

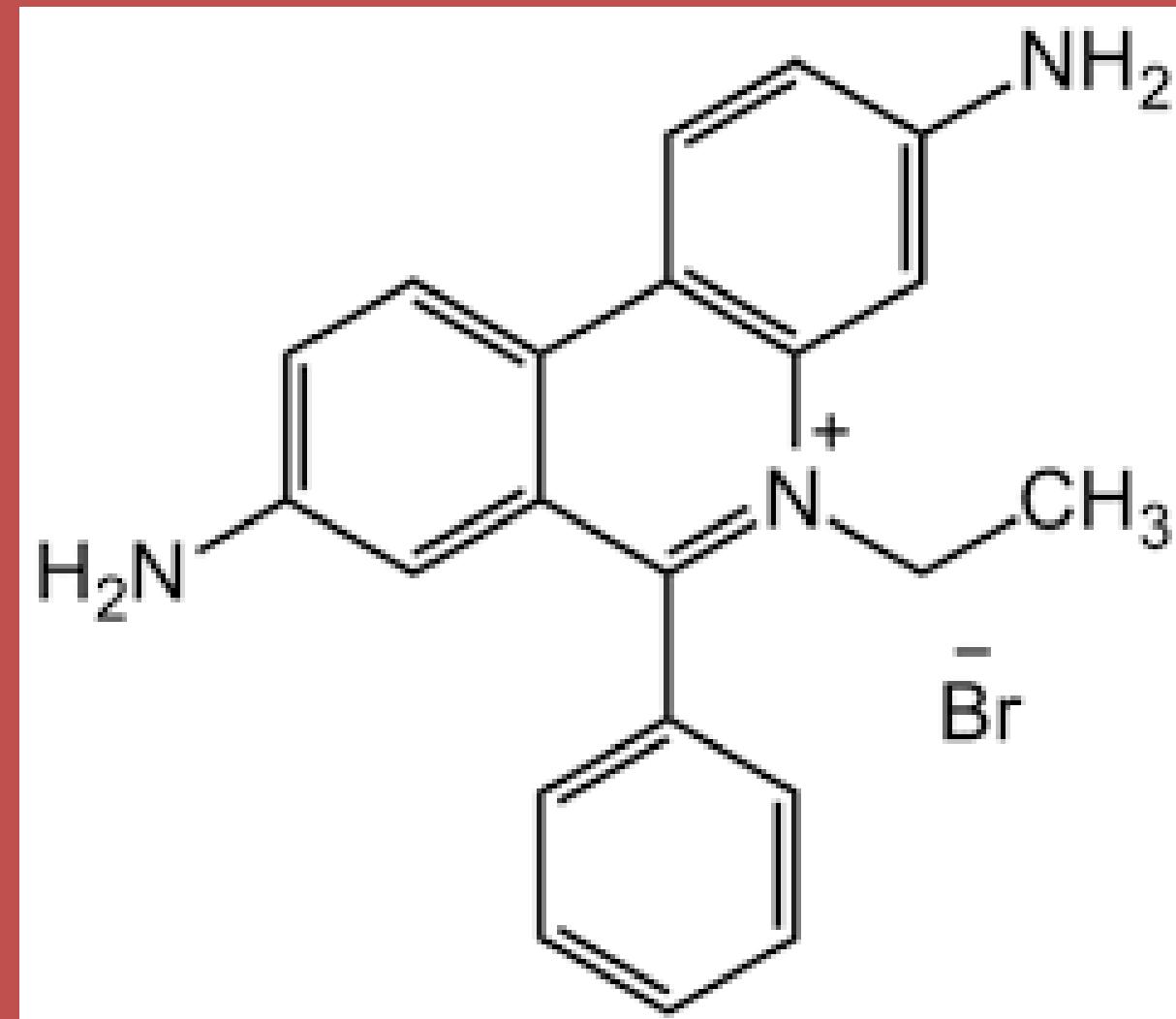
# Looking for an alternative to Ethidium Bromide

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## Introduction

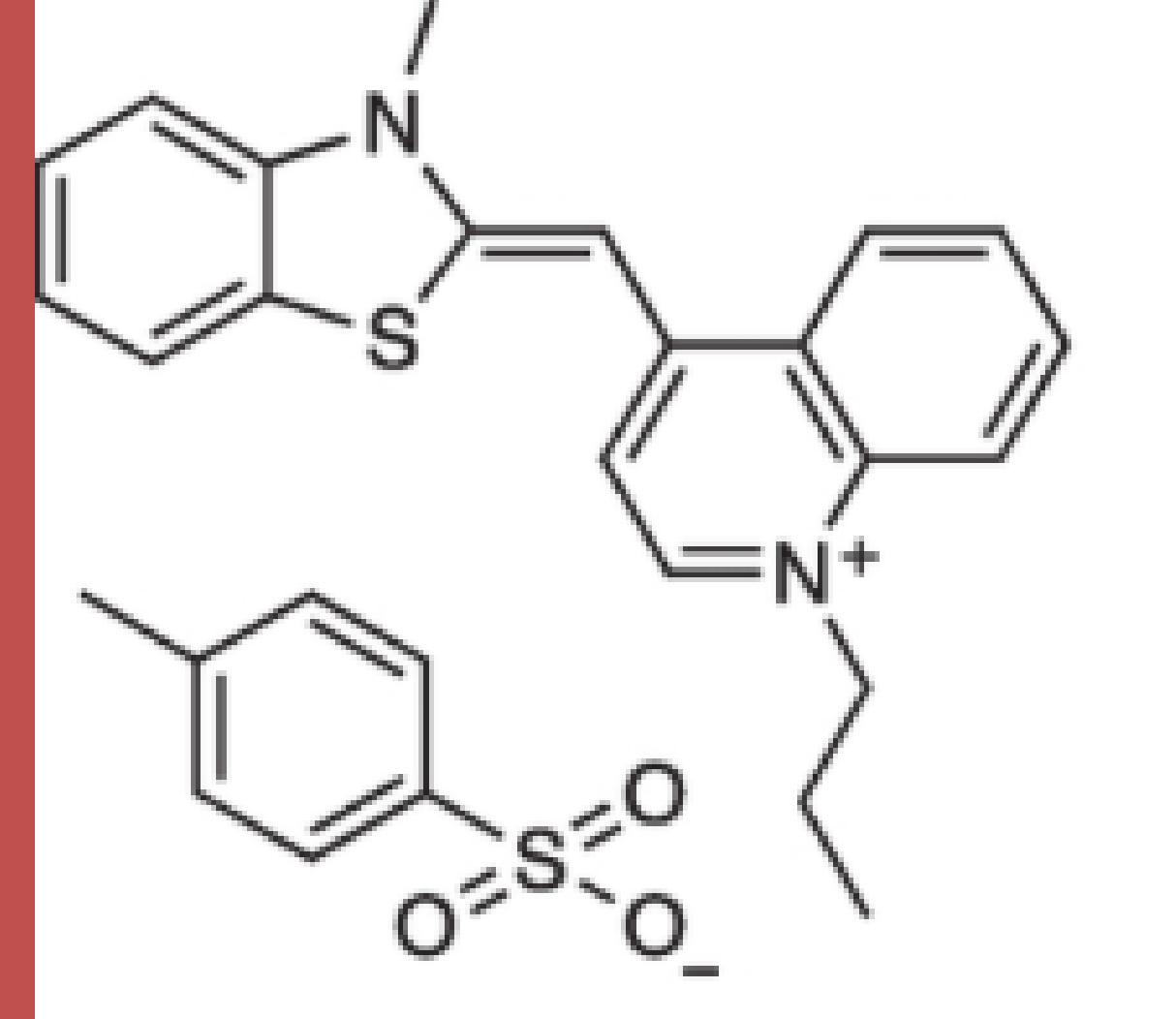
Making DNA visible in gel electrophoresis is essential for numerous molecular biological analyses. Traditionally, ethidium bromide, a cheap and reliable dye, is used for this purpose, but it does pose significant health and safety risks. This is why there is a growing need for safer alternatives that offer the same analytical quality. In this project, we compare three promising dyes: SYBR Safe, GelRed™ and GelGreen™ with ethidium bromide in terms of sensitivity, band intensity and ease of use. The aim is to determine whether these modern dyes are an equivalent but safer alternative for everyday laboratory use.

### Ethidiumbromide



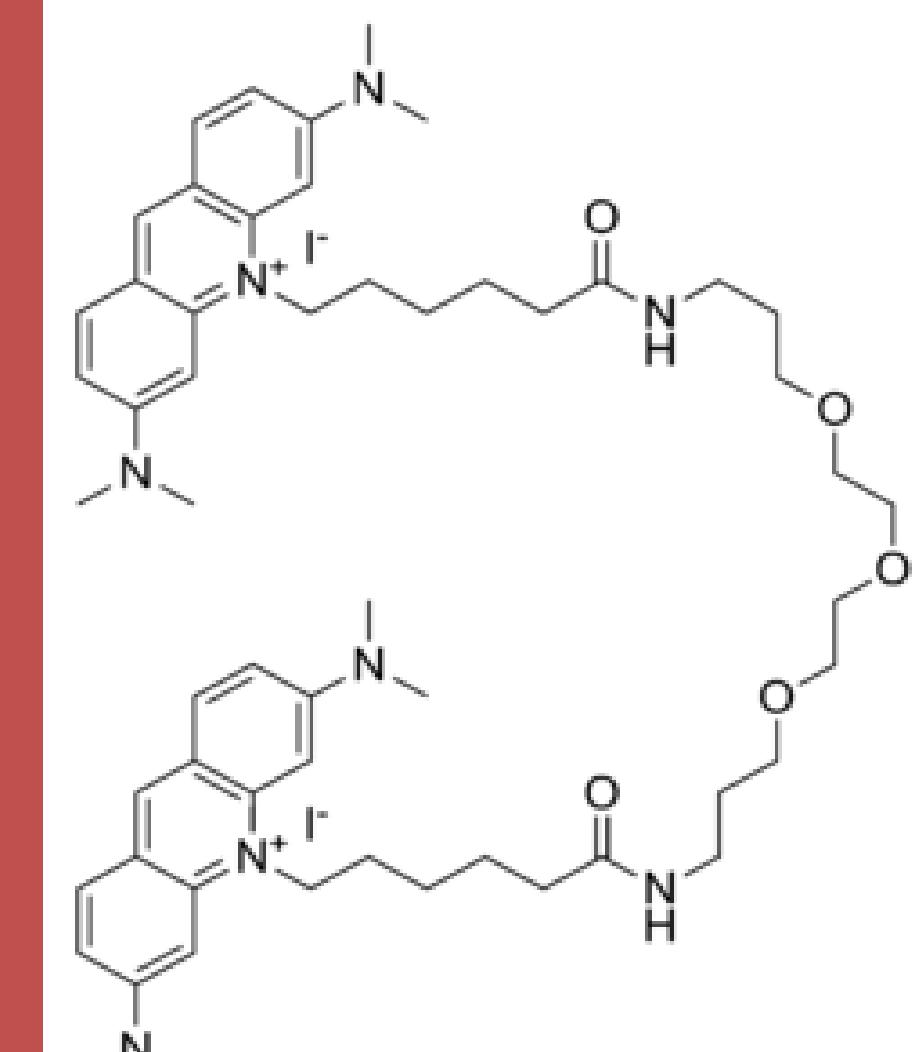
- 296 nm
- €0,14 (colouring bath 200 mL)
- Staining time: 15-30 minutes

### SYBR Safe



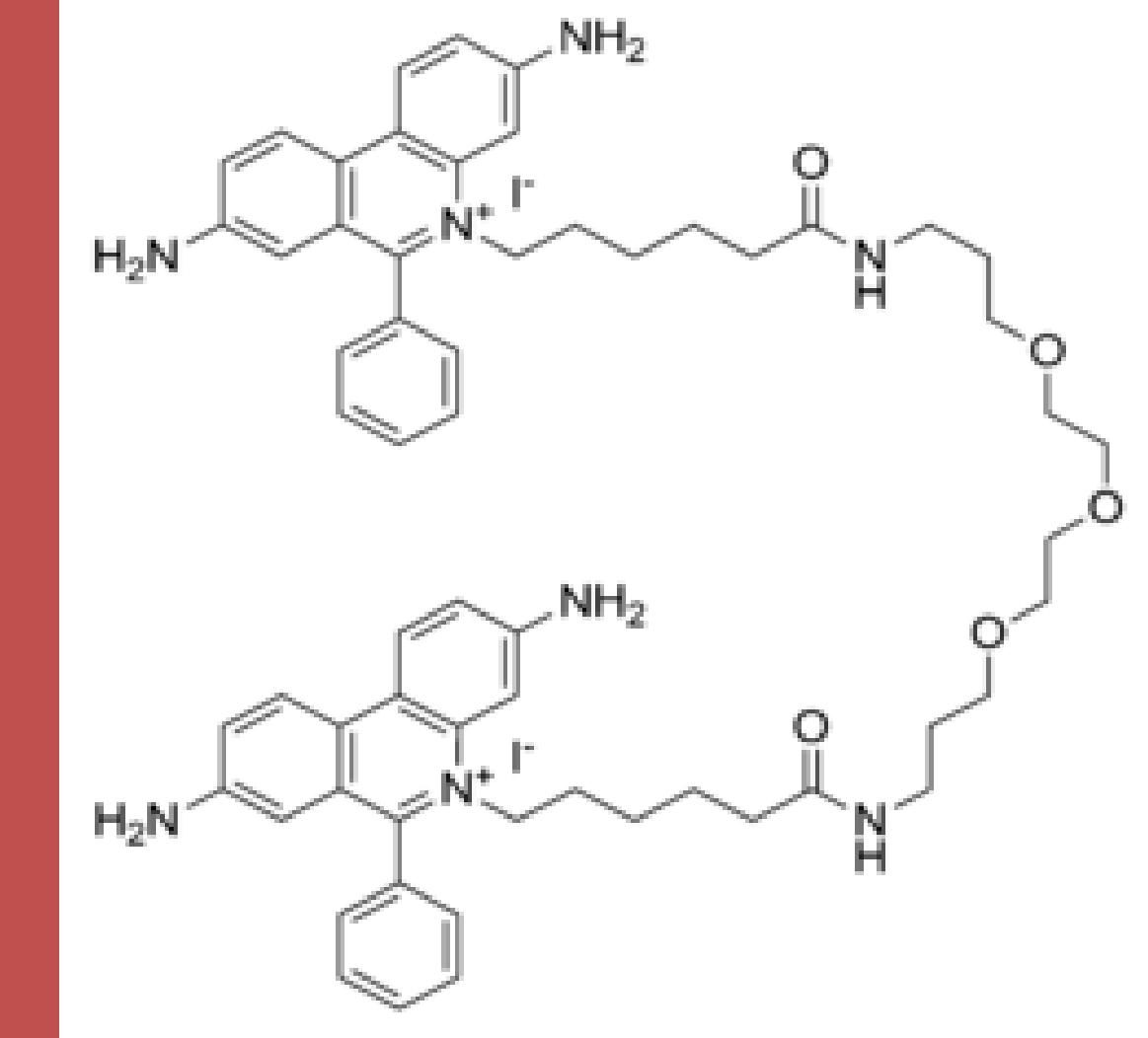
- 280 nm (UV) or 502 nm (blue light)
- €6,80 ((colouring bath 200 mL)
- Staining time: 30 minutes

### Gelgreen™



- 530 nm
- €4,71 (colouring bath 200 mL)
- Staining time: 30 minutes

### GelRed™



- 279 nm
- €4,88 (colouring bath 200 mL)
- Staining time: 30-60 minutes

### Ethidiumbromide   SYBR Safe

- + Cheap
- + Short staining time
- Health and safety risk

- + Safe usage
- + Clear band resolution
- Expensive
- Staining with no light

### Gelgreen™

- + Safe usage
- Low band resolution
- Slow staining time

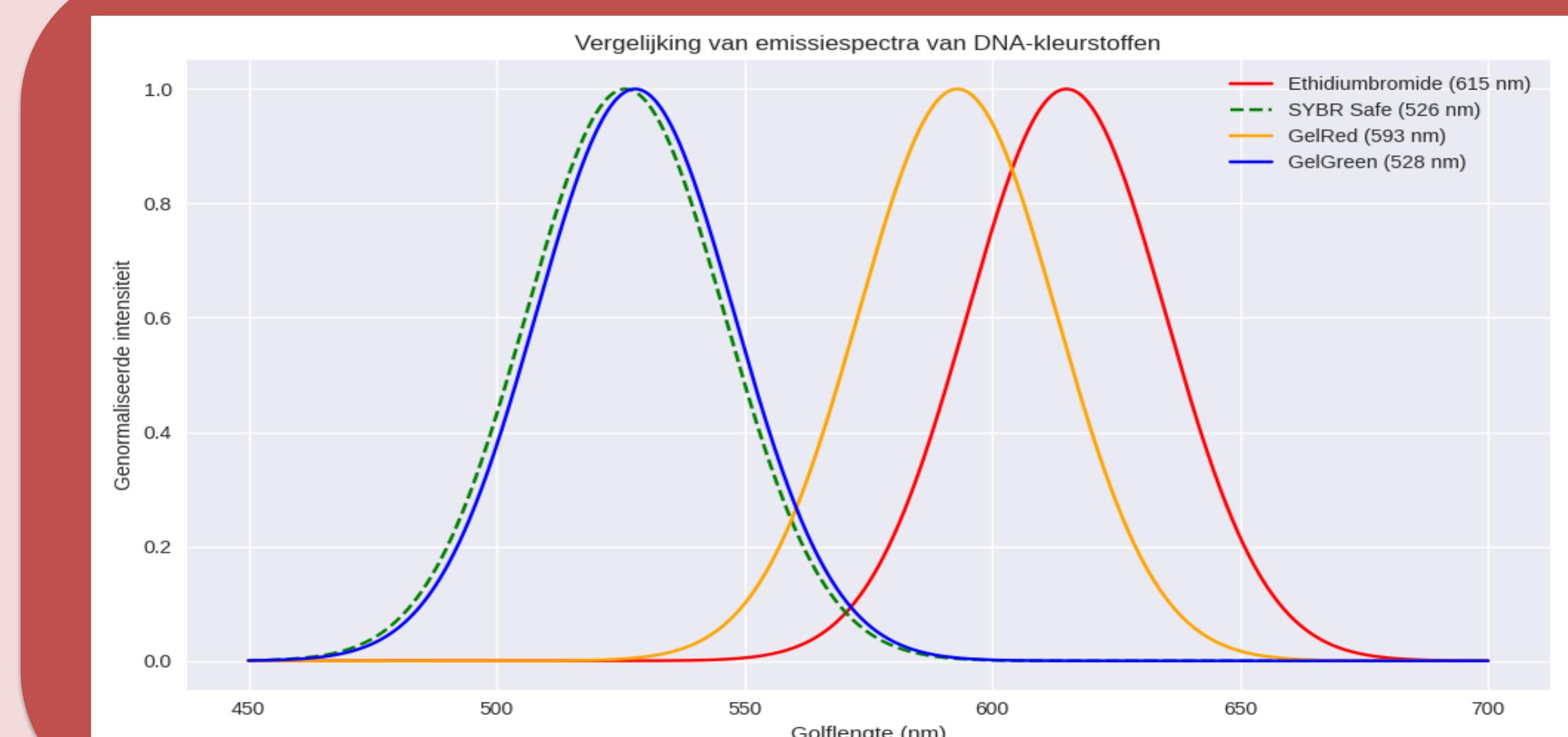
### GelRed™

- + Safe usage
- + Clear band resolution
- + Highly stable
- + Reasonable price

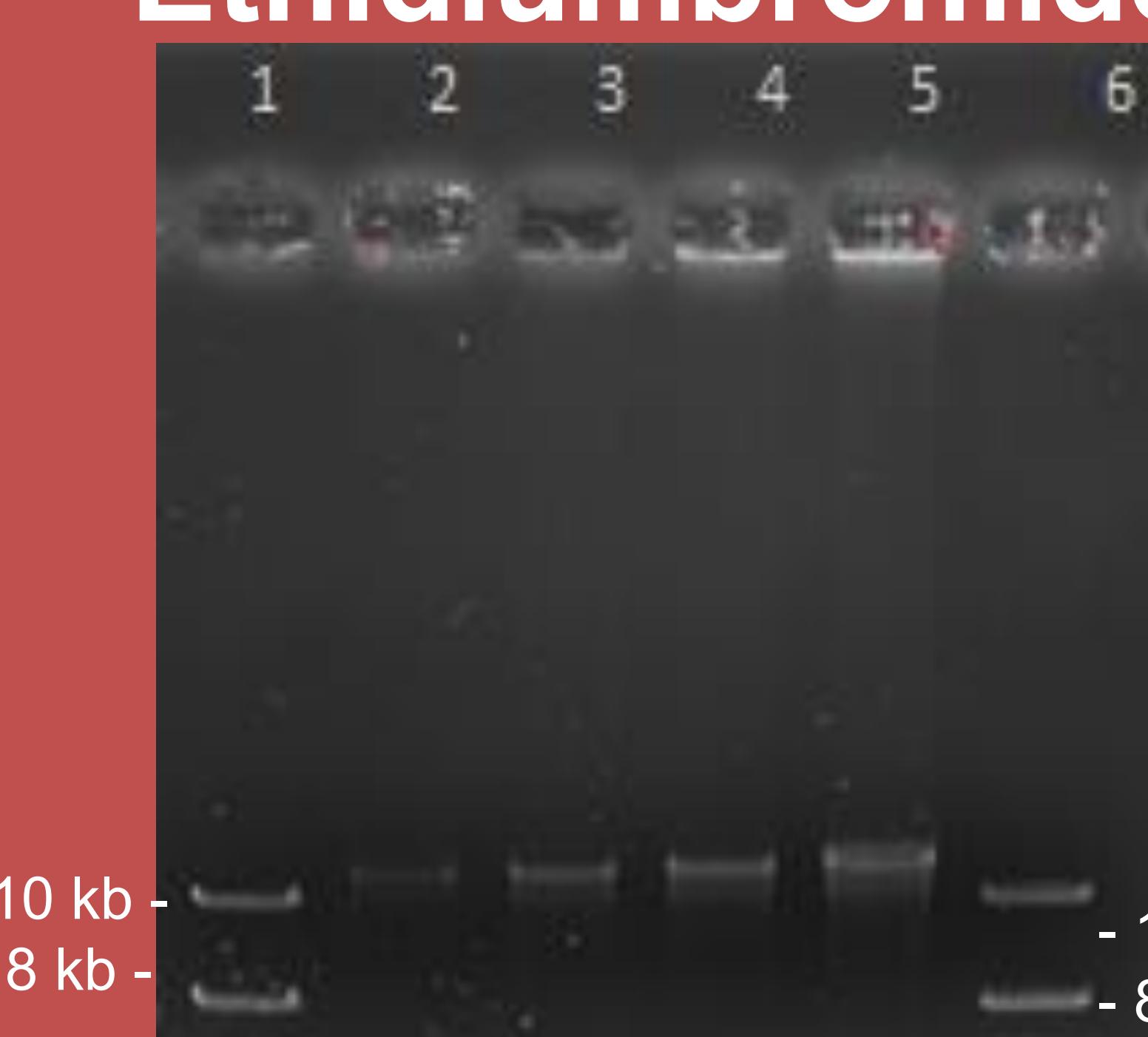
## Results and discussion

### Gel electrophoresis of λDNA concentration gradient

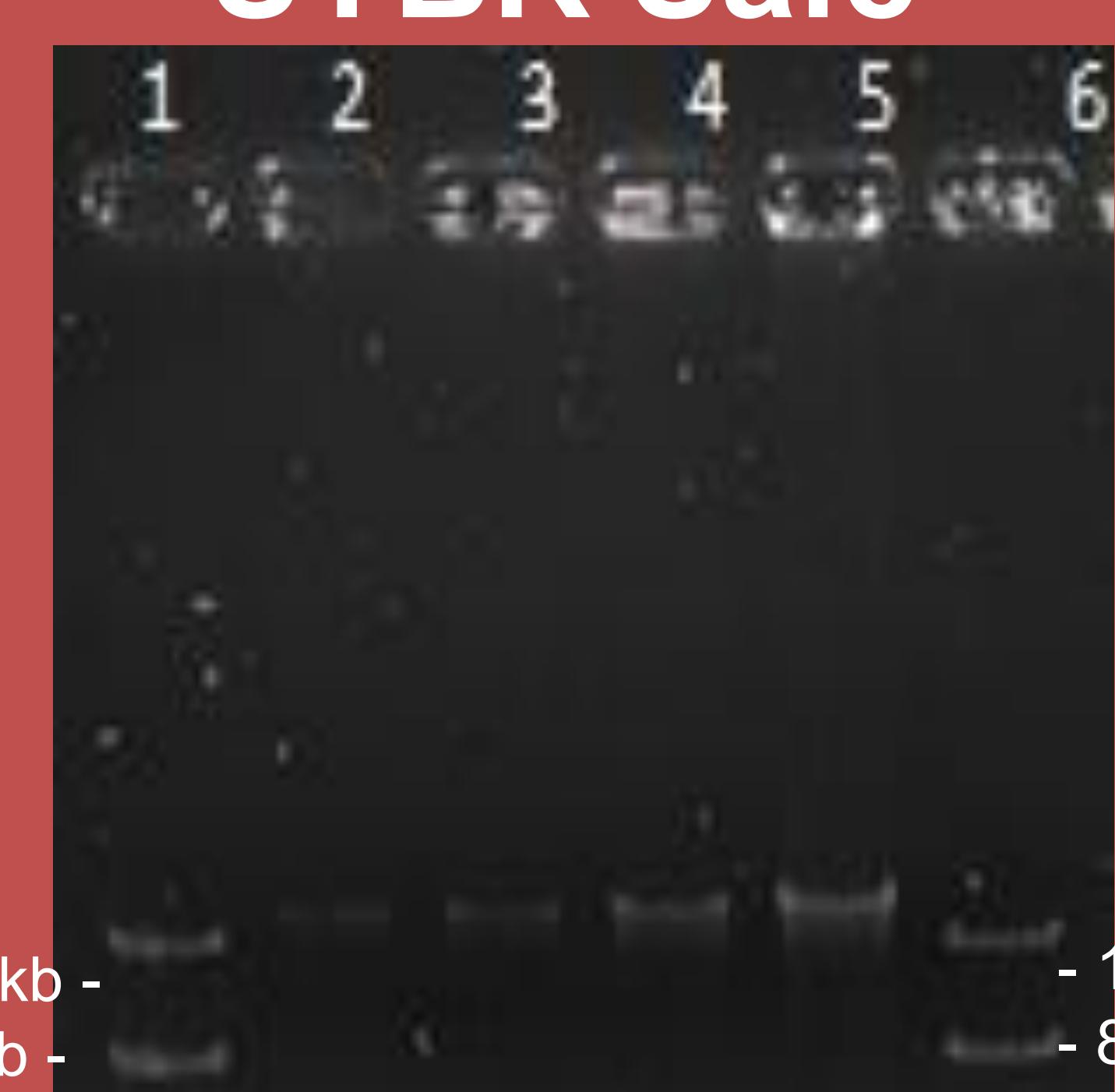
This experiment analyzes the visibility of DNA bands across a λDNA concentration gradient using agarose gel electrophoresis. The gradient consists of four concentrations: 50 ng, 100 ng, 200 ng, and 400 ng, loaded between two 1 Kb<sup>+</sup> DNA ladders for size reference. A 0.7% agarose gel (120 mL) in TAE buffer was prepared, and each lane contained 12.5 μL of sample. Electrophoresis was performed at 140 V for 50 minutes. All gels were destained for 10 minutes in deionized water.



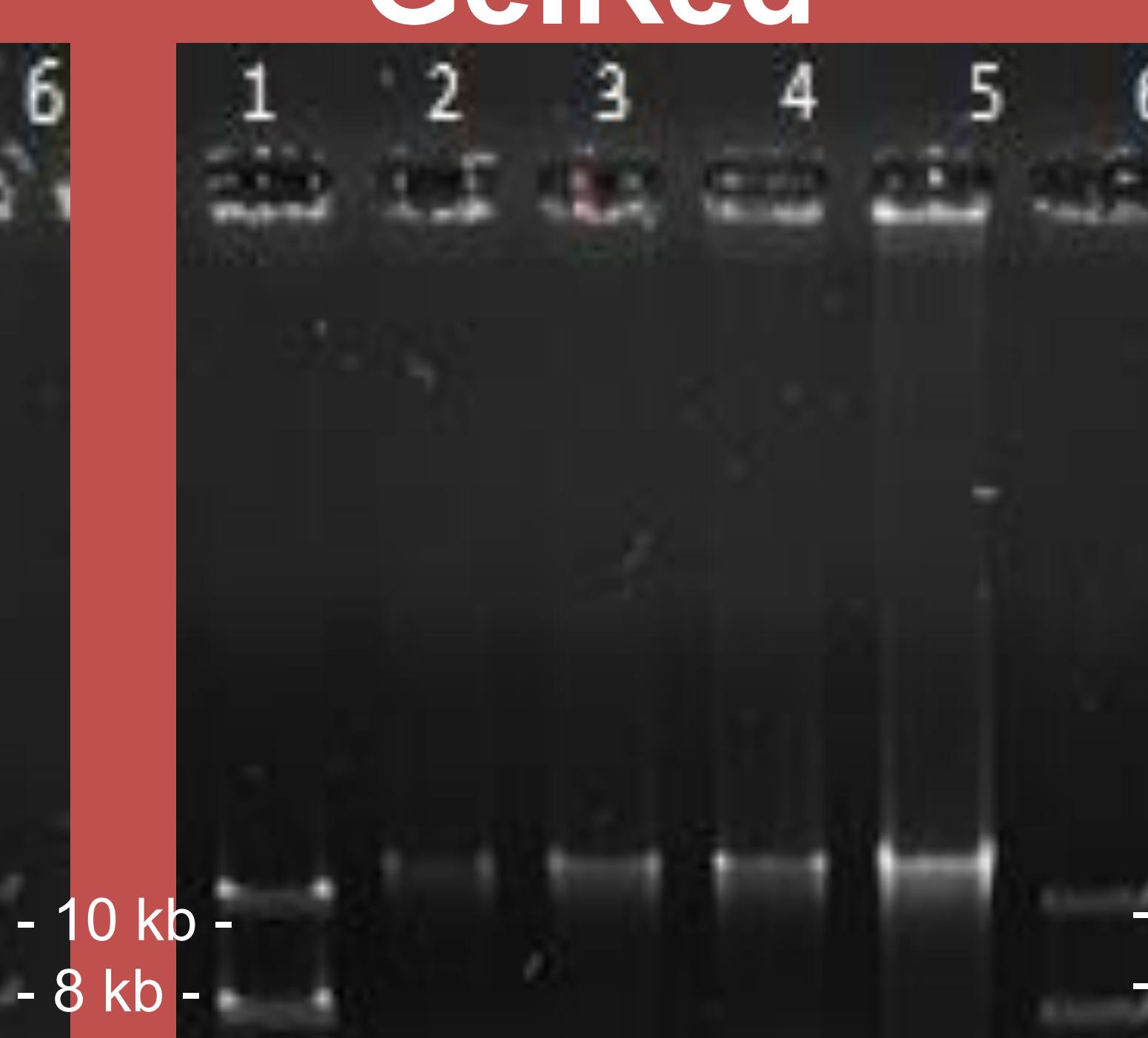
### Ethidiumbromide



### SYBR Safe



### GelRed™



### GelGreen™



(1) 1 Kb<sup>+</sup> ladder 2,5 μg (2) λDNA gradiënt 50 ng (3) λDNA gradiënt 100 ng (4) λDNA gradiënt 200 ng (5) λDNA gradiënt 400 ng (6) 1 Kb<sup>+</sup> ladder 2,5 μg

## Conclusion

GelRed™ is the most reliable and practical alternative to ethidium bromide, offering superior contrast and clarity in DNA and RNA analyses. SYBR Safe performs reasonably but is light-sensitive. GelGreen™ shows weak fluorescence and is not recommended. Decolourisation improves visibility for all dyes.