Use of sensors and in silico models for the prediction of meat colour

Jason Sicard, Alain Kondjoyan, Fabrice Audonnet, Valérie Scislowski

RÉPUBLIQUE FRANÇAISE
Liberté
Égalité
Fraternité

Affiliations

INRAE
Jason SICARD
Alain KONDJOYAN

Institut Pascal
Fabrice AUDONNET

ADIV
Valérie SCISLOWSKI

Use of sensors and *in silico* models for the prediction of meat colour

Tools to reduce meat wastage

Context

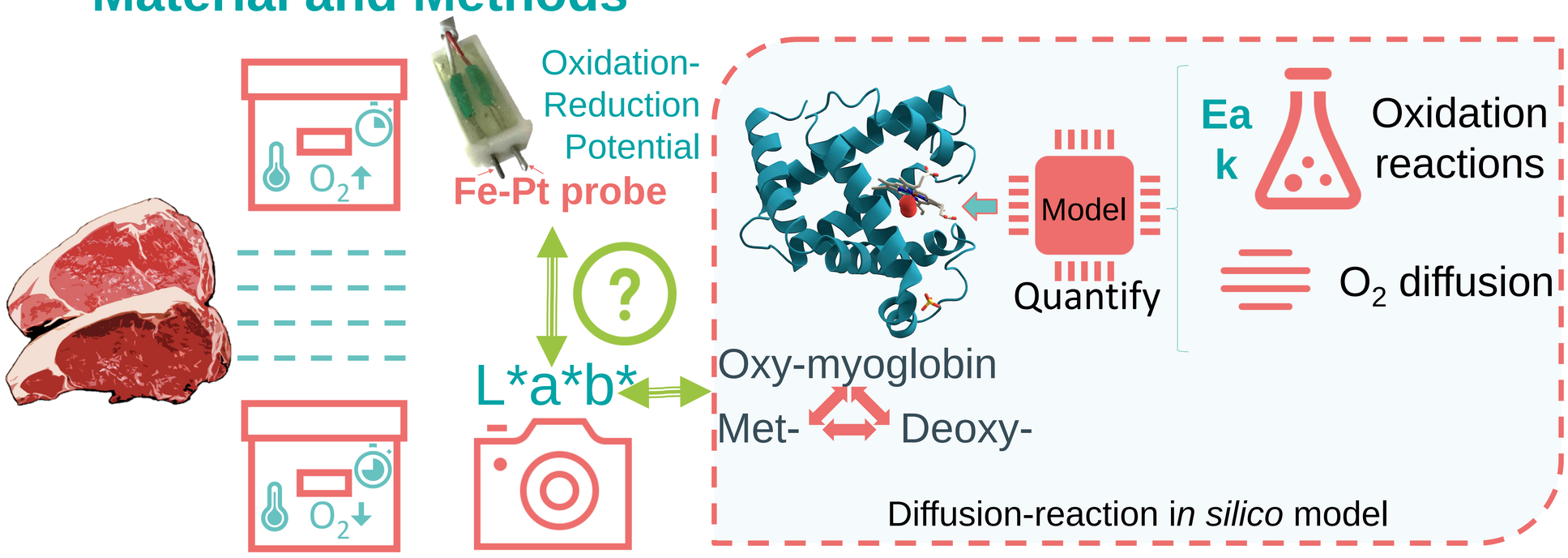
What I find scandalous is neither the poor nor the rich, but the amount of waste. (Mother Theresa)

20%

Over 20% of the meat produced globally is lost or wasted. (FAO)

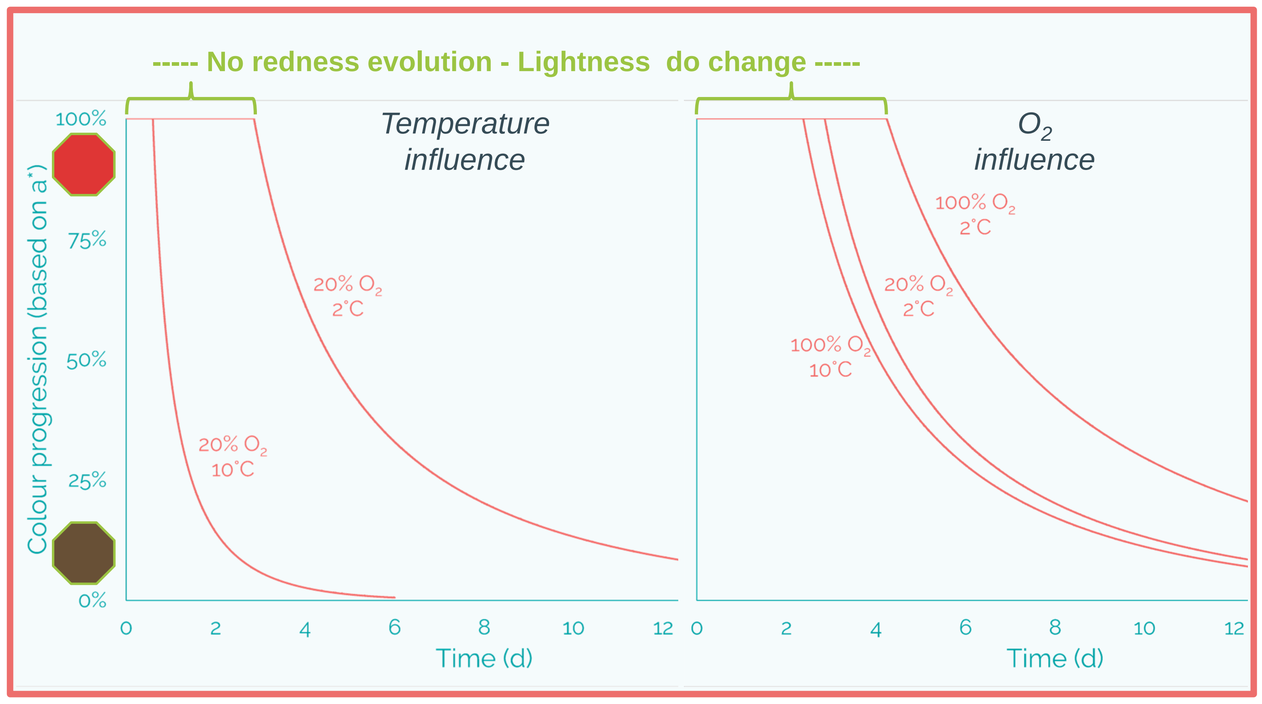
Consumers preferences for beef colour and packaging influence likelihood to purchase, but do not bias eating satisfaction (cooked). (Carpenter et al. 2001)

Material and Methods



Results

- ✓ In meat juice, ORP measured by sensor is tightly correlated to a*.
- ✓ Mechanistic models predict the evolution of myoglobin in meat.
- ✓ Redness estimated from the fraction of oxymyoglobin.
- ✓ Ageing time and cutting direction are less impactful.



Conclusion

- ✓ Meat colour evolution due to oxidation is predictable ; models can assist in the design of innovative and more sustainable food products.

Perspectives

- ✓ Validation of the ORP/colour relation for meat contaminated by microorganisms.
- ✓ Diffusion-reaction model application to lamb, pork or fishes rich in myoglobin
- ✓ Extension to off-flavours

Centre
Clermont Auvergne-Rhône-Alpes

UR0370 QuaPA
INRAE Site de Theix
63122 Saint-Genès-Champanelle
FRANCE
Tél. : + 33 (0)4 73 62 42 25
: jason.sicard@inrae.fr
www.clermont.inrae.fr/quapa

References:
Kondjoyan, A.; Sicard, J.; Cucci, P.; Audonnet, F.; Elhayel, H.; Lebert, A.; Scislowski, V. Predicting the Oxidative Degradation of Raw Beef Meat during Cold Storage Using Numerical Simulations and Sensors—Prospects for Meat and Fish Foods. *Foods* **2022**, *11*, 1139, doi:10.3390/foods11081139.

Kondjoyan, A.; Sicard, J.; Badaroux, M.; Gatellier, P. Kinetics Analysis of the Reactions Responsible for Myoglobin Chemical State in Meat Using an Advanced Reaction–Diffusion Model. *Meat Science* **2022**, *191*, 108866, doi:10.1016/j.meatsci.2022.108866.