

MUSEUM FIXATIVES – A REVIEW

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ABSTRACT

Fixatives for museum specimens is selected on basis, to preserve the tissues for a long time, maintain the architecture and arrests autolysis fixatives for museum are based on mainly formalin derived from kaiserling tectique and its modification.

KEYWORDS: Mounting specimen needs to be kept in a large container.

Mounting specimen needs to be kept in a large container which can accommodate specimen along with 3-4 times volume of fixative and should not rest on bottom or side.

Kaiserling recommended initial fixation be neutral formalin (KI) solution and then transferred to a final preserving glycerin solution (KIII) for long term display in which Colour preservation is also present.^[1]

Kaiserling I Solution - Formalin 1L
Potassium acetate 45g
Potassium nitrate 25g.
Distilled water Make up to 10 litres
Kaiserling III Solution - Potassium acetate 1416g
Glycerine 4 litres
Distilled water Make up to 10 litres
Thymol crystals (prevent moulds)

This is the final solution in which the specimen will remain for display. *Leave solution to stand for 2 – 3 days before using to ensure proper mixing of chemicals. Add 1% pyridine as stabilizer. This solution acts as permanent fixative. This solution easily turns yellowish and needs to be replaced to restore colour of the specimen. The specimen will initially float to surface but later sink to bottom.

Restoration of specimen is necessary as they lose their natural color on fixation. The recommended method is the Kaiserling II method.

Kaiserling IISolution - 95% alcohol for 10 minutes to 1hour depending on the size of specimen. The specimen is then kept and observed for color change for around 1-1.5 hrs. After this step, specimen is ready for preservation. Before treating with kaiserling solution the specimen should be washed in running water.

Mr. R. J. V. Pulvertaft^[2] had few Specifications of individual specimens for fixation

- Specimens containing bile or stained by bile must be fixed and stored apart from others, as they will stain them.
- It is often preferable to fill hollow viscera with cotton-wool soaked in fixative, tie off at both ends.
- Unopened cystic cavities should be injected with fixative, if opened they should be packed with cotton-wool.
- Certain solid viscera should be fixed by vascular injection--e.g., the brain through the basilar artery.
- The lungs and limbs are particularly suitable for fixation by vascular injection.

He also suggested that the original method of Kaiserling (1897) is still widely used. Mr. R. J. V. PULVERTAFT also felt Fixation in formalin is almost universal, but the danger of formalin to technicians and pathologists is not adequately recognized.

Jores (1913) modified the method, which was further altered by Klotz and Maclachlan (1915) for colour fixation.

Solution I (Colour Fixation Fluid)

Chloral hydrate 50g.
Carlsbad salts (artificial) 50g.
Formalin 100ml.
Tap water 1,000ml.

The composition of the Carlsbad salts

Sod. sulphate 22g.
Sod. bicarbonate 20g.
Sod. chloride 18g.
Pot. nitrate 38g.
Pot. sulphate 2g.

After fixation for periods of up to six weeks specimens are washing in running water for 12 hours and then mounted in Solution No. II

Solution II- Pot. acetate 300g.

Glycerine 600ml.

Dist. water 1,000ml.

Advantages of this method were combined by Aegerter (1941) in the following formula - Colour Fixation Fluid

Sod. chloride 140g.

Sod. bicarb. 80g.

Chloral hydrate 625g.

Formalin (40%) 512ml.

Dist. water to 20 litres

After immersion in this fluid for up to 20 hours specimens are placed in the original Kaiserling I solution for from one to five days without washing and then, again without washing, mounted in a modified Kaiserling III solution.

Pulvertaft, 1936 from Westminster Medical said for special purposes special fixatives are necessary that the colour of faded specimens of chloroma could be restored by the addition of sodium hydrosulphite to the medium. Further papers on this method have been provided by Wentworth (1938, 1942, and 1947) Westminster Medical School also follows Kaiserling Solution No. I and III) if the solution is not crystal clear, impurities in the sod acetate are usually to blame. Such solutions should be filtered through paper pulp under negative pressure immediately before sealing 0.4% sod hydrosulphite is added.

Dr. A. D. Morgan show that haemolysis later sets in if there is much blood when specimens are washed in running water Saline or Kaiserling Solution No. I may be used for rinsing. The amount of hydrosulphite should not normally exceed 0.4%. If colour restoration must be rapid, 0.6% may be added, but this is to be avoided, as a white precipitate may form. Jars must be sealed immediately after mounting, and of course the lid must not be perforated, a practice necessary with large glass jars to prevent cracking on cooling in winter but quite unnecessary with " perspex " jars

Unsatisfactory results are due to inadequate fixation, washing with tap water after fixation, excess hydrosulphite, delayed sealing of the jars, acidity of the mounting fluid (whose pH should be 8), or the use of stale formalin containing para4formaldehyde as a white precipitate.^[3]

Fragile specimens, such as embryos, shrink in this mounting medium owing to osmosis, which may be prevented by lowering the glycerine content and by injecting gelatine into the cranial cavity. Wentworth (1942) omits glycerine in the mounting medium. This is an economy, but reduces the refractive index of the

medium and therefore causes a loss of brilliancy. Carbon monoxide has also been employed as a colour-retaining agent. Schultz (1931) introduced the technique, which gives brilliant colour contrast, but entails the risks of poisoning and explosion. These may be avoided by the technique of Robertson and Lundquist (1934). The method is also described by Lewis and Gaines (1936).

REFERENCES

- 1 Wwww.Nios.Ac.In/Media/Documents/Dmlt/Hc/Lesson-20.Pd.
- 2 Museum Techniques: A Review By R. J. V. Pulvertaft From The Westminster Hospital School Of Medicine, London (Received For Publication December 15, 1949.
- 3 The Preparation of Museum Specimens By L. W. Proger Pathological Curator, Royal College Of Surgeons Of England.