

PHOTOPROTECTION VERSUS PATIENT IDENTIFICATION SAFETY : Evaluation of UV-protection bag intended for anticancer drug infusion

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CONTEXT

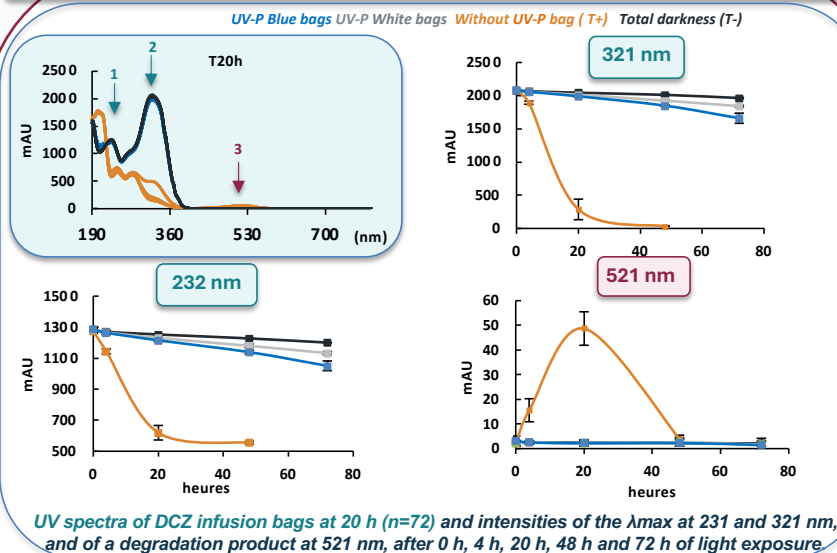
UV-protective (UV-P) bags protect photosensitive anticancer drugs, but their opacity can make visual inspection and patient identification more difficult. New white UV-P bags (JCE Biotechnology) improve readability of patient information through the bag compared with the blue UV-P bags (SLB Médical), previously used in our hospital.

OBJECTIVE : Compare the UV protection effectiveness provided by BLUE and WHITE bags.

MATERIALS & METHODS

- Study of dacarbazine (DCZ) degradation, diluted to 0.625 mg/mL (highly photosensitive).
 - Preparation and wrapping of infusion bags (n = 3).
- | BLUE BAGS | WHITE BAGS | WITHOUT OPAQUE BAG : T+ | TOTAL DARKNESS : T- |
|-----------|------------|-------------------------|---------------------|
| H0 | H0 | H0 | H0 |
| Ok | 30k | 150k | 360k |
| lux·h | lux·h | lux·h | lux·h |
- Light exposure at 7,500 lux and 20°C for up to 72 hours.
- H0 H4 H20 H48 H72
Ok 30k 150k 360k 540k
lux·h lux·h lux·h lux·h lux·h
- Analysis of samples from the infusion bags by flow-injection UV-visible spectrophotometry (FIA) (190–800 nm) : identify relevant spectral bands (λ max) and monitor intensity changes in over time.
 - Evaluation of transmittance by UV spectrophotometry (325–700 nm) in 6 white and 6 blue UV-P bags, at 6 points, analyzed 6 times.

RESULTS - UV-VISIBLE FIA ANALYSIS



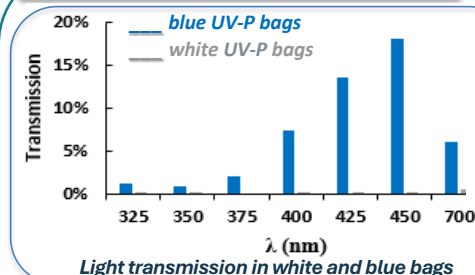
Rapid degradation of DCZ without photoprotection (T+): decreased intensity at 232 nm and 321 nm, with a spectral band appearing at 521 nm (pink degradation product).

Up to 20 h: DCZ remains stable in both blue and white UV-P bags (intensity differences <3%).

From 48 h onwards: greater degradation of DCZ in blue UP-V bags, with a significant decrease in spectral intensities at 232 nm and 321 nm.

WHITE UP-V bags provide greater photoprotection of DCZ during prolonged exposure to light.

RESULTS - TRANSMITTANCE



Good UV filtration by both bag types.

Lower reflection of visible light by the blue UV-P bags (residual transmission >10% between 425 and 450 nm).

DISCUSSION AND CONCLUSION

- PHOTOPROTECTION**
The white UV-P bags provide better photoprotection than the blue ones, which nevertheless remain acceptable in the UV region.
- COUNTERINTUITIVE RESULT**
The opacity of a UV-P bag is not sufficient to predict its photoprotective effectiveness.
- PROCESS SAFETY**
The new white UV-P bags provide protection while also facilitating patient identification safety.

PERSPECTIVE : In-depth UV-HPLC analysis of DCZ degradation products

Keywords: patient identification • drug stability • photodegradation • spectroscopy

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