



Use of eco-friendly products in place of hazardous chemicals for preservation in engineering college libraries of Baruipur subdivision under Maulana Abul Kalam Azad University of Technology, West Bengal: A Study

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Abstract:

The article focuses on the use of eco-friendly products for preservation of library collection in place of hazardous chemicals. Preservation is given a least priority in many college libraries. Various preservation techniques are used for arresting the deterioration of library materials caused by various inorganic and organic agents. Different chemical products are used to protect the library materials from harmful living agents such as micro-organism, insects and rodents. These chemical products act as insect repellents which are very effective but leave harmful effects on environment. This paper discusses about the use of natural herbal products in engineering college libraries of Baruipur subdivision under Maulana Abul Kalam Azad University of Technology in south 24 parganas district to save environment for reducing the use of hazardous chemicals and finally gives the suggestions for using the herbal products in engineering college library.

Keywords: Preservation, Deterioration, Chemicals, Eco-friendly products, Insect repellents, Herbal products.

1. Introduction:

Library is the heart of institution and it is a repository of knowledge. In other words, library is a collection of organized documents which mainly consists of paper based materials such as books, journals, magazines, manuscripts, maps, etc. The basic objectives of library are procured, organized the documents and disseminated to its users for its basic needs. Proper dissemination of library materials is possible if the documents are in good usable condition. Librarian should responsible for proper preservation and restoration of the library materials. The physical forms of library materials are mostly organic in nature. These materials are susceptible to deterioration due to a number of factors which include climatic factors, biological factors, chemical factors, human factors and disasters. Library should have to take the various conservation policies to ensure the good usable condition of library documents. The primary activity of library is to arrest the deterioration of documents and curative measure of damaged materials. Environmental pollution is the major problem in today's life. Library professional should have to take the major role for pollution free library.

1.1. What is preservation?

ALA Glossary of Library and Information Science defines preservation as "the activities associated with maintaining library and archival materials for use either in their original form or in some other" and conservation as "the use of chemical and physical procedures in treatment or storage to ensure the preservation of books, manuscripts records and other documents"¹.

1.2. Causes of deterioration:

There are various factors behind deterioration of library materials².

(a) Environmental factors:

(i) Light: Library printed paper materials are serious damaged by light, especially sun light, photochemical degradation and artificial light like fluorescent light.

(ii) Heat: High heat with low moisture causes dehydration of the cellulose fibers and paper becomes brittle. High heat with high moisture causes the growth of moulds. The room temperature is increased for use the electric bulbs in the library and it effects the physical condition of the library documents.

(iii) Humidity: High moisture in the atmosphere causes serious damage to paper materials. The sizing materials of paper become weak and paper becomes yellow. Excessive moisture also creates the fungus on paper.

(iv) Dirt and dust: Dust when mixes with high humidity form dirt which causes physical and chemical degradation.

(v) Water: Water, which is harmful for the library collection may come from different sources like natural calamities, from leaking of roofs, defective plumbing and negligence of library professionals etc.

(b) Biological factors:

(i) Micro-organism: Micro-organisms include fungus and bacteria which cause substantial harms to library materials.

(ii) Insects: The major harmful insects which damage library materials are silverfish, book lice, book worms, cockroaches, termites, etc.

(iii) Rodents: Mice, rats and squirrels belong to rodent's family. They damage books and other materials badly.

© Chemical factors:

The sizing materials of paper cause acidic effect which is the main factor of chemical deterioration of paper.

(d) Human factor:

Careless handling by the library users of staff can cause damage to library materials especially books.

(e) Disasters:

Disasters may be natural or man-made. Fire is one example of man-made disaster which causes great damages to library collection. Natural disaster includes flood, cyclones, earthquake, etc. which can also destroy library materials.

1.3. Some preventive measures:

There are two aspects of preservation of library materials. The preventive measures which include all forms of indirect actions and the curative measures consist of all forms of direct actions. The plan of library architecture should be properly designed. Regular dusting and careful handling should be done. Air conditioner can be used. Disaster management system should be prepared to combat natural calamities.

The all harmful insects should be prevented in the library. Various chemical and non-chemical substances are used in libraries to get control over pests. Some of these act as insect-repellents and some as insecticides. Following are some of the chemicals used in library preservation to control specific types of biological factors³.

(i) Micro-organism: Fungicides that may be sprayed periodically include mercuric chloride in alcohol or water, paranitrophenol in water, thymol mixed with sodium chloride, sodium silicate mixed with sodium pentachloride, chlorophenol, hydroxyl quiniline, etc. Fumigation methods are very much effective to control fungus. In vacuum fumigation method, chemicals that are used are mixture of ethylene oxide and carbon di-oxide in specific proportion, mixture of ethylene chloride and carbon di-oxide, carbon tetrachloride, formaldehyde, para-dichlorobenzene, etc. In ordinary fumigation method, thymol and formaldehyde are used.

(ii) Insects: Pesticides like DDT, Pyrethrum, para-dichlorobenzene may be sprayed periodically. Care should be taken so that pesticides are not directly sprayed over books.

(iii) Rodents: These can be controlled with trapping or poisoning, Zinc phosphide and arsenic oxide are used as poison. Naphthalene is used as an effective insect-repellent substance.

Various eco-friendly non-chemical substances are used in library preservation as insecticides and insect-repellents.

1.4. Harmful effects of chemicals for library preservation:

Chemicals that are used in library preservation may be harmful in various ways. These may be toxic in nature and injurious to human health, may cause adverse effects on the materials to be treated with, or may result in environment pollution in the form of contamination with water and air.

The hazards of chemicals are originated from their inherent toxic, flammable, reactive, explosive, corrosive and carcinogenic properties⁴. The chemicals that are used in library preservation are harmful in many ways. Some of them are highly toxic in nature, e.g., DDT, arsenic oxide, zinc phosphide, formaldehyde, etc. Some of them are carcinogenic, such as, arsenic oxide, ethylene oxide, etc. Careless and prolong use of these chemicals may cause serious damage to human health. Besides, continuous use of the same reagents may increase immunity of the harmful pests.

1.5. Various eco- friendly products are used for library preservation:

Library preservation is not any new concept in India. Various indigenous methods of manuscript preservation were in vogue in ancient India. Different types of plant products were used to prevent infestation of insects and fungus such as dried ginger, powdered roots of dried sweet flags, ajwain, neem leaves, tobacco leaves, mint leaves, lemon grass oil, resin oil, citronella oil, black cumin, garlic, etc.⁵ The advantages of using these materials are-

(a) These are not hazardous for human health;

(b) These do not leave adverse effects on the materials to be preserved;

© These do not require costly equipments and expertise.

Some natural plant products that may be used in library preservation are enlisted below⁶.

Product	Function
Lemon grass oil	Fungicide
Powdered roots of dried sweet flag	Insecticide
Powdered ajwain	Insecticide, fungicide
Dried and powdered leaves of Aswagandha	Insect repellent
Dried ginger	Do
Neem leaves	Do
Citronella oil	Do
Lemon grass oil	Do
Mixture of neem leaves, karanja, nirgundi and citronella	Insecticide
Dried tobacco leaves	Insect repellent
Mint leaves	Do
Black cumin (Kala jeera)	Insect repellent
Neem oil	Anti-feedants for insects
Camphor	Insect repellent
Turmeric	Insect repellent

2. Objective of the study:

- The main objective of the study is to identify the various preservation policies of engineering college libraries in baruipur subdivision.
- To find out the nature of deterioration of library materials and causes of deterioration.
- To identify the various eco-friendly products or natural herbal products are used for preservation of library collection in engineering college libraries of baruipur subdivision in place of chemical hazardous.
- To find out the main reasons of hindrance for using the natural herbal products for library preservation.
- To suggest for using the herbal products in engineering college library to save environment for reducing the use of hazardous chemicals.

3. Methodology:

A structured questionnaire method is followed to survey the preservation techniques in the 7 engineering college libraries of baruipur subdivision in south 24 parganas district of West Bengal. This includes questionnaire and interview method. The problems for using the chemical products for preservation of college libraries collections and proposed solutions will be incorporated.

4. Limitation of the study:

The major emphasis of the present study is on engineering college libraries of the south part of West Bengal, which is restricted to Baruipur Sub-division of South 24 Parganas district that are self financed. However, the study has some limitations. The study is restricted to the libraries of 7 engineering colleges established till date. In this case, data has been collected from the engineering college library.

5. Analysis and Interpretation of Results:

T.1 Basic data of different engineering college.

Name of the Colleges	Yr. of establishment	Status	Affiliation	Stream	Intake Capacity
1. Netaji Subhas Engineering College, Sonarpur	1998	Self finance	MAKAUT	8	780
2. Future Institute of Engineering and Management, Sonarpur	2002	„	„	6	450
3. Gargi Memorial Institute of Technology, Baruipur	2011	„	„	5	240
4. Swami Vivekananda Institute of Science and Technology, Sonarpur	2008	„	„	5	390
5. Future Institute of Technology, Sonarpur	2014	„	„	5	300
6. Greater Kolkata College of Engineering and Management, Baruipur	2008	„	„	5	300
7. JLD Engineering and Management College, Baruipur	2015	„	„	5	300

This table shows that the status of all seven engineering colleges is self finance. Maximum stream is 8 in Netaji Subhas Engineering College. All the colleges are affiliated by MAKAUT. The highest intake capacity is 780 in Netaji Subhas Engineering College.

T.2 Shows present staff position of different engineering college libraries.

Name of the college	Librarian	Asst. Librarian	Library Assistant	Library clerk	Library Attendant	Library Peon	Total
1. Netaji Subhas Engineering College, Sonarpur	1	2	5	-	-	1	9
2. Future Institute of Engineering and Management, Sonarpur	-	2	7	1	-	-	10
3. Gargi Memorial Institute of Technology, Baruipur	1	1	1	-	1	-	4
4. Swami Vivekananda Institute of Science and Technology, Sonarpur	1	-	3	-	--	1	5
5. Future Institute of Technology, Sonarpur	-	1	4	-	-	-	5
6. Greater Kolkata College of Engineering and Management, Baruipur	-	1	1	-	1	-	3
7. JLD Engineering and Management College, Baruipur	-	1	-	-	3	-	4

Source: Primary data

This table shows that the only three college libraries have a Librarian. The maximum library staff is 10 in Future Institute of Engineering and Management, Sonarpur. The minimum library staff is 3 in Greater Kolkata College of Engineering and Management, Baruipur. Out of seven college libraries only three college libraries have Library Attendant and only two college libraries have Library Peon. Only one college library has a Library Clerk.

T.3 Distribution of library collections upto 2017.

Name of the college	Printed				Non printed		
	Books	Bound Journals	Dissertation	Project report	E-books	E-journals	CDs/D VDs
1. Netaji Subhas Engineering College, Sonarpur	96035	480	10	100	60	504	780
2. Future Institute of Engineering and Management, Sonarpur	59493	684	100	350	5000	250	1000
3. Gargi Memorial Institute of Technology, Baruipur	18746	145	-	540	588	06	1908
4. Swami Vivekananda Institute of Science and Technology, Sonarpur	37500	744	30	138	-	7000	1060
5. Future Institute of Technology, Sonarpur	14676	204	20	100	1000	50	200
6. Greater Kolkata College of Engineering and Management, Baruipur	25127	228	35	110	1000	200	1200
7. JLD Engineering and Management College, Baruipur	3700	200	-	-	200	06	850

Source: Primary data

The above table shows that the distribution of library collections upto 2017. There are two types of collections. One is printed collections and another is non-printed collections. The maximum collection of books is 96035 in Netaji Subhas Engineering College library and minimum collection of books is 3700 in JLD Engineering and Management College library. The maximum collection of E-books is 5000 in Future Institute of Engineering and Management and maximum E-journals collection is 7000 in Swami Vivekananda Institute of Science and Technology.

T.4: Preservation technique used in different engineering college libraries:

Name of the college	Various type of techniques							
	Pesticide Like DDT, Pyretherum etc.	Cleaning & Dusting	Shelving Lib. Materials to allow free flow air	Installing air - conditioner	Insect repellent substance like Naphthalene	Eco-friendly products like Neem pata, etc	Fire detection	Photo Copying
1. Netaji Subhas Engineering College, Sonarpur	Yes	Regularly	Partially	Yes	Yes	Yes	Yes	Yes
2. Future Institute of Engineering and Management, Sonarpur	Yes	Regularly	Partially	Yes	Yes	Yes	Yes	Yes
3. Gargi Memorial Institute of Technology, Baruipur	Yes	Regularly	Partially	No	Yes	No	Yes	No
4. Swami Vivekananda Institute of Science and Technology, Sonarpur	Yes	Regularly	Partially	Yes	Yes	Yes	Yes	Yes
5. Future Institute of Technology, Sonarpur	Yes	Regularly	Partially	No	Yes	Yes	No	Yes
6. Greater Kolkata College of Engineering and Management, Baruipur	Yes	Regularly	Partially	Yes	Yes	No	Yes	Yes
7. JLD Engineering and Management College, Baruipur	Yes	Regularly	Partially	No	Yes	Yes	Yes	No

The above table shows that the various preservation techniques are used in different engineering college libraries in Baruipur sub-division. Here various chemicals are used like DDT, arsenic oxide, zinc phosphide, formaldehyde, etc. for library preservation. These may be toxic in nature and injurious to human health. Cleaning and dusting is regularly done in these libraries. Insect repellent substance like Naphthalene is used for library preservation. Various herbal products are used for library preservation like neem pata, neem oil, tobacco leaves, lemon grass oil, resin oil, citronella oil, black cumin, garlic, etc. Fire detection system is present in six libraries and photo copying system is used in five libraries.

T.5: Familiarity with hazardous chemicals in preservation:

Sl. No.	Item	No. of Respondents	%
A	Yes	04	57
B	No	03	43
Total		07	100

The above table shows that the only four library authorities know about hazardous chemicals but other three library authorities do not aware of this matter.

T.6: Familiarity with herbal products in place of hazardous chemicals:

Sl. No.	Item	No. of Respondents	%
A	Yes	05	71
B	No	02	29
Total		07	100

The above table shows that only five library authorities know about the use of herbal products for library preservation in place of hazardous chemicals.

6. Findings:

- Most of the libraries use the various hazardous chemicals for preservation.
- Few libraries use the herbal products in place of hazardous chemicals.
- Most of the libraries have no adequate funding for library preservation.

- Manpower capacity is very poor.
- Most of the libraries have no proper policies for effective preservation.
- Most of the libraries use the fire extinguisher.
- Most of the libraries staff is not properly trained for effective preservation.
- College authority spent a few amount for the preservation.
- After critical evaluate, it is observed that a vast negligence is seen in the security system of the engineering college library.

7. Conclusion & suggestion:

Most of the college libraries face the various problems for preservation of library collection. They have no adequate funding, manpower capacity and proper policies for effective preservation. Maximum libraries are used the various hazardous chemicals for preservation of library collection. These chemicals act as insect repellent which are very effective but harmful effects on environment. These chemical products which are used for library preservation may be harmful in various ways. They may cause serious damage to human health and adverse effects on the materials. It is observed that most of the libraries are not aware about the hazardous chemicals. Therefore, it is urgent need to ensure the proper effective preservation for using the various eco-friendly products in place of hazardous chemicals. The consciousness of library professionals should be increase about harmful effects of chemicals and use of natural herbal products or natural eco-friendly products for library preservation. Librarian and members of the staff should learn about the herbal products. The use of some natural herbal products is getting important gradually, such as neem leaves, neem oil, neem seed powder, nirgundi leaves and citronella oil etc. It will not only ensure health security but also reduce the cost of library preservation. It is more necessary for the engineering college libraries which can not afford much of their budgets towards preservation. In conclusion, we must say that the use of non-hazardous natural products must be popularized among the library professionals. There is an old adage that "Prevention is better than Cure". So, preventive measures should be taken before much deterioration of the library materials has been caused and hence to be planned since the inception of the library.

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