Photodynamic Inactivation of *Escherichia coli* on Sea Bass Fillets

Cátia Vieira[1]; Sónia N. Pedro[2]; Ana T. P. C. Gomes[1]; Carmen S. R. Freire[2]; Paula Ramos[3]; M. Amparo F. Faustino[4]; Adelaide Almeida[1]

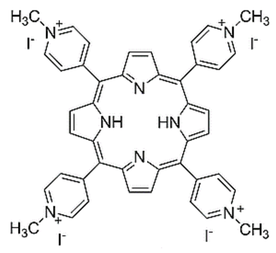
[1] Department of Biology & CESAM, University of Aveiro, 3810-193 Aveiro, Portugal;
[2] Department of Chemistry & CICECO-Aveiro Institute of Materials, University of Aveiro, 3810-193 Aveiro, Portugal;
[3] Laboratory of Aquatic Animals Pathology, IPMA, Av. Doutor Alfredo Magalhães Ramalho, 6, 1495-165 Algés - Portugal
[4] Department of Chemistry and QOPNA, University of Aveiro, 3810-193 Aveiro, Portugal;

Introduction

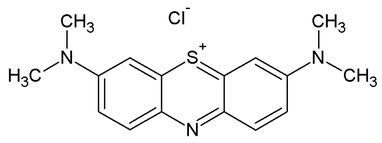
- Fish is an important source of high-quality protein and essential nutrients **[1]**;
- However, the introduction of pathogenic bacteria during the production and processing of fish can lead to deterioration of the food products and endanger the consumers **[2]**;
- To address this challenge is necessary to develop novel antimicrobial approaches to efficiently disinfect fish products.

Goals

Evaluate the Photodynamic Inactivation (PDI) of *Escherichia coli* in Sea Bass Fillet, in the presence of the photosensitizers (PS) **Tetra-Py(+)-Me** and **Methylene Blue**, and the coadjuvant **potassium iodide** (**KI**).



Tetra-Py(+)-Me

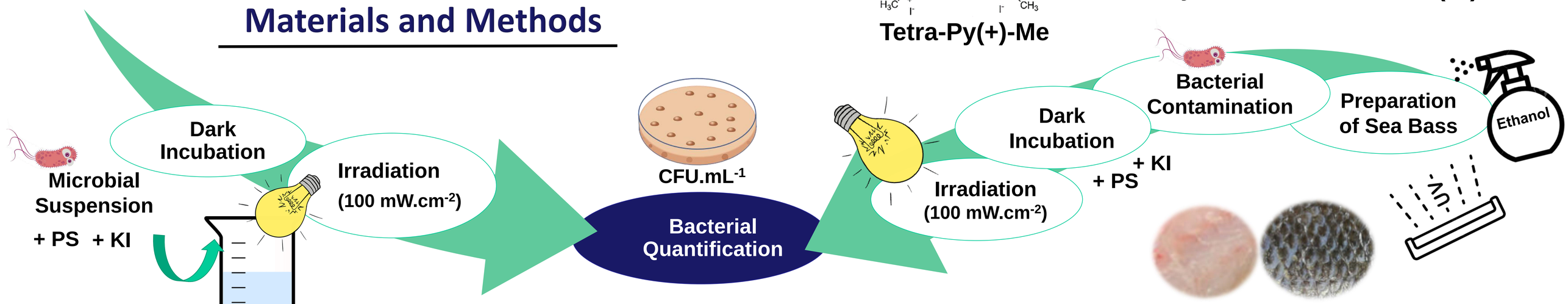


Methylene Blue

$K^+ I^-$

Potassium Iodide (KI)

Materials and Methods



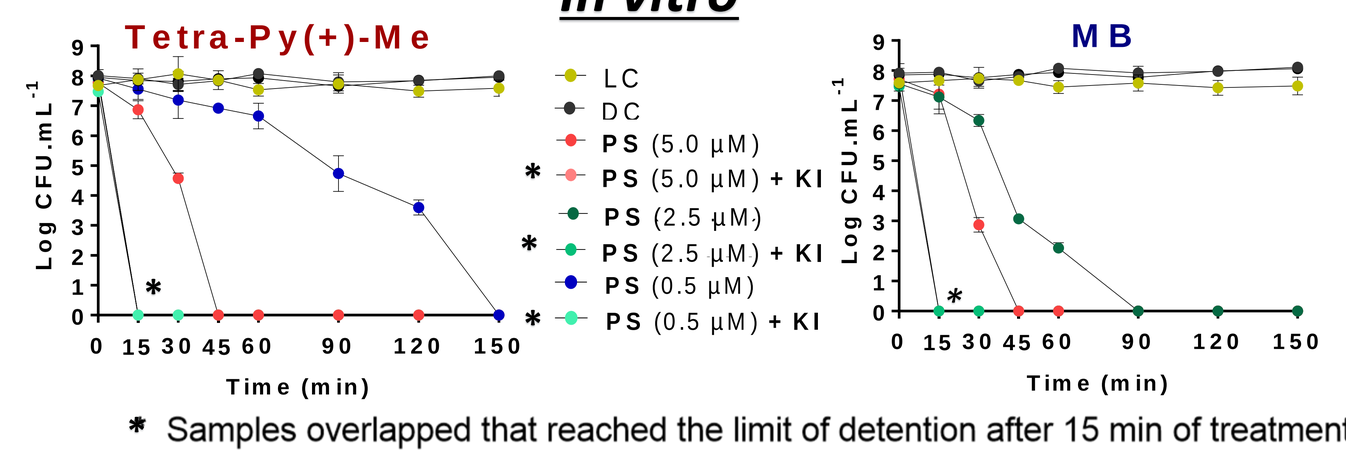
***In vitro* assays - Artificial Sea Water (ASW)**

LC – Bacteria, light ; **LC + KI** – Bacterial Suspension + KI (100 mM), light ; **DC** – Bacteria + PS + KI (**100 mM**) ; Dark **PS** – Bacteria + PS, light ; **PS + KI** – Bacteria + PS + KI (**100 mM**), light

Assays in Sea Bass Fillet

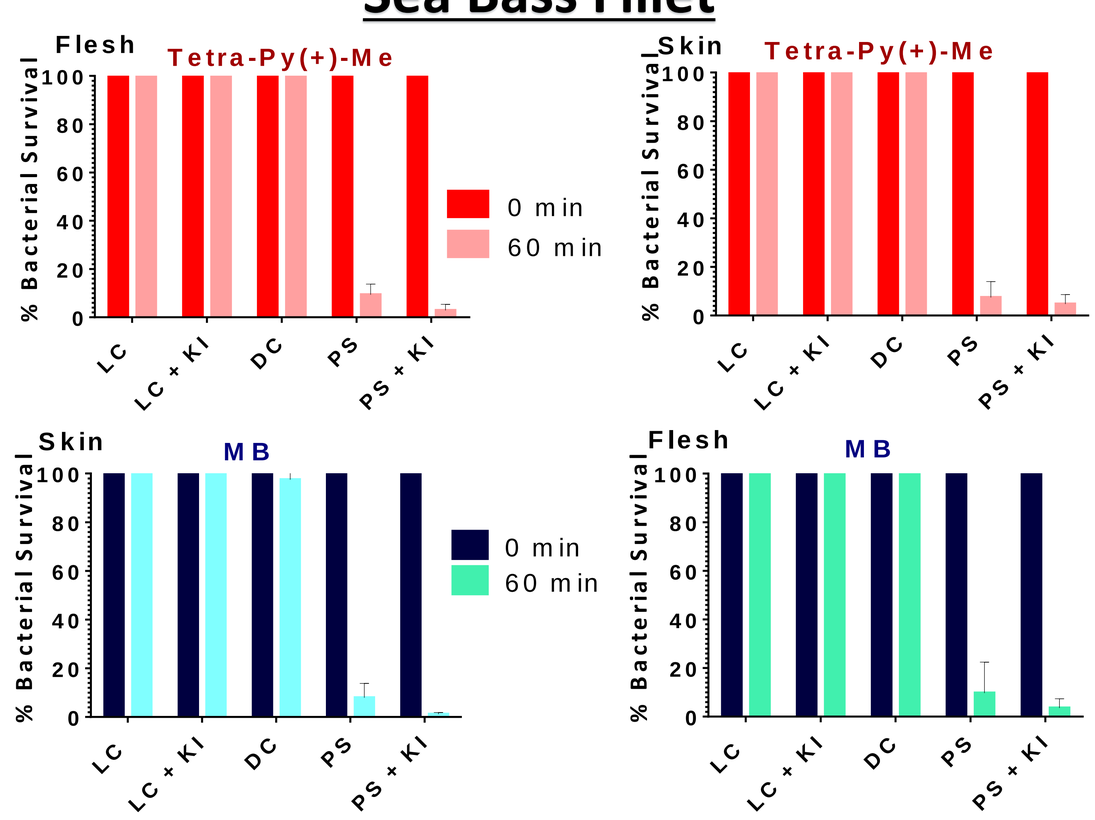
Results

In vitro



* Samples overlapped that reached the limit of detention after 15 min of treatment

Sea Bass Fillet



Conclusions

- ***In vitro*, Tetra-Py(+)-Me** and **MB** at **5.0 µM** promoted the photoinactivation of *E. coli* till the detention limit of the methodology (~ 8 Log of $CFU.mL^{-1}$ reduction) after 45 min of treatment. The application of **KI** (**100 mM**) improved the aPDT efficiency of both PSs, allowing the reduction of the treatment time to 15 min.
- **In Sea Bass Fillet,** both PSs at **50 µM** in combination with **KI** (**100 mM**) promoted a 95 to 99 % reduction on *E. coli* survival. This results suggest that aPDT can be a promising approach to disinfect fish products and provide safe food to the consumer.

References

[1] Costello, C., Cao, L., Gelcich, S. et al. *Nature*. 2020; 588: 95–100. https://doi.org/10.1038/s41586-020-2616-y ; **[2]** Sheng, L, Wang, L. *Compr Rev Food Sci Food Saf.* 2021; 20: 738– 786. https://doi.org/10.1111/1541-4337.12671

Acknowledgments

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