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Efficiency of IgY Extraction from Egg Yolk: Polyethylene Glycol Method Versus a Novel Resource-Limited Method

Robert Capotă¹, Dana Ciaușu-Sliwa¹, Andra-Cristina Bostănaru-Ilieșcu¹,
Valentin Năstasă¹, Mihai Mareș¹

¹ Ion Ionescu de la Brad Iași University of Life Sciences

Abstract: This study compares two IgY extraction protocols from egg yolk: the classical polyethylene glycol (PEG 6000) method and a novel resource-limited (RL) approach. Eggs from immunized hens were collected one, two, and four weeks post-inoculation, and IgY levels were quantified by ELISA. PEG ensured consistent yields and reproducibility ($CV < 25\%$), while RL achieved higher IgY concentrations at later stages (up to 6.77 mg/mL) yet with greater variability. RL offers advantages of low cost, safety, and minimal equipment needs, supporting its use in resource-limited or industrial settings.

• Introduction

IgY is the main avian antibody with promising diagnostic and therapeutic uses. The extraction method strongly influences yield and purity. PEG is a standard, reliable approach, while the RL method aims to simplify the process for low-resource settings.

• Material and method

Eggs were obtained from hens immunized with a multivalent antigenic mixture (15 bacterial and fungal antigens).

Eggs from immunized hens were collected 1 (T1), 2 (T2) and 4 (T3) weeks post-inoculation.

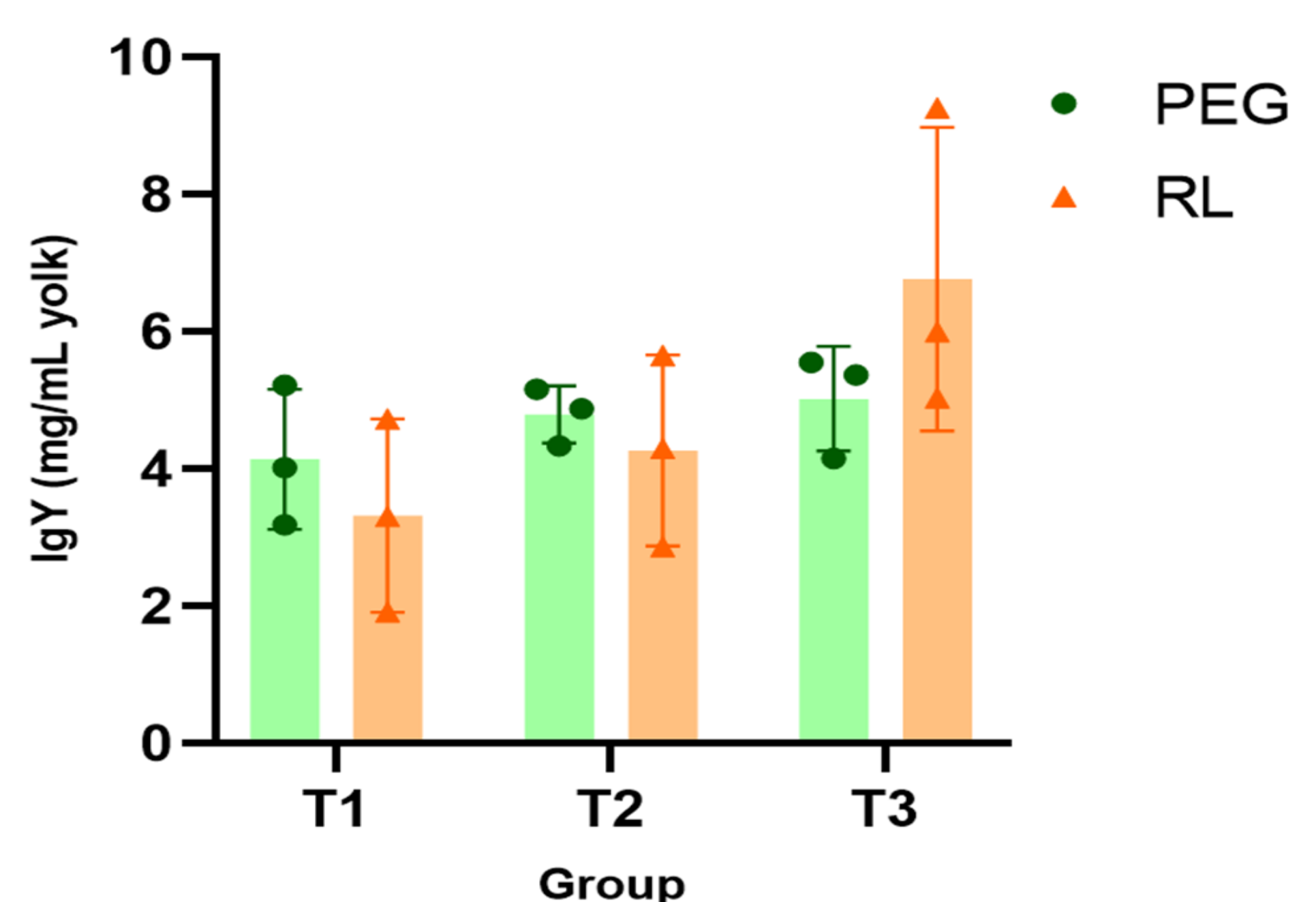
Two methods of extraction were employed:

- PEG: three-step precipitation (3.5–12% PEG6000), centrifugation, dialysis.
- RL: yolk dilution, pH 4.8 acidification, freeze-thaw, 2 M NaCl precipitation, neutralization.

IgY was quantified by ELISA; total protein by Bradford assay.

• Results and discussions

- PEG → consistent yields, lower CV ($< 25\%$).
- RL → higher IgY at T3 (6.77 mg/mL) however variable results.
- Bradford underestimated protein content.
- PEG ensures reproducibility; RL suits cost-sensitive or field applications.



• Conclusions

PEG precipitation remains the most reliable and reproducible method for IgY extraction. The RL method is less consistent although it achieves higher yields at later timepoints and offers important practical benefits — low cost, safety, and ease of use.

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