# Shelf-life extension of gilthead seabream (*Sparus aurata*) fillets by combined application of in-package cold atmospheric plasma and active packaging

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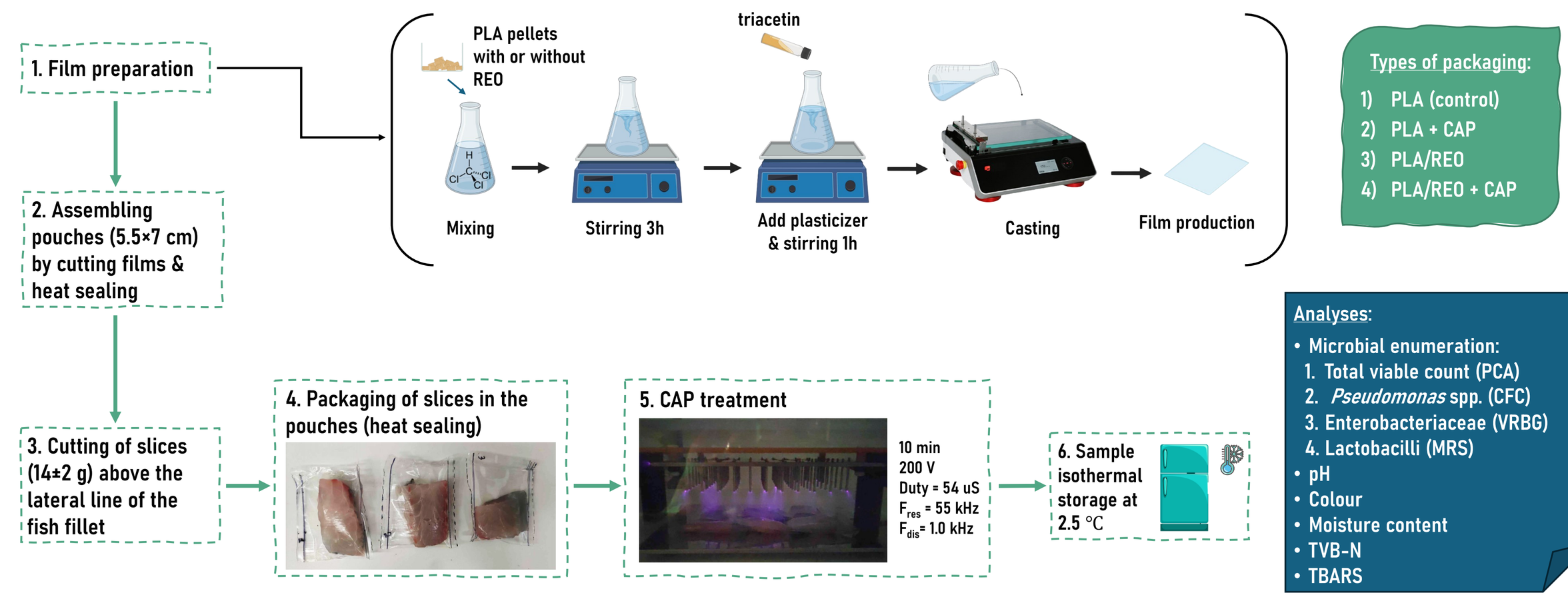
## Introduction

Cold atmospheric plasma (CAP) is considered as an effective antimicrobial element which consists of several reactive chemical species obtained from electrical discharges in atmospheric gases. The generation of cold plasma inside sealed packages (in-package processing) allows a local reaction, while preventing any post-process contamination, and thus forming an improved preservation method of perishable fresh foods, such as fish (Misra et al., 2019). Polylactic acid (PLA) is a linear, aliphatic, thermoplastic and bioplastic polymer, obtained from renewable resources, which presents similar properties to several convensional synthetic polymers and is approved by the Food and Drug Administration (FDA) of the United States for direct contact with foods (Farah et al., 2016). Natural additives like plant essential oils (EOs) present antimicrobial and antioxidant properties and are categorized as GRAS, while rosemary (*Rosmarinus officinalis* L.) EO (REO) has been attributed to the higher antioxidant, antimicrobial, fungicidal, and anticancer activity (Dong et al, 2018; Zeid et al., 2019). The aim of the study was the evaluation of the effect of in-package cold atmospheric plasma processing on the quality and shelf-life of gilthead seabream (*Sparus aurata*) fillets during refrigerated storage. PLA films containing 0 and 20% rosemary EO sol. (w/v) used for fish packaging combined with in-package CAP processing were evaluated for their preservative effect on fish fillets, based on microbial and physicochemical quality parameters.

## Materials & Methods




## Results

### Microbial enumeration

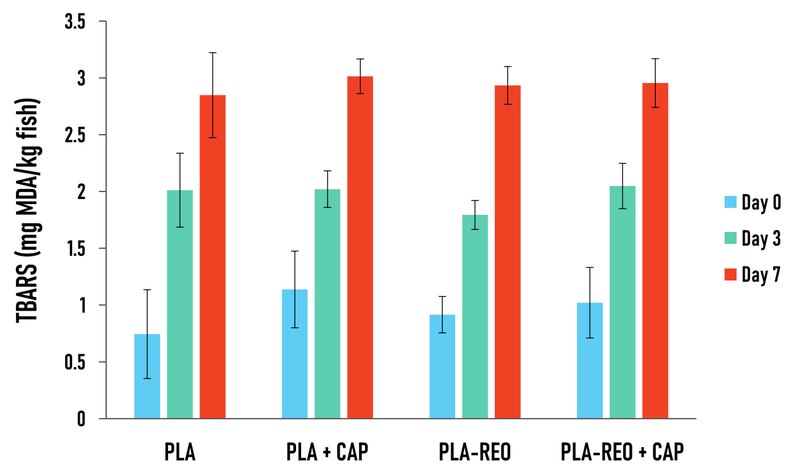



### Total Volatile Basic Nitrogen (TVB-N)




### Lipid peroxidation

Thiobarbituric acid reactive substances (TBARS)




## Conclusions

- Shelf-life of the fish fillets was not affected by the different types of packaging comparing to the control samples (ranging 6-7 days at 2.5°C).
- TVB-N values increased during 7-days storage period but was not significantly affected by the type of packaging.
- TBARS values were not affected significantly by the type of packaging, nor the CAP treatment.
- The values of colour parameters, pH & moisture content of the fish fillets did not differ significantly among the different types of packaging.
- Future studies should investigate more intense processing conditions and alternative biopolymers, enabling release of biomolecules into packaged food matrix.

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(https://www.ichthys-eu.org/about)

ICHTHYS

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