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Plastic Embedding: A Noble Technique for Preserving Specimens in Museum

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Abstract: ***The preservation of natural history material has never been of greater importance than at present, when the introduction of new, successful methods of preservation is changing the picture of preserving biological specimens in museums. The present study has been undertaken to see the usefulness of plastic embedding technique for preserving biological Specimens in museums. The study was conducted using various nymphs and various legs of insect for the preservation using plastic embedding technique. The specimens were dried and subjected to 10 percent acetone for the removal of natural oils. The selected specimens were cleaned and embedded within epoxy resin. The resin is allowed to set completely for 5 - 7 days and finally trimmed and polished. The results exhibited clear structural details, shrinkage, clarity and interface between the specimen and resin. Hence this technique proved to be an effective tool for the better preservation of biological specimens in the museum.***

Keywords: Plastic Embedding, Epoxy resin, Preservation, Biological specimens

1. Introduction

Polymers are substances whose molecules comprised of a large number of small subunits consisting of a number of atoms, are usually referred to as the segments of the polymer (Dholakiya 2012). Polyesters are one of the most versatile synthetic copolymers has a lot of applications and widely used commercially as fibres, plastics, composites and for coatings applications and preservation of biological specimens etc. (Thamilselvan et al., 2021; Dholakiya 2012). The preservation of natural history material has never been of greater importance than at present, when the introduction of new, successful methods of preservation is changing the picture of preserving biological specimens in museums. It is interesting to see any natural history museum established a hundred years ago and to observe how many specimens are in good conditions which are either never or rarely seen are greatly modified by the treatment (Pulvertaft, 1950). Preservation and restoration of collections is one of the main purpose of museums for educational institutions so that those specimens may remain safely in their collections for future generations to disseminate knowledge. The Museum specimen believes that each individual scientific specimen has inherent educational value (Thamilselvan et al., 2021; Powers et al.2014). Earlier, in the beginning in the 17th century, chemical fluids were used for the preservation and storing of specimens. The whole specimens was dipped in that chemicals and called Wet preservation technique. In this process Formaldehyde was used for the fixation of specimens which prevents the further deterioration and decay process (Autolysis) of the specimen. Decomposition of biological specimens is a natural process which affects morphological studies, teaching, and research. Therefore, it becomes necessary to find ideal preservation techniques (Ravi and Bhat, 2011) and long term specimen preservation with morphology & anatomy preserved in its best possible condition are still a challenge. The epoxy resin is a broad group of reactive compounds contain an oxirane or epoxy ring. It is mainly used for the industrial purpose such as majorly coatings, adhesives for their outstanding mechanical properties, high adhesive strength, high electrical and heat resistances etc. (Thamilselvan et al., 2021; Pulvertaft, 1950). Now a day, Museologist and natural history conservator have been using epoxies innovatively for plastination and plastic embedding delicate botanical as well zoological specimens. Epoxies are also used for the preservation of fossils, small insects, parts of various organism, hard parts structure etc. that have been used for academic purposes as well as memorable decorative pieces. Hence, these versatile and easily adjustable natures of epoxies make it very convenient, cost effective and easily manageable technique for the preservation biological specimens. Therefore, the present study has been undertaken with a view to assess the ability of Epoxy resin to preserve the biological specimens.

2. Materials and Methods

The study was conducted in the department. Various nymphs, legs of insect and some fish bones were selected for the preservation using plastic embedding technique. The nymphs, legs of insect were dried and subjected to 10 percent acetone for the removal of natural oils. Fish bones were air dried and then placed in thermostat at 37 degree centigrade to remove remaining water content. The selected specimens were cleaned and embedded within epoxy resin. The resin is allowed to set completely for 5 - 7 days and finally trimmed and polished. Before embedding the specimens, the moulds were prepared with smooth and hard paper so that specimens or hard structure can easily be kept in the mould. To make solution of epoxy resin with catalyst following method was adopted. First pour a little resin into a mixing cup and leave it to allow air bubbles to rise. After that took 100 ml epoxy resin and add catalyst into it. The proportion of resin and catalyst is 10/1 (100 ml epoxy resin and 10 ml catalyst). Generally the normal working proportion of catalyst is 1% by weight (ie.10ml catalyst to 1kg resin) but this can be increased to 10% for very small quantities of resin, or in low working temperatures. It is

suggested that too much catalyst may result in the cracked or discoloured casting. The catalyst was thoroughly mixed with resin so that equal distribution of catalyst takes place. After that solution was Poured into the mould to form a base layer and covered the mould to protect from dust, and leave to harden. After about I hour at 25ºC, it will have reached a firm jelly - like consistency. After that, placed the specimen on the base layer. After placing the specimens in the mould, mix up a further quantity of resin and pour around the specimen. Now keep the specimens for 5 - 7 days for complete dryness.

3. Finishing

After complete curing about 7 days, any surface adherence can be removed with the help of neat washing - liquid, followed by rinsed in warm water. After complete cure the casting was shaped further with hacksaw or sander to cut roughly to shape. Finishing was done with the help of wet and dry paper, started with a coarse grade and worked through to finer grades.

4. Results

The results exhibited clear structural details, shrinkage, clarity and interface between the specimen and resin. Now these preserved specimens can be exhibited in museum for display purpose.

Figure 1: Plastic embedded Insect Nymphs

Figure 2: Plastic embedded Insect Legs

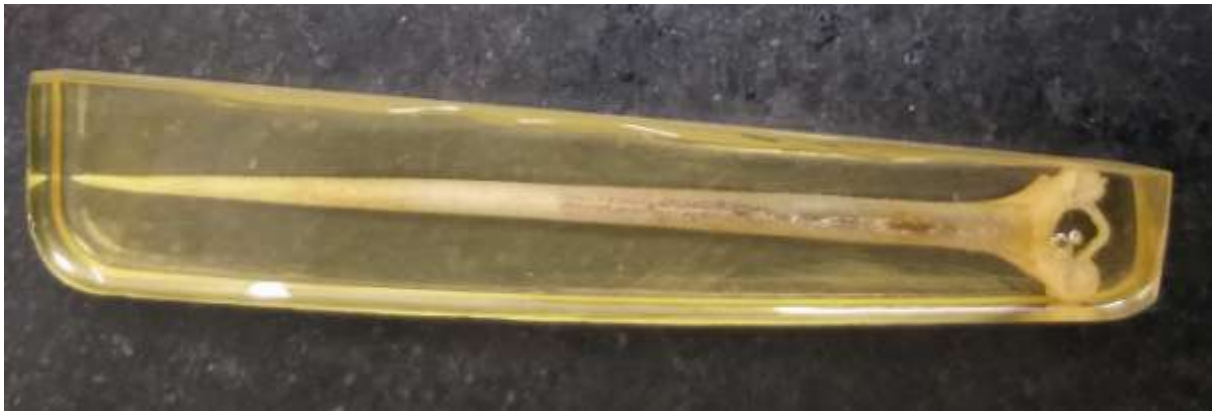

Figure 3: Plastic embedded fish spine

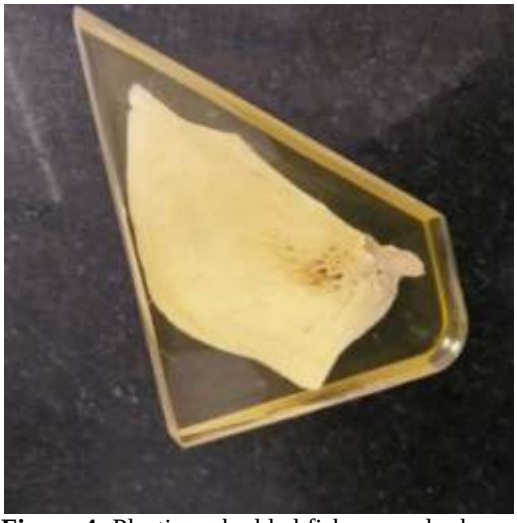

Figure 4: Plastic embedded fish opercular bone

5. Conclusion

The preserved specimens in epoxy are non - toxic and non - infectious and structurally more clearly. This technique is very handy for usage and do not require any specific equipments like in plastination technique. This technique is superior to those preserved in formalin or alcohol because it does not smell bad. Hence, his technique proved to be very fruitful in embedding specimens in epoxy resin for preservation of all types of smaller biological specimens as well as fossils also.

6. Acknowledgement

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