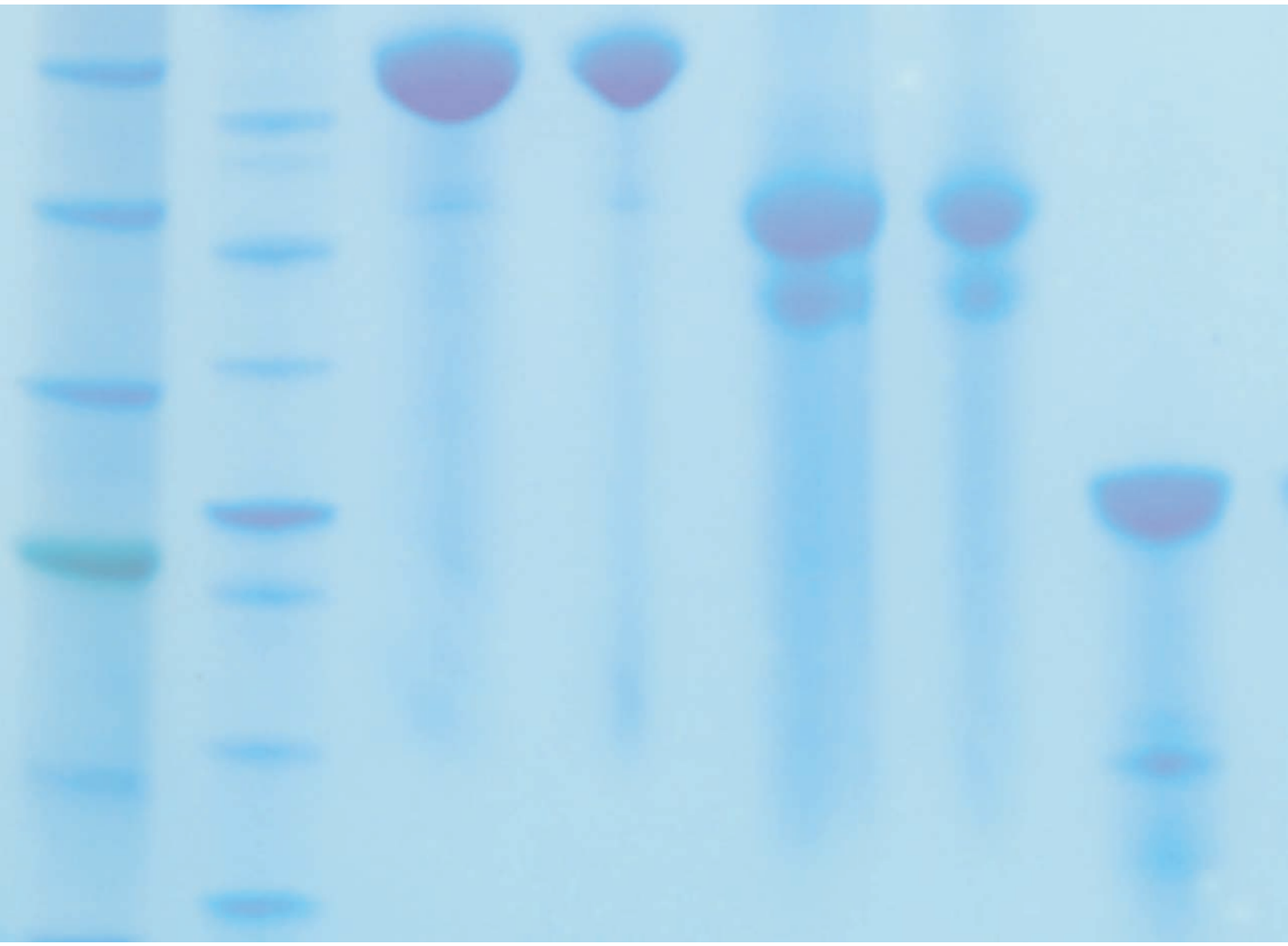
Side-by-side evaluation of FastGene® Q-Stain and Imperial™ Protein Stain



The following data was provided by the manufacturer: NIPPON Genetics EUROPE GmbH

Product	FastGene® Q-Stain (FG-QS1)
Manufacturer	NIPPON Genetics EUROPE GmbH

Purpose

This study aims to evaluate and compare the performance of FastGene® Q-Stain and Imperial™ Protein Stain for protein detection.

Summary

Coomassie Brilliant Blue staining has long been a gold standard for visualizing proteins in polyacrylamide gels, known for its broad protein-binding range and dependable results. However, traditional Coomassie protocols commonly involve **toxic reagents** such as **methanol and acetic acid** during the fixing and destaining steps. These substances are **hazardous to users and the environment**, and the protocol itself is **time-consuming**, often requiring **several hours to overnight incubation** to achieve clear results.

To address these limitations, modern staining reagents like FastGene® Q-Stain and Imperial™ Protein Stain have been developed. FastGene® Q-Stain offers simplified workflows, methanol- and acetic acid-free formulations, and provides shorter staining times. These features make it an attractive alternative for routine protein analysis.

A comparative evaluation of FastGene® Q-Stain and Imperial™ Protein Stain revealed distinct differences in handling convenience, background staining, and sensitivity.

Reagents and materials

- Bovine Serum Albumin (BSA; P0834-10X1ML)
- FastGene® PAGE Gel 4-20% (PG-S420)
- FastGene® Q-Stain (FG-QS1)
- Imperial™ Protein Stain (24615)
- FastGene® MOPS Buffer Pouches (PG-MOPS10)
- De-ionized water
- FastGene® PAGE Protein System (PG01)
- FastGene® FAS-X (GP-FAS-X)

Experimental procedure

1. A BSA standard ranging from 2000 ng to 7,5 ng was loaded onto a FastGene® 4–20% PAGE Gel and electrophoresed for 60 minutes at 140 V using MOPS running buffer.

2. Prior to staining, **all gels designated for Imperial™ Protein Stain** were washed four times for 5 minutes each in deionized water, in accordance with the manufacturer's protocol.

3. Gels were then stained under the following conditions:

I. 60-minute staining (according to each manufacture's protocol)

- Q-Stain: followed by a 20-minute destaining step.
- Imperial™ Protein Stain: followed by a 60-minute destaining step.

II. 120-minute staining (according to each manufacture's protocol)

- Both stains were followed by overnight destaining.

Note: Destaining is not required when using FastGene® Q-Stain. However, for the purpose of comparison with Imperial™ Protein Stain, a 20-minute gentle agitation in deionized water was performed after the 60-minute staining durations. This step was included to ensure consistency between protocols.

Results

Ease of use

FastGene® Q-Stain offers a clear advantage in terms of workflow simplicity. Unlike the Imperial™ Protein Stain, which requires a labor-intensive pre-staining wash step consisting of four 5-minute washes, FastGene® Q-Stain can be applied directly to the gel without any prior washing, significantly reducing preparation time and manual handling.

Additionally, FastGene® Q-Stain enables an one-step procedure: under standard conditions, no washing, fixing or destaining is required. While these steps are not strictly excluded, they are typically unnecessary, making FastGene® Q-Stain ideal for laboratories looking to simplify their gel staining process without compromising on results.

Background and visual appearance

Gels stained with Imperial™ Protein Stain exhibited an intense blue colour, which, while visually striking, may interfere with background clarity and contrast. On the contrary, FastGene® Q-Stain produced gels with a more neutral, less saturated blue background, which aids the visual distinction of protein bands.

Detection sensitivity

- At **60 minutes** (Figure 1), FastGene® Q-Stain exhibited enhanced sensitivity, detecting BSA down to 62 ng, whereas Imperial™ Stain only reached a lower detection limit of 250 ng.

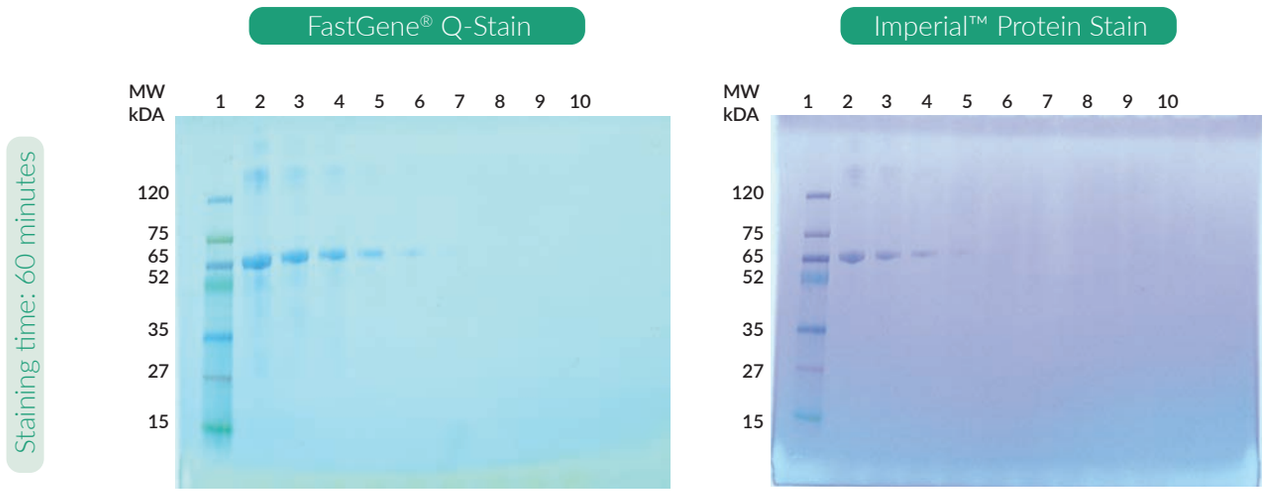


Figure 1: Comparison of protein staining on PAGE gels 4-20% with FastGene® Q-Stain and Imperial™ Protein Stain for 60 minutes.
FastGene® Prestained Protein Marker (MWP01) and BSA were separated by FastGene® PAGE System and stained with FastGene® Q-Stain (left) and Imperial™ Protein Stain (right).
Lane 1 contains FastGene® Prestained Protein Marker (MWP01); Lanes 2-10 contain BSA at 2000 ng, 1000 ng, 500 ng, 250 ng, 125 ng, 62 ng, 31 ng, 15 ng, and 7.5 ng, respectively.

- After **120 minutes** (Figure 2), FastGene® Q-Stain outperformed Imperial™ significantly, detecting BSA bands as low as 31 ng. In contrast, the Imperial™ stain was limited to a detection threshold of 125 ng.

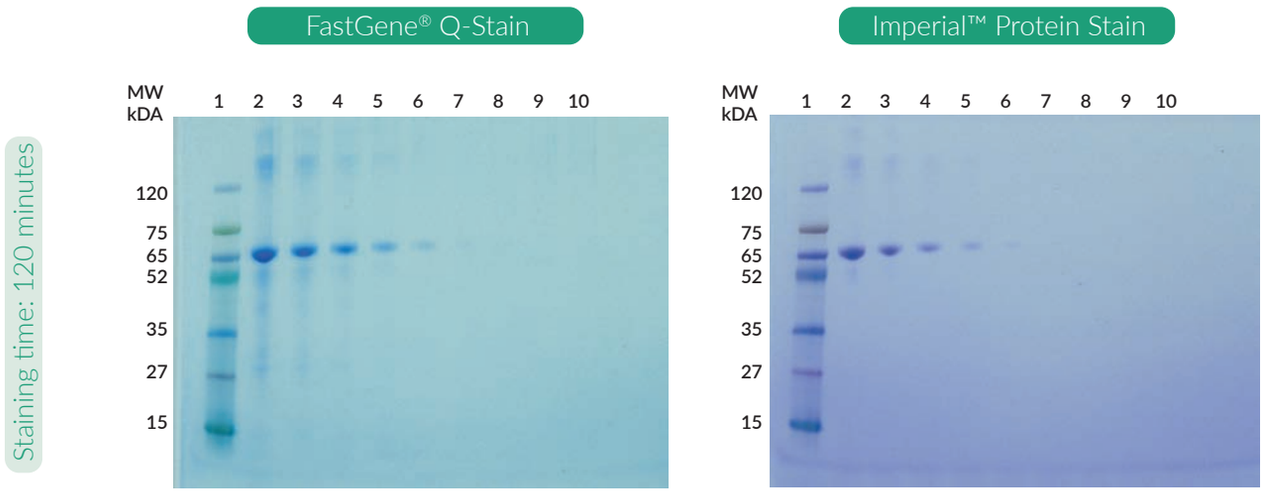


Figure 2: Comparison of protein staining on PAGE gels 4-20% with FastGene® Q-Stain and Imperial™ Protein Stain for 120 minutes.
FastGene® Prestained Protein Marker (MWP01) and BSA were separated by FastGene® PAGE System and stained with FastGene® Q-Stain (left) and Imperial™ Protein Stain (right).
Lane 1 contains FastGene® Prestained Protein Marker (MWP01); Lanes 2-10 contain BSA at 2000 ng, 1000 ng, 500 ng, 250 ng, 125 ng, 62 ng, 31 ng, 15 ng, and 7.5 ng, respectively.

Overall, these results suggest that FastGene® Q-Stain not only simplifies the staining process but also provides superior sensitivity over time, while achieving lower detection thresholds compared to Imperial™.

Conclusion

FastGene® Q-Stain provides several practical and analytical benefits compared to Imperial™ Protein Stain. Its simplified protocol eliminates the need for a pre-staining wash, making it more user-friendly and time-efficient.

FastGene® Q-Stain exhibits notably higher sensitivity at staining durations of 60 and 120 minutes, detecting protein amounts as low as 31 ng BSA after two hours. Additionally, the lower background color facilitates clearer visualisation of the bands.

In summary, FastGene® Q-Stain is the superior choice for rapid, high-sensitivity protein gel analysis.

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