



Universidad de Valladolid



# QUERCETIN AND RESVERATROL IN COMBINATION WITH HP- $\beta$ -CYCLODEXTRIN PROTECT HUMAN CONJUCTIVAL EPITHELIAL CELLS FROM OXIDATIVE STRESS

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## INTRODUCTION

Increased production of Reactive Oxygen Species (ROS) leads to oxidative stress, which plays an important role in the mechanism of different ocular surface diseases, like Dry Eye Disease (DED).

Thanks to their antioxidant properties, natural polyphenolic compounds like quercetin (QUE) and resveratrol (RSV), have gained attention as potential therapeutic agents for ocular diseases. However, their poor physico-chemical characteristics need to be improved by the use of a formulation strategy.

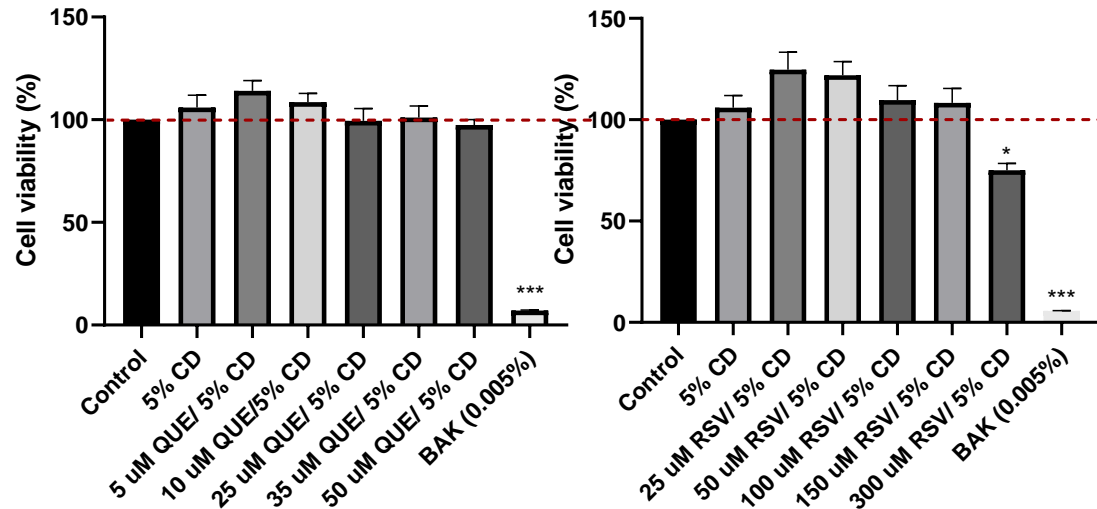
**Therefore, the aim of this study was to assess the effectiveness to scavenge ROS of QUE and RSV in combination with HP- $\beta$ -Cyclodextrin.**

## METHODS

- ✓ All experiments were performed on **human conjunctival epithelial cells (IM-ConjEpi)** in passages 12-18.
- ✓ Inclusion complexes QUE/5% (w/v) and RSV/5% (w/v) were prepared at different concentrations of the two polyphenols. For **QUE**, this range was from **5-50  $\mu$ M**, while for **RSV** from **25-300  $\mu$ M**.
- ✓ The possible cytotoxic effect of the inclusion complexes was assessed through the XTT assay, which consists in the reduction of a tetrazolium salt into a formazan dye by metabolically active cells.
- ✓ H<sub>2</sub>DCFDA (2',7'-Dichlorofluorescein diacetate), a fluorescent indicator of ROS was used to assess the ability of the inclusion complexes to scavenge intracellular ROS species.

## RESULTS-1

### Cell Viability

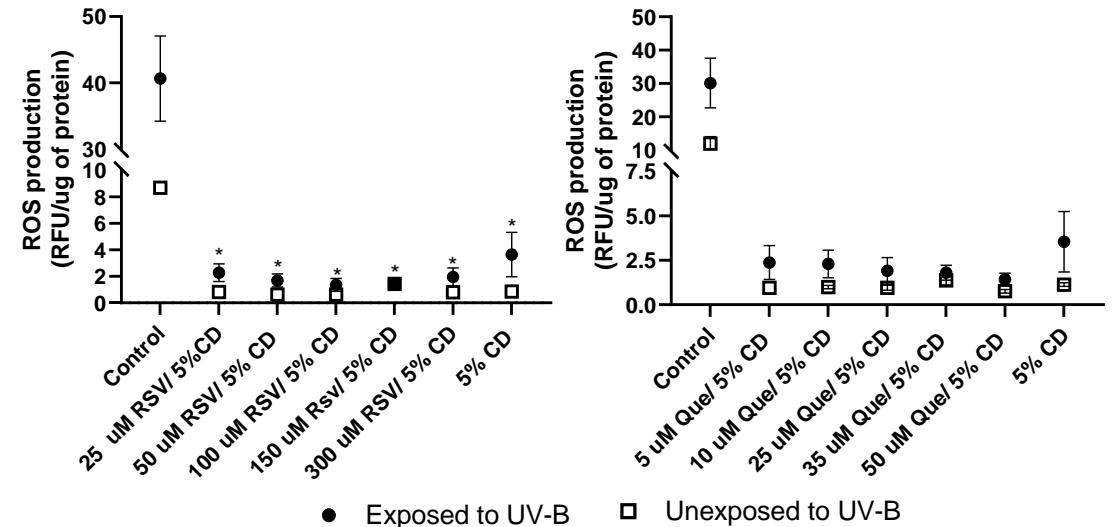


- ✓ Cell viability, which was evaluated through the XTT assay has shown that both types of inclusion complexes did not cause cell death. In particular, the highest concentration of RSV in the complex that did not cause any cytotoxic effect was 150 μM. For QUE, all the concentrations that were tested were non cytotoxic.

The data are means ± SEM of three independent experiments. \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

## RESULTS-2

### Intracellular antioxidant ability



- ✓ Both types of inclusion complexes showed a high antioxidant potential *in vitro* in IM-ConjEpi cells. This antioxidant scavenging potential did not depend on the concentration of QUE and RSV that were used in the complexes.

The data are means ± SEM of three independent experiments. \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

## CONCLUSIONS

- ✓ The association of QUE and RSV with HP-β-cyclodextrin **showed to be safe** in IM-ConjEpi cells
- ✓ Both formulations **protected IM-ConjEpi cells from oxidative stress**
- ✓ Although the results seem promising, more experiments such as the assessment of the anti-inflammatory activity of the inclusion complexes are planned to be performed