. Based on thermodynamics, the significantly different **thermal diffusion** processes for the boiled and poached chicken will lead to distinct **thermal gradients** and result in different moisture loss rates from the chicken samples to the surrounding water. To further study the effects of moisture loss on the tenderness of chicken breast, we construct a device to perform the **texture profile analysis (TPA)**. The TPA results show that with a more drastic moisture loss rate, the boiled chicken is tougher compared to the poached chicken with a slower and steadier moisture loss.

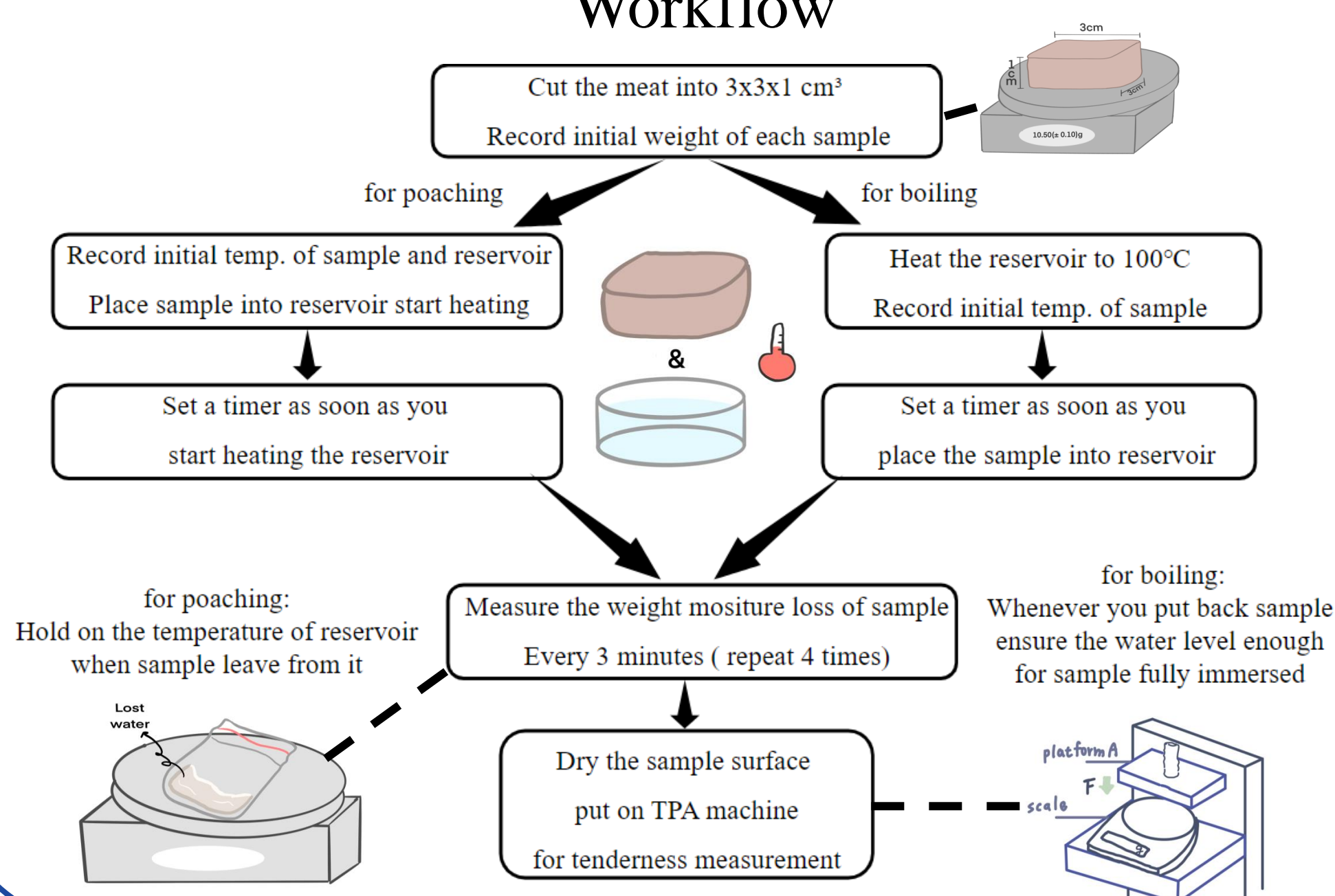
Experimental setup



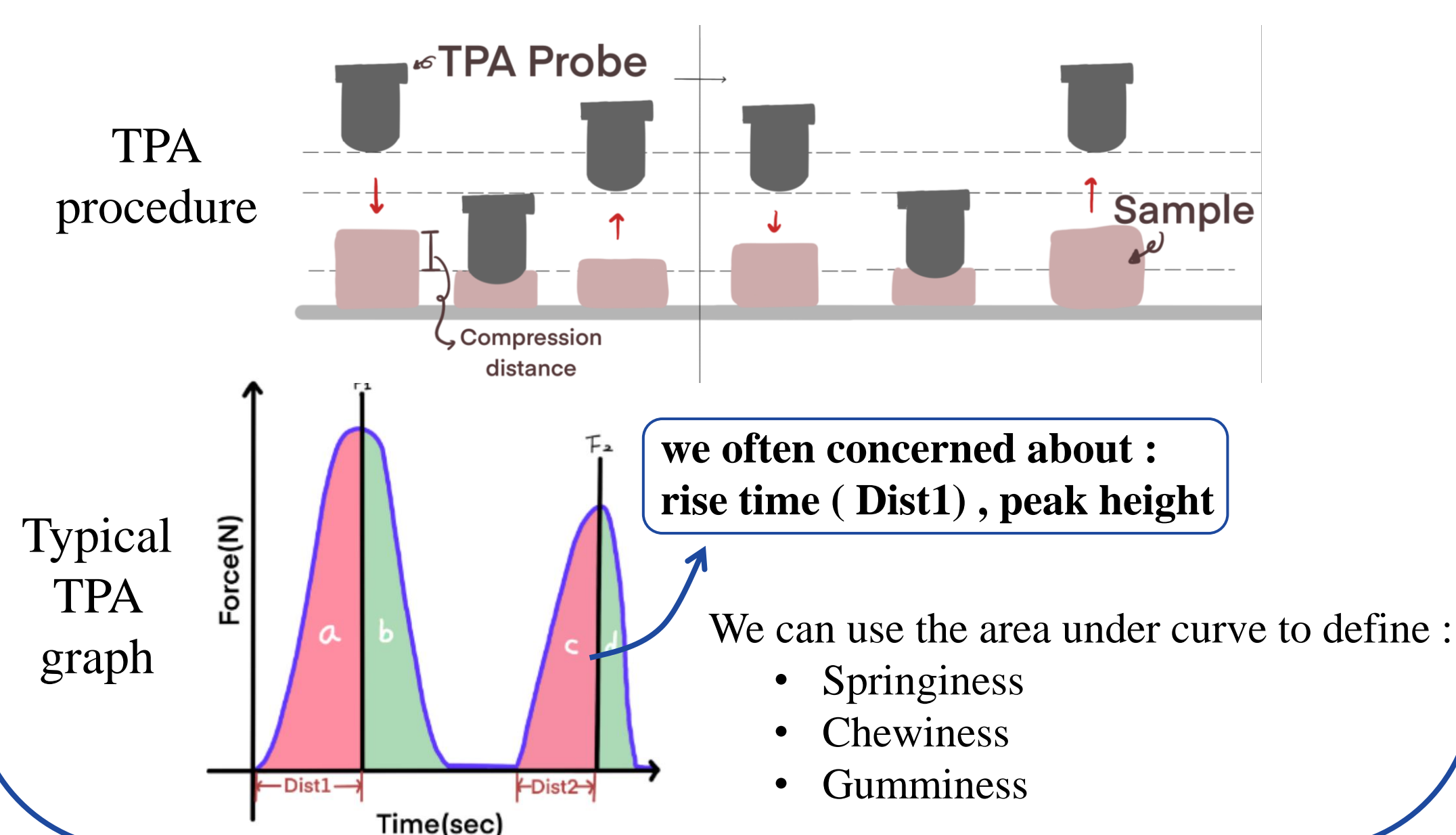
Physic Model & Principles



Workflow



Texture Profile Analysis



Results & Summaries

According to the graphs we made, we can draw the following summaries :

- For boiling sample :
 - Moisture content drops drastically.
 - Elasticity test has a consistent slope.
 - TPA : rise to peak quickly , second peak value is 96% of first peak.
- For poaching sample :
 - Moisture content decrease slowly , remaining moisture more than boiling sample.
 - Elasticity test has an inconsistent slope
 - TPA : rise to peak slower than boiling , second peak value is 88% of first peak.

Conclusions

The poaching graph indicates that its structure has been severely squeezed, while the boiling sample exhibits toughness in both experiments. This suggests that during the chewing process, the poaching sample is more easily broken down, making it more tender.

References & Supplementary

- [1] F. Rabeler, A.H. Feyissa, "Modelling the transport phenomena and texture changes of chicken breast meat during the roasting in a convective oven," J. Food Eng. 237, 60-68 (2018).
- [2] K. Siripon, A. Tansakul, G.S. Mittal, "Heat transfer modeling of chicken cooking in hot water," Food Research International 40, 923-930 (2007).



YouTube Showcase



GitHub Repository

