

BACKGROUND & IMPORTANCE

Autologous Serum Eye Drops (ASEDs)

- Are an alternative treatment for **pharmaco-resistant dry eye diseases**, owing to active molecules (AM) such as fibronectin, Epidermal Growth Factor (EGF), and **vitamin A**
- But **sterilization** cannot be achieved by autoclaving (heat-sensitivity of AM)

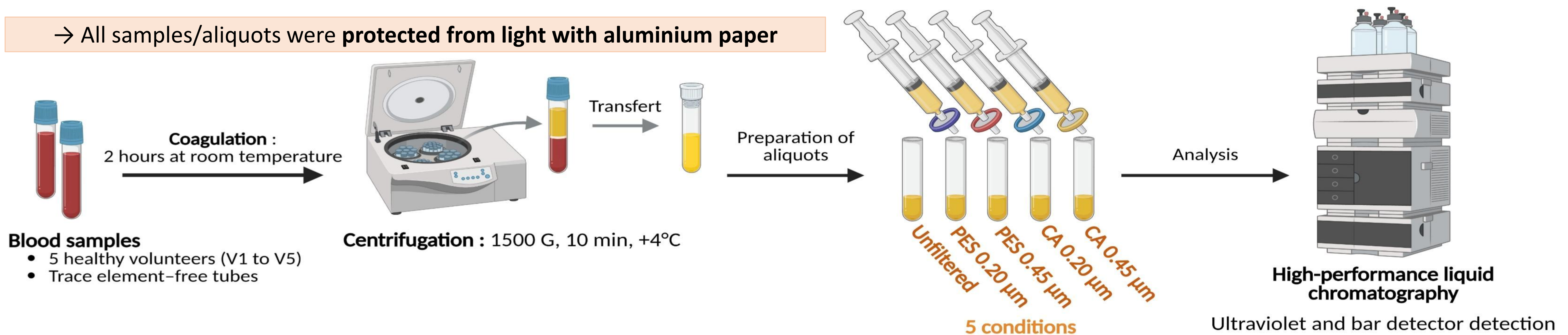
→ **Sterilizing filtration** is therefore used: risk of **retaining active molecules** within or on the filter, which may **reduce their concentration** and, potentially, their **efficacy**

AIM & OBJECTIVES

- **Optimize production** of ASEDs by ensuring microbiological safety without altering their therapeutic effect
- **Evaluate the impact of filtration** by measuring **vitamin A** (one of the smallest AM) concentrations under **five conditions**:
 - **No filtration**
 - Filtration through two materials (**polyethersulfone (PES)** and **cellulose acetate (CA)**) at two porosities each (**0.20 µm** and **0.45 µm**)

MATERIAL & METHODS

→ All samples/aliquots were **protected from light with aluminium paper**



Statistics: paired samples were compared using the **Wilcoxon signed-rank test**, with a significance threshold of **p = 0.05**

In relation to the dosage form studied (eye drops) we also took the usual concentration variation of **7.5% as a significant threshold** → this cut-off will also be considered to **compare vitamin A with the precedent AM explored (absolute value)**

RESULTS

	Vitamin A concentrations (µg/dL)					Mean (µg/dL)	Standard deviation (µg/dL)	Comparisons of average concentrations relative to unfiltered sera (absolute value, %)
	V1	V2	V3	V4	V5			
Unfiltered	58	65	62	46	56	57.4	7.3	/
PES 0.20 µm	58	67	62	48	58	58.6	7.0	2.1
PES 0.45 µm	59	68	64	47	59	59.4	7.9	3.5
AC 0.20 µm	59	68	71	50	62	62.0	8.2	8.0
AC 0.45 µm	60	69	66	51	62	61.6	6.9	7.3

V1 to V5 : Healthy volunteers numbers 1 to 5

Comparisons of filtered vs non-filtered sera

	Unfiltered
PES 0.20 µm	0.1814
PES 0.45 µm	0.0625
AC 0.20 µm	0.0625
AC 0.45 µm	0.0625

→ non-statistically significant difference (**p > 0.05**)

Comparisons between sera filtered through materials of identical porosity

	PES 0.20 µm
AC 0.20 µm	0.0579
	PES 0.45 µm
AC 0.45 µm	0.0625

→ non-statistically significant difference (**p > 0.05**)

CONCLUSION & RELEVANCE

Vitamin A: no statistically significant decrease in concentration was observed following filtrations

- Nevertheless, a trend **toward differences between PES and AC membranes at identical porosities** was observed, which seems to be favourable for **PES membranes**.
 - **further investigations in a larger cohort**
- A slight **increase** in vitamin A concentration is also observed **after** filtration.
 - **subject of a subsequent communication**
- For **vitamin A and EGF**, previously studied, concentration reductions **> 7.5% with AC 0.20 µm**, are observed. However this last threshold has **no therapeutic significance** in the case of **vitamin A** for which conventional ophthalmic formulations are readily available. In addition, this vitamin has a wide therapeutic margin when administered systemically.
 - **the interpretation thresholds must be revised for the active molecules in ASEds**

