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SATURATED SALINE SOLUTION AS AN ALTERNATIVE TO FORMALDEHYDE FOR ANATOMICAL SPECIMEN PRESERVATION: A STUDENT PERCEPTION STUDY

Andreea-Diana LAZĂR[1], Petronela Mihaela ROȘU[1,*], Adela Ioana MUSTĂȚEA[1], Ștefan ORAC[1] and Ștefania Mariana RAITA[1]

[1]*University of Agronomic Sciences and Veterinary Medicine of Bucharest, Faculty of Veterinary Medicine, Romania*
**Correspondence: petronela.rosu@fmvb.usamv.ro*

Abstract: *Formaldehyde remains widely used in veterinary anatomy teaching despite its negative effects on tissue quality and students' experience during practical sessions. This study compared first-year students' perceptions of porcine lungs, hearts and tongues preserved for 367 days either in 10% formalin or by direct immersion in saturated saline solution. A structured questionnaire was completed by 132 students. Saline-preserved specimens received significantly higher ratings for odour, colour, tissue consistency, visibility of anatomical details and overall quality (Wilcoxon signed-rank test, all $p < 0.001$), and 88.6% of students preferred them for future use. From the students' perspective, saturated saline solution is a promising alternative to formalin preservation in veterinary anatomy laboratories.*

• Introduction

Formaldehyde is effective and inexpensive, but exposure during gross anatomy practicals is associated with irritative symptoms in students [Takahashi et al., 2007], and the search for safer preservation methods is ongoing [Balta et al., 2015]. Saturated saline solution has been proposed as an alternative for human and veterinary specimens [Hayashi et al., 2014, Burns et al., 2018, Lombardero et al., 2017]. This study assessed how veterinary students perceive specimens preserved by the two methods.

• Material and method

- Porcine lungs, hearts and tongues, each preserved by both methods: 10% formalin vs. saturated NaCl solution, 367 days at 20–22 °C.
- 132 first-year veterinary students (2025–2026) examined both specimen types and completed an anonymous Google Forms questionnaire.
- Section 1: odour, colour, tissue consistency, visibility of anatomical details and overall quality, rated for each specimen type on a 1–5 scale (1 = very poor; 5 = excellent); ratings of 4 or 5 were considered favourable.
- Section 2: psychological comfort, ability to concentrate, ease of identifying and understanding anatomical structures, learning efficiency and preference for future use.
- Statistics (jamovi, Version 28): Wilcoxon signed-rank test with rank-biserial correlation (r_{rb}) for paired ratings; binomial sign test for Section 2 items; $\alpha = 0.05$.

• Conclusions

- Students rated saline-preserved specimens more favourably for all assessed parameters.
- Saline preservation was associated with greater perceived comfort and easier identification of anatomical structures.
- Student perceptions alone cannot establish preservation efficacy or safety; objective assessments are needed.

• Results and discussions

Saline-preserved specimens received favourable ratings (4 or 5 on the 1–5 scale) from markedly more students for all five parameters (Wilcoxon, all $p < 0.001$; $r_{rb} = 0.80–0.99$).

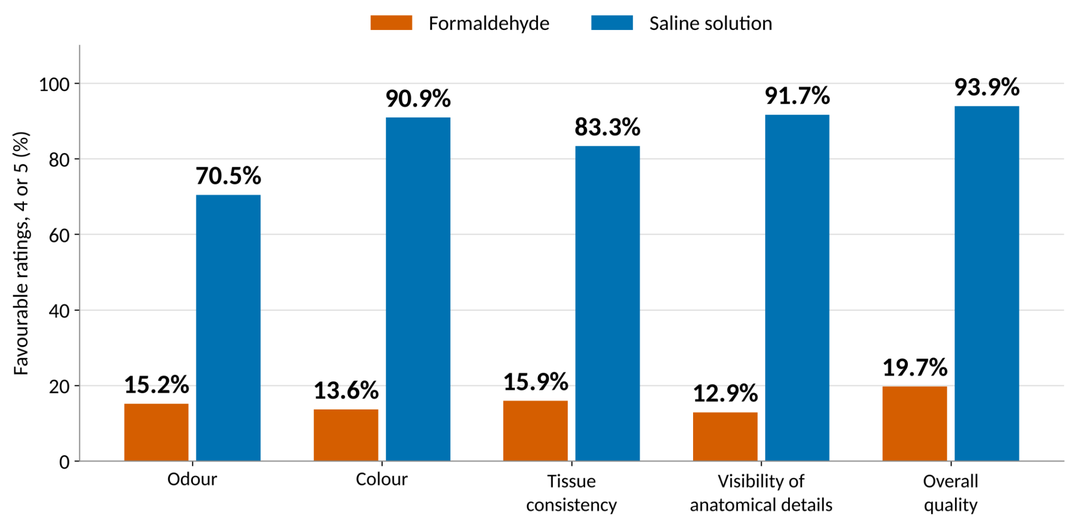


Figure 1. Students giving favourable ratings (4 or 5) for each parameter (n = 132).

Most students reported greater comfort and easier identification of structures with saline-preserved specimens, and 88.6% preferred them for future use (sign test, all $p < 0.001$).

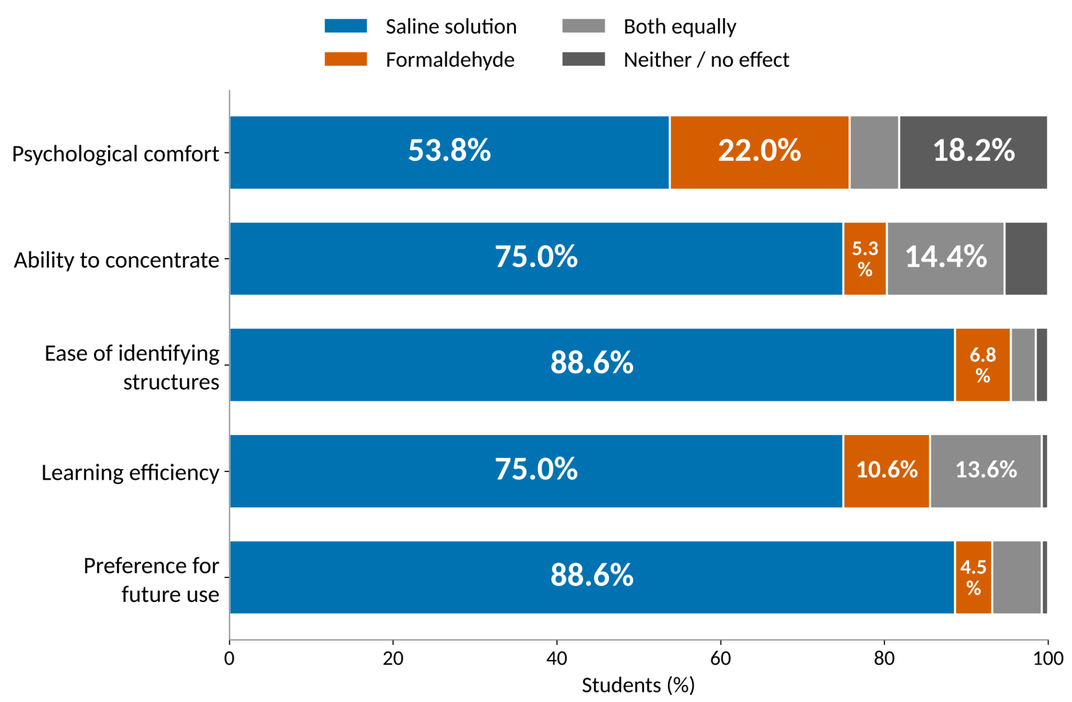


Figure 2. Responses to the comfort, learning and preference items (n = 132).

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