

Sterilization of intraocular lenses loaded with moxifloxacin

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Purpose

To investigate the effect of two sterilization methods

1. Steam autoclaving
2. γ -irradiation

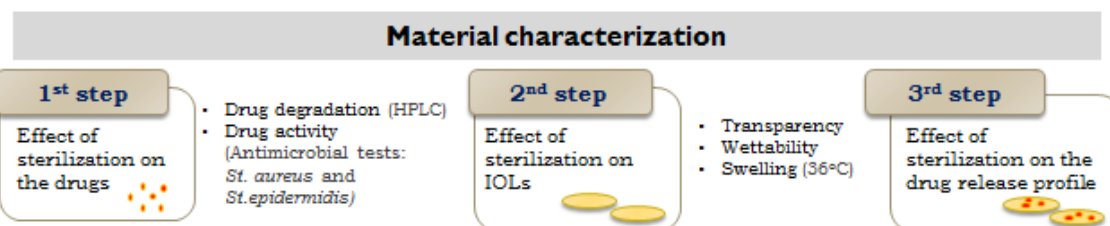
on Moxifloxacin-loaded intraocular lenses IOLs.



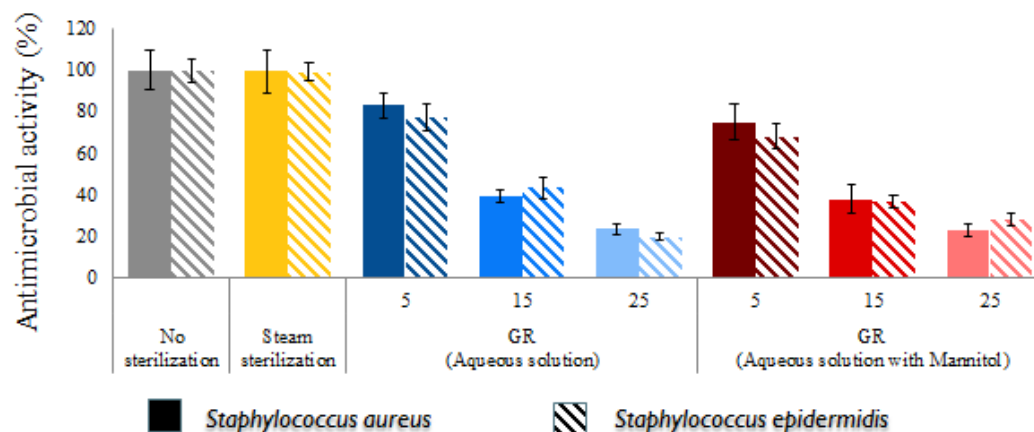
Produce drug-loaded IOLs with the ability
to deliver a controlled amount of antibiotic during an adequate period of time.

Methods

Sterilization conditions		
	Steam Pressure (60 min, 121°C and 1 bar)	Gamma radiation (3 doses: 5, 15 and 25 kGy)
DRUGS: Moxifloxacin 	Aqueous solution (NaCl 0,9%)	•Aqueous solution (NaCl 0,9%) •Aqueous solution (NaCl 0,9%) with 5% mannitol
IOL MATERIAL: Hydrophilic acrylate with 26% water uptake 	Aqueous solution (NaCl 0,9%)	Aqueous solution (NaCl 0,9%)

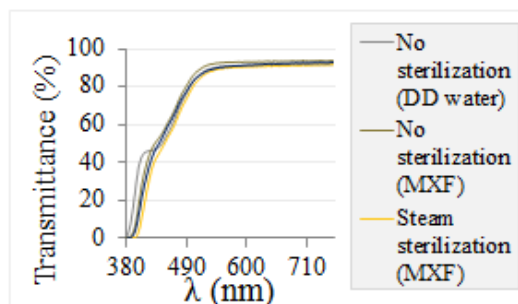
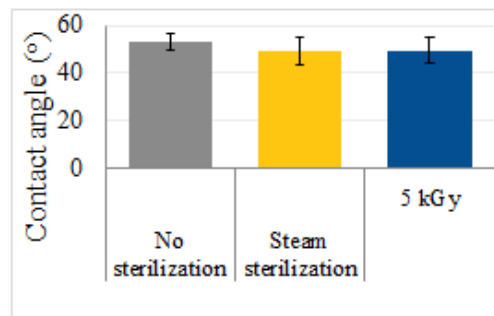
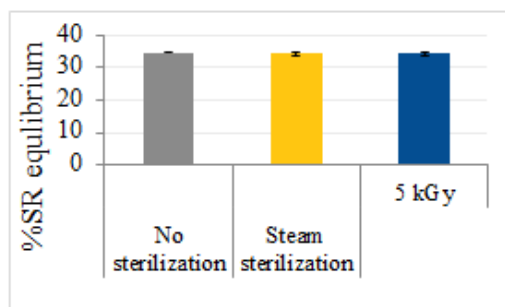


Results



- Steam sterilization did not induce drug degradation
- γ-radiation led to significant decrease of drug antimicrobial activity when sterilization is carried out at 15 kGy and 25 kGy.
- 5 kGy was used in further studies

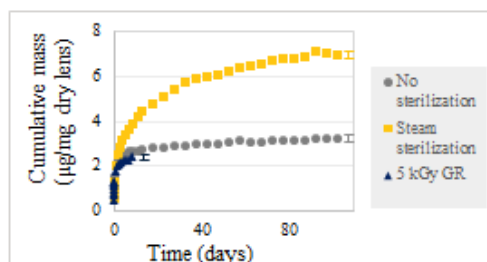
Results



Steam sterilization and γ -radiation at 5 kGy did not affect significantly:

- the swelling behaviour,
- the wettability;
- the transparency of the lenses.

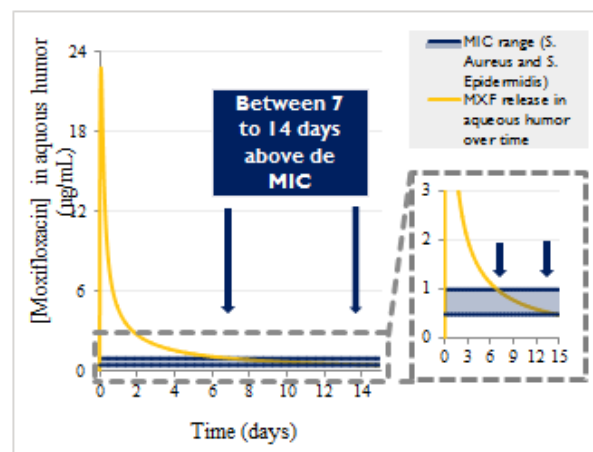
Results



Steam sterilization improves significantly the drug release profile:

- higher amount of drug is released
- with a more sustained kinetics.

The application of a mathematical model that considers the physiological conditions of the eye allows to predict that the steam sterilized drug-loaded IOLs lead to therapeutic concentrations of the antibiotic between 7 and 14 days.



Conclusion

The sterilization conditions may be critical for drug-loaded IOLs.

In this study, **steam sterilization** revealed to be the **best sterilization method**, since it:

- did not affect the antibiotic activity,
- allowed to keep adequate lens properties
(swelling behaviour, transmittance and hydrophilicity) and
- significantly improved the drug release profiles.