

TECHNICAL REPORT OF HYGIENE AUDIT



Submitted to
**NEHRU ARTS AND SCIENCE COLLEGE
COIMBATORE – 641 105, TAMIL NADU, INDIA.**

Date of Audit: 07.08.2021 (Saturday)

Submitted by



NATURE SCIENCE FOUNDATION
*(A Unique Research and Development Centre
for Society Improvement)*



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1. Introduction

A hygiene audit will provide an insight into how an organization operates in a sustainable manner in terms of hygiene environment to the stakeholders as per the International Standard for Occupational Health and Safety Management Systems (ISOHSMS). If an organization has a hygiene auditing process implemented already, then it should apply environmental context into a clean environment. Environmental audit is a natural management tool and it will become more effective when hygiene audit is added to it. It is an essential requirement to adopt an audit process for a sustained utilization of resources in a hygienic way in both developed and developing countries like India. Hygiene will be of different types such as personal hygiene, environmental hygiene, medical hygiene and public hygiene which are all interrelated between each other in terms of maintaining a hygienic atmosphere to the stakeholders (Chen *et al.*, 2015; Jeans *et al.*, 2015).

Hygiene audit is a process that leads to extraction of information about guided procedures in hygiene implemented in an organization which provides a realistic assessment of how it protects or affects the health of stakeholders. It also measures the effects and provides solutions to overcome or reduce the adverse effects due to unhygienic conditions. This audit can minimize the hazardous materials (for example: food wastes and human wastes) utility in the campus remarkably which in turn reduce the adverse effects to human beings as a whole (Gould *et al.*, 2016). As per the Government norms and guidance, the environmental legislations including food consumption should be followed by all the organizations and necessary steps should be taken to minimize the food waste in any campus. The food wastes will lead to high contamination rates in the campus and also lead to cause diseases to the stakeholders and the public (Gnanamangai *et al.*)

To ensure that the hygienic environmental management system, maintenance of environmental and personal hygiene, availability of clean resources, maintenance of water supply and hygiene, cleanliness ensured at the site of disposal of human waste materials and personal safety in the campus should be implemented effectively. Each year a plan for the hygiene audit should be prepared by the management of an organization (Rajalakshmi *et al.*). A committee of faculties and student representatives and social aware members appointed to take this plan forward in the beginning of every year will ensure that the entire hygienic environmental management system is implemented in the organization without any hindrance. An effective hygiene practice should be followed among the stakeholders which in turn useful to control a wide variety of disease outbreaks (Roethlisberger and Dickson, 2017).

A healthy population is the essential component of a country's wealth in terms of political, economic and environmental sustainability. In terms of population growth statistics, India is the fastest populating country to strike the second position in total population cover which is about 138 million and constitutes 17.25% of the total global population (IGBC, WGBC). Demographic status of India revealed that if the population increase continues to be at this rate, India is expected to be the most populated country by 2050. Along with the birth rate, social and environmental issues are also increasing and alarming now-a-days. As consequences of over population, social well-being of

man and status of quality environment of the country get affected by the developing pressure on food, clothes, housing and other basic necessities, unemployment, loss of standard of living, decrease of forest cover, environmental pollution, energy crisis, ecological degradation and lack of hygienic condition-resulting in the distortion of well-being of entry (Silvennoinen *et al.*, 2015).

2. About Hygiene Audit

According to M/s. Nature Science Foundation's hygiene audit guidelines, hygiene audit is a survey of extracting a cumulative information concerning the status of hygiene and sanitation of respective premises and individuals belonging to any organisation such as academic or non-academic institutes, industries, food establishments and any other enterprises. This audit provides realistic data on how the organisations' cleanliness affects people's health and environment. A set of prominent objectives and goals are predetermined prior to hygiene audit with an aim to reduce the adverse effects of contaminated surfaces to human beings and to eradicate hazardous substances from the compound remarkably to diminish the multiplication of infectious diseases (Prescott *et al.*, 2005, Raja Lakshmi *et al.*).

As per the norms of the Health department of Indian Government, the environmental legislation's guidelines for food consumption should be followed by all the Organizations without any deviations. Hygiene audit process determines to monitor and record the sanitation status and personal hygiene to make strong recommendations for the complete cleanliness of environment and individuals associated with the organisation. The outcome of the hygiene audit suggests to give pure atmosphere to various stakeholders such as employees, faculties, supporting staff members, parents and students those who are depending upon the educational institutions and the employees and customers of other business establishments (Gnanamangai *et al.*).

To achieve a hygienic environmental management system in an academic institution and industry, maintenance of environmental and personal hygiene, availability of clean resources, maintenance of quality water supply and cleanliness ensured at the site of disposal of human waste materials in the campus should be implemented effectively (Rajalakshmi *et al.*). A periodic conduction of hygiene audit can ensure these practices in an institution-making both the human health and environmental safety protected which is the key focus of a hygiene audit.

Hygiene auditing is a paradigm and a kind of assessing tool evaluates the hygiene environment systematically and subjected to adopt the sanitization management systems with the following objectives:

- Number of microbial load in the air.
- Methods of disposal of food and human wastes.
- Availability of hand wash, soap, sanitizer, dryer, tissue roll, etc.
- Placing environmental information in the public domain.
- Facilities of sufficient ventilation, napkin disposal and waste management.
- Effective water purification and recycle system for use of hygienic water.

3. Aims and Objectives of the Hygiene Audit

The main objectives of a hygiene audit are to achieve complete safety for both people and the environment of any organization by promoting the hygiene management and sanitization standards in the enterprise. The hygiene audit identifies, quantifies, describes and prioritizes the framework of hygienic environment in standard compliance with the applicable regulations, potential applications, policy matters, data validations and regulatory standards to the stakeholders. The main objectives of a hygiene audit are:

- To assess the diversity and density of microbial wealth in the atmosphere.
- To assess the waste management strategies and methods of disposal of food and human wastes.
- To check the availability of tools and materials for hygiene such as hand wash, soap, sanitizer, dryer, tissue roll, hand gloves, masks, lab coats, etc.
- To be aware of the public domain with personal and environmental hygiene.
- To ensure the facilities of sufficient ventilation, napkin disposal and waste management in the campus.
- To check the availability of effective water purification and recycling systems for ensuring the safety of drinking water.

4. Checklists for the Hygiene Audit

The checklists for the conduct of a hygiene audit, different parameters on personal as well as environmental hygiene have been included. Availability of sanitizing materials like soap, hand wash liquid, detergents, sanitizer, lab coats, hand gloves, towels, tissue paper rolls, etc. nearby washbasins and restrooms should be made available to the customers. Lot of awareness programmes on personal and environmental hygiene, pest management strategies adopted, sanitation methods, hygiene maintenance and instructions to be followed for the stakeholders may be conducted regularly through hygiene clubs, forums, cells and associations. In addition, the details on water purification systems (if any), water recycling, disposal of food wastes, human wastes and other refuse along with the justifications on sufficient ventilation (both natural and mechanical) and proper napkin disposal facility should be made available (Gnanamangai *et al.*;; Vinothkumar *et al.*,).

In order to determine the quality practices undertaken by any organization or FBO (Food Business Operator) and to recommend more convenient strategies to eradicate contaminants coming out from the food wastes. Hygiene audit inspectors follow a set of predetermined checklists as per the International Standard for Occupational Health and Safety Management Systems (ISO,; FSMS.).

5. Procedures followed in the Hygiene Audit

Hygiene auditing ensures the monitoring and safeguarding the standards of sanitation by assessing both the organizations' as well as the associated people's hygiene practices and by suggesting such establishments with proper measures of cleanliness. According to hygiene audit criteria, in order to perform hygiene audit, the methodology included different eco-friendly management tools such as preparation of questionnaire, data validation, physical inspection of the campus, interventions of hygiene studies, observation and review of the documentation of hygiene, interviewing key persons for data collection and its analysis, enumeration of various microorganisms such as bacteria, fungi and actinomycetes in air using suitable basal media, measurements and recommendations (AOAC, 2011; Gnanamangai *et al.*). As the major contaminants causing hygiene issues and disease outbreaks due to various pathogenic microorganisms in the atmosphere that cannot even be seen with naked eyes, it focuses on the enumeration of several microbial colonies in the Petri plates containing nutrient medium (Pelzer *et al.*, 2000).

The food base containing nutrients that supports the growth of any microorganism is called culture medium or basal medium. The culture media are formulated in various forms according to the growth habits of microorganisms containing carbon, nitrogen, vitamin, amino acids, mineral and metals (iron, zinc, magnesium, manganese, sodium,). However, the culture media should be prepared under sterile condition by weighing and dispensing the individual ingredients or procuring ready-made medium from the market for culturing the selected microbes under controlled environment. Generally the common nutrient media contain both organic and inorganic nutrients required for the enriched growth of specific microorganisms. Agar can be used to solidify the media and culture plates can be exposed in different areas of an organization. This will help ensuring the maintenance of hygiene and cleanliness of the area.

5.1. Preparation and Cleaning of Glassware and Plastic ware items

Glassware and plastic ware items and culture media were properly cleaned with 10% sodium hypochlorite solution and washed properly with distilled water subsequently sterilized using an autoclave at 120°C temperature and 15 lbs/psi pressure (Cappuccino and Sherman, 2004). To evaluate the contamination source and rate of contaminants in the air at canteens, hostels, cafeterias/food court, seminar halls, auditorium, classrooms and the kitchen in the organization, simple culture media such as nutrient agar (NA), potato dextrose agar (PDA) and casein nitrate agar (CNA) are normally used to enumerate bacteria, fungi and actinomycetes; respectively from the test samples. Conical flask, Sterile water, Non-absorbent cotton, Spatula, Autoclave, pH meter, Electronic balance, Brown paper, Butter paper, etc. were used for the preparation of basal media as well as culturing the microorganism.

5.2. Preparation of Culture Media

Media components for Nutrient agar (NA) medium are Peptone (5.0 g), Sodium chloride (5.0 g), Beef extract (3.0 g), Yeast extract (3.0 g), Agar (30.0 g) and Distilled water (1000.0 ml). Around 600 g of peeled potato (not infected) were boiled in 600 ml of distilled water and subsequently filtered through a muslin cloth thoroughly. It was made up to 1000 ml with distilled water in which 20.0 g each of Dextrose and Agar were added. Starch-casein agar (SCA) medium was prepared by mixing of 10.00 g of Starch, 0.30 g of Casein, 2.00 g each of KNO_3 , NaCl , K_2HPO_4 , 0.50 g of $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$, 0.02 g of CaCO_3 , 0.01 g of $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$, 1 litre of Distilled water and 18.00 g Agar. They were sterilized using an autoclave at 120°C temperature and 15 lbs/psi pressure. After sterilization, these media were poured onto sterile Petri plates and allowed for solidification under sterile condition in a laminar air flow hood.

5.3. Enumeration of Bacteria, Fungi and Actinomycetes in water and air samples

The sterile Petri plates containing nutrient agar (NA), potato dextrose agar (PDA) and casein nitrate agar (CAN) Similarly, for the enumeration of *Escherichia coli* (*E. coli*) were taken for the enumeration of bacteria, fungi and actinomycetes; respectively in air to assess the number aero-flora (IMTECH, 1998). These plates were exposed for 2-3 minutes at specific places where the number of microorganisms as micro flora in the air was to be enumerated. The exposed Petri plates were incubated under room temperature for 24-96 hours. Similarly, one ml of water samples was transferred to the petriplates containing the basal medium and then incubated under the controlled environments.

The number of bacterial colonies grown in the Petri plates containing nutrient agar medium within 24-48 hrs. of incubation period were counted using a Colony counter. In the case of fungal growth, the Petri plates containing potato dextrose agar medium were observed after 72-96 hrs. of incubation. The colony of actinomycetes was recorded in between the incubation period of 48-72 hrs. The bacterial colonies exhibited different shape, size, colour and texture on morphology. Fungal colonies were identified based on visual characteristics such as colony morphology, elevation, colony margin, aerial mycelium and colony colour. Actinomycetes showed a good sporulation with compact and dense, chalk-like dry colonies with powdery mass, different colour variations from pale pink to white colour on the Petri plates and shown a branched filamentous mycelium in their cell / filament morphology similar to fungal characters (Holt, 1989; IMTECH, 1998).

6. about the Organization

6.1. ABOUT NEHRU ARTS AND SCIENCE COLLEGE

Nehru Arts & Science College has emerged from the galaxy of Nehru Group of Institution with the dictum “Knowledge is wisdom”. The Trust headquarter at Coimbatore, Tamil Nadu, has spread its wings to the neighbouring state Kerala by Establishing Educational Institution of high reputation. The trust was constituted by Late P. K. Das, F.I.E., F.I. Mech. E., M.S. Engg., A. F. R. Ae. S. (London), C. Engg. The College is situated in tranquil environment of sprawling 35 acres campus located in Thirumalayapalayam about 2.5 Km from NH 47(connecting Coimbatore and Palakkad), 15 Km from Kerala Border.

The college was established in 1998 offering 04 programmes with 54 students. It is affiliated to Bharathiar University, recognized by UGC with 2(f) and 12(B), certified with ISO 9001:2008 and ISO 14001: 2004.NAAC was accredited by NAAC with “B” Grade in 2009 and reaccredited with “A” Grade in 2014. Due to the consistent and conscious efforts of the Management and Principal **Dr.B.Anirudhan**, in nurturing the Institution, it has grown in strength and achieved success over the years. The college has got Autonomous status in July 2017. The vision of the college is “to mould the character, shape the career, perfect the behaviour and excel in educating the younger generations of today for tomorrow”. The mission of the college is “to offer innovative and socially relevant job-oriented courses with a view to enhance the employment prospects of the learners. In carrying out educational mission, we endeavour to upgrade the knowledge, skill and behaviour of the students, striving hard towards excellence in all spheres of our activities”. The Quality policy of the college is “to transform our students as knowledgeable individuals, skilled professionals and well-behaved human beings to live as worthy citizens to work for the wellbeing of the society and strive towards building a better India with true spirit of culture, patriotism and nationality to create international brotherhood and global harmony through value based and man making education.”

To this end, they pursue continuous development of infrastructure and enhance state of the art equipment to provide our students a technology up to date and intellectually inspiring environment of learning, research, creativity, innovation, and professional activity, inculcate in them ethical and moral values. The institute is committed to build a better nation through quality education with team spirit. Students are enabled to excel values of life and become good citizens. The system, infrastructure, and services were inspired to satisfy the students, parents, industry, and society.

6.2. About Nature Science Foundation (NSF)

NSF is a Non-Profit ISO 9001:2015 certified Organization and registered with NGO Darpan NITI Aayog and Ministry of Micro, Small and Medium Enterprise, Government of India functioning energetically towards the noble cause of nature conservation and environmental protection. NSF is managed by a board of trustees of NSF Public Charitable Trust under the TN Societies registration Act 1975 (TN Act 27 of 1975) on 29th November 2017 at Peelamedu, Coimbatore- 641 004, Tamil Nadu, India with Certificate of Registration No. 114 / 2017. In addition, NSF has 12A, 80G

and Form 10AC certificates for income tax exemption. The main motto of the NSF is to “Save the Nature to Save the Future” and “Go Green to Save the Planet”. NSF Branch Offices are also functioning effectively at Gorakhpur, Uttar Pradesh and Faridabad, Haryana, India to adopt the ‘Go Green Concept’. NSF family is widespread across India with over 70 state-wise Lead auditors to conduct Green and Environment Audits.

NSF is functioning strenuously to conduct different awareness programmes and implement various schemes to public and school / college students towards the noble cause of nature protection. Some of the programmes are also being organized for the benefit of tribal communities to create the supply chain for biodiversity conservation studies. The objectives along with vision and mission are illustrated to promote educational and environmental awareness programmes through social activities for enhancing the quality of life and to conserve nature from environmental pollutants using traditional and modern technologies for sustainable land management. NSF is educating the tribal community children through social service and towards the upliftment of tribes as a whole and make them as entrepreneurs.

International Eco Club Student Chapter (IECSC) has been established for Student volunteers and faculty members are encouraged to conduct National and International events, Student Technical Symposium, Distinguished lecture programme, Environment Day celebration, Ozone Day celebration, Project model exhibition, Awareness programmes on Environmental pollution, Biodiversity and Natural resources conservation and etc. with the financial support of the Foundation. NSF is being released ‘Magazine’ and ‘Newsletter’ biannually to share the information about Environmental awareness programmes on biodiversity conservation, seminar on soil conservation, water management and solid waste management, restoration and afforestation programmes in Western Ghats of southern India.

In order to encourage the students, members of faculty, academicians, scientists, entrepreneurs and industrial experts those who are involving in nature protection and biodiversity conservation studies, NSF tributes the deserved meritorious candidates with various awards and honours such as ‘Best Faculty Award’, ‘Best Women Faculty’, ‘Best Scientist Award’, ‘Best Student Award’, ‘Best Research Scholar Award’, ‘Best Social Worker Award’, ‘Young Scientist Award’, ‘Life-Time Achievement Award’ and ‘Fellow of NSF’ will be given.

NSF has introduced various types of Audits such as ‘Eco Audit’, ‘Green Audit’, ‘Energy Audit’ and ‘Hygienic Audit’ to academic Institutions, R&D Organizations and Industries towards the accreditation process as well as maintaining a hygienic eco-friendly environment to the stakeholders in their campus. All audits will be conducted as per the Checklist prepared by the NSF ISO EMS 14001:2015 criteria and in compliance with Government Law and Environmental Legislations including World / Indian Green Building Council and the concept of Swachh Bharath Abhiyan under Clean India Mission. Green campus and Environment Policy, Purchase Policy, MoU, International Eco Club Student Chapter Certificate will be given to get the maximum mark weightage in NAAC. Audit processes are being conducted through the certified Auditors as per the following.

Audit	Certified Auditors	Certified Auditors
Green Audit	<ul style="list-style-type: none"> ● IGBC - Indian Green Building Council ● GBCRS - Green Building Code and Green Ratings Systems ● GRIHA – Green Rating for Integrated Habitat Assessment 	<ul style="list-style-type: none"> ➤ Mrs. S. Rajalakshmi ➤ Dr. R. Mary Josephine ➤ Dr. B. Mythili Gnanamangai ➤ Er. Ashutosh Kumar Srivastava ➤ Er. N. Shanmugapriyan
Energy Audit	<ul style="list-style-type: none"> ● BEE - Bureau of Energy Efficiency ● LEED - Leadership in Energy and Environmental Design ● CII-GreenCo – GreenCo Rating System Felicitator 	<ul style="list-style-type: none"> ➤ Er. D. Dinesh Kumar ➤ Er. N. Shanmugapriyan ➤ Dr. N. Balasubramaniam ➤ Dr. P. Thirumoorthi ➤ Dr. G. Muruganath
Environment Audit	<ul style="list-style-type: none"> ● IGBC -Indian Green Building Council ● ASSOCHAM - Associated Chambers of Commerce and Industry of India ● FSRS – Fire Safety & Rescue Services 	<ul style="list-style-type: none"> ➤ Mrs. S. Rajalakshmi ➤ Dr. A. Geetha Karthi ➤ Dr. R. Mary Josephine ➤ Dr. B. Mythili Gnanamangai ➤ Er. Ashutosh Kumar Srivastava ➤ Er. N. Shanmugapriyan
Hygiene Audit	<ul style="list-style-type: none"> ● FSMS – Food Safety Management System & Occupational Safety & Health (ISO 22000:2018) ● SBICM - Swatch Bharath under India Clean Mission 	<ul style="list-style-type: none"> ➤ Mrs. Gaanaappriya Mohan ➤ Er. Ashutosh Kumar Srivastava ➤ Dr. R, Sudhakaran ➤ Dr. N. Saranya
Academic & Administrative Audits	<ul style="list-style-type: none"> ● Academic & Administrative Audits as per the NAAC Criteria 	<ul style="list-style-type: none"> ➤ Dr. B. Anirudhan ➤ Dr. B. Shreeram

7. Audit Details

Date / Day of Audit	: 07.08.2021 (Saturday)
Venue of Audit	: Nehru Arts & Science College
Audited by	: Nature Science Foundation, Coimbatore - 641 004, Tamil Nadu, India.
Audit type	: Green Campus Audit
Name of ISO EMS Auditor	: Mrs. S. Rajalakshmi, Chairman & ISO EMS Auditor, NSF.
Name of the Lead Auditor	: Dr. R. Mary Josephine, Board of Directors & Botanist, NSF.
Name of the Hygiene Auditor	: Mrs. Gaanaappriya Mohan, FSMS OHS Hygiene Auditor, NSF.
Name of Subject Expert-I	: Mrs. S. Rajalakshmi, Chairman & ISO EMS Auditor, NSF
Name of IGBC AP Auditor	: Dr. B. Mythili Gnanamangai, IGBC AP, Indian Green Building Council.
Name of Eco & Green Officer	: Ms. Sowndharya, Programme officer, NSF.



Opening meeting with the College Principal, IQAC Coordinator, Staff Coordinators and Audit Team of the Nature Science Foundation.

8. Observations of the Hygiene Audit

8.1. Enumeration of Microbes in water and air samples at different locations of the Organization.

The results indicated that Actinomycete colonies were found to be lesser than fungal and bacterial colonies in terms of number of colony forming units (cfu) in all the Localities of the Organization. All the three microbes were found to be high at Indoor

Stadium followed by CSE Lab least with Controller of Examination. The number of bacterial, fungal and Actinomycete colonies at HOD Room recorded was 15.6, 12.3 and 10.4 cfu. Similarly, they were 20.9, 08.7 and 07.5 cfu at Principal Room (Table)



Hygiene Audit Team

Total number of microbial colonies showed that bacterial colonies were about 86.7 cfu, fungal colonies were about 54.8cfu and Actinomycete colonies were about 41.2 cfu (Table 1 and Figure 1). Generally, Actinomycete colonies are found to be least (Avg. 09.12 cfu) always in all the places due to generic characteristic features. On the other hand, bacterial colonies are always exhibited higher (17.34 cfu) due to small size and rapid multiplication factors. The fungal colonies are always placed in between two microorganisms (10.96 cfu) such as bacteria and Actinomycete in terms of size, shape, growth, doubling time and generic characters.

S.No.	Name of the Place in which water samples obtained	Number of Microbial colonies (cfu) *			
		Bacterial colonies	Fungal colonies	Actino mycete colonies	Total colonies / Average
1.	Controller of Examination	10.5	10.5	03.8	26.1(08.7)
2.	Principal Room	20.9	08.7	07.5	37.1(2.36)
3.	CSE Lab	19.5	07.4	13.8	40.7(13.5)

4.	Indoor Stadium	20.2	15.9	05.7	41.8(13.9)
5.	HOD Room	15.6	12.3	10.4	38.3(12.7)
Total/Average number of Microbial colonies		86.7 (17.34)	54.8 (10.96)	41.2 (08.24)	182.7(60.9)

Cfu: Colony forming units

* Average three replicates

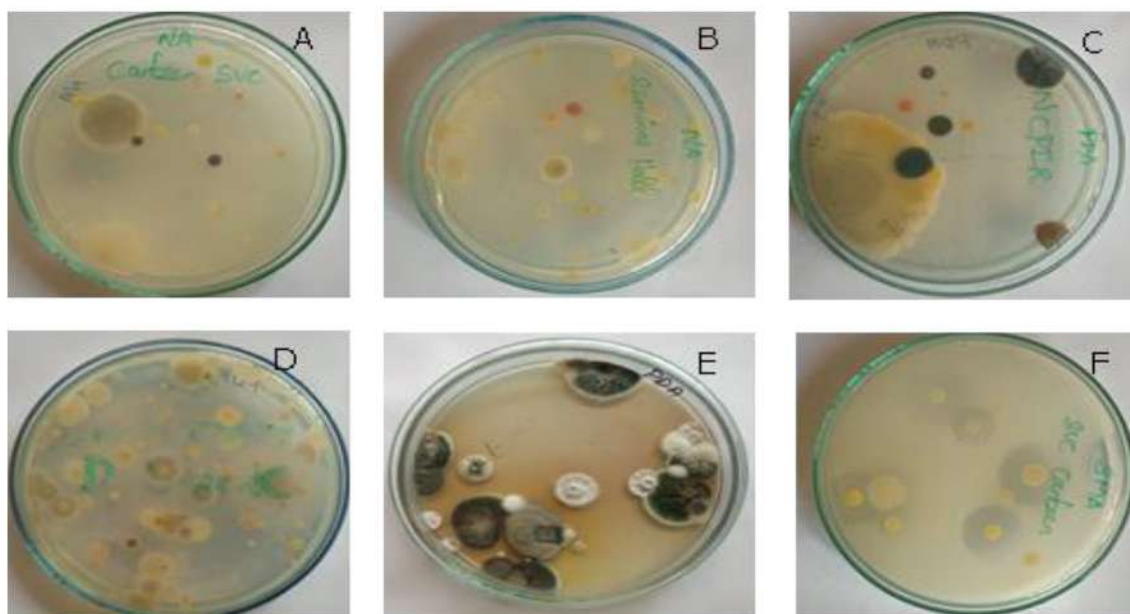
** Values in the parentheses are the average number of microbial colonies.

Note:

- Bacterial colonies were enumerated in Nutrient agar plates on 24 hrs interval.
- Fungal clusters were counted in Potato Dextrose agar plates on 72 hrs interval.
- Actinomycete colonies were counted in Casein Nitrate agar plates 48 hrs interval.

Standards (APHA, 2015):

- Number of bacteria maximal limit is 100 cfu
- Number of fungi maximal limit is 65 cfu
- Number of actinomycetes maximal limit is 50 cfu



Microbial colonies in Potato Dextrose Agar medium in different places of Nehru College of Arts and Science, Coimbatore, Tamil Nadu.

8.2. Water Quality Analysis and Interpretation

The water samples were analysed for various parameters which includes physical, chemical and biochemical parameters like water pH, turbidity, total soluble solids, conductivity, total hardness and *E. coli* population density for which water samples were collected from RO water units, water doctors and water coolers kept at

College canteen, hostels, staff room, laboratories and library. The results indicated that the water quality parameters such as pH, Turbidity, Conductivity, Total hardness and *E. coli* population density were found to be within the permissible limits. The pH value estimated in the water samples were measured from 6.8 to 8.2. The total hardness measured in the water samples was in the range of 80 and 320 mg/l. Both pH and total hardness of water samples were recorded below the permissible limit. The water sample analysis report indicated that the waters supplied to the stakeholders are drinkable one and safe.



Test for *E. coli* population in water samples

[Result: The samples did not turn yellow colour after incubation, therefore *E. coli* is absent in the water samples]

Table 2. Estimation of water quality parameters

Locations	pH Values*	Total hardness (TDS in PPM)**	Results and Observation
Auditorium	8.2	320	Above the permissible limit
Open corridor	7.5	80	Below the permissible limit
Canteen	6.8	90	Below the permissible limit
Staff Room	8.0	120	Below the permissible limit
Laboratory	7.5	240	Below the permissible limit
Library Hall	6.9	110	Below the permissible limit

* Permissible limit is 6.5 – 8.5

** Permissible limit is 300 mg/l

8.3. Observation on Personal Hygiene and Safety measures

A number of illness and disease outbreaks are reported to be consequences of lack of maintaining proper personal hygiene among people. By touch, handling of contaminated food, contact with the untidy surfaces can cause invasion of germs and other contaminants. A good personal hygiene is primarily achieved by cleansing hands to remove germs. Soap washing or use of sanitizers ensures removal of 90% of germs and protects the person from catching illness and spreading it to other people. Hence, it is important to create awareness among the stakeholder on personal hygiene.





Washbasins Maintenance at NASC Campus

As far as the stakeholders and employees are concerned, the safety and convenience of everyone working/access to the organization, the suitable safety rules and regulations should be observed at all times. The basic steps should be followed at all times to reduce the contamination of the working environment especially in edible preparation areas. Wearing a laboratory coat or apron along with hand gloves and caps before entering a working environment for protecting clothes from contamination or accidental discolouration by staining solutions are always mandatory in Organization's hygiene. It will be highly useful to offer good hygiene environment to the stakeholders.

The observation on providing hygiene environment to the stakeholders at Aathiyamaan College of Engineering revealed that sanitizing materials such as soap, liquid detergent, tissue paper roll, hand gloves, hand towels are made available nearby washbasins and restrooms focussing towards personal hygiene and sanitation related concerns. It is observed that working tables and benches are kept clean at

Laboratories across the Departments. The working tables and benches are regularly cleaning with a disinfectant solution and neat cloth. Equipment and machineries are very neatly maintained without any dusts and covered with the appropriate covers.

Appropriate dustbins and eco-friendly covers are made available at laboratories, canteens, food courts, cafeteria and hostels across the campus. At hostel dining halls and canteens, food suppliers are tied their long hairs properly and wear disposable hand gloves, full cover aprons and caps minimize contamination and fire hazards.

Details of pest management strategies adopted (cockroach traps, rodents control measures, insect repellents and other control facilities) at NASC campus is very good. Food preparation (kitchen) area at hostels and canteen is very clean, free of insect pests and in good state of ventilation and exhaust system along with proper water supply and drainage. It is observed that waste disposal area and waste disposal collection centre are neat and clean, free of insect pests and free of spillage with no stagnation of water in food zones.

8.4. Napkin disposal facility

Menstrual Hygiene Management (MHM) is an indispensable part of the Swachh Bharath Mission Guidelines (SBM-G) for adolescent girls and ladies. As in step with MHM hints, 'Safe disposal' method making sure that the process of destruction of used and dirty materials is performed without human touch and with minimum environmental pollutants and 'Unsafe disposal' method throwing used material into ponds, rivers, or inside the fields exposes others inside the vicinity to decaying material and have to be averted. Some of the unsafe practices of napkins include throwing them unwrapped into fields and rooftops, wrapping them in paper/ plastic bags and throwing them outdoors or in dustbins, burying them for de-composting, throwing them in latrine / toilets, burning it. These unsafe practices are to be avoided and rather health practices can be adopted.

The College is implementing the safe practices of disposing of napkins using small scale incinerators in ladies hostels. Incinerators facility and disposal structures in the proper directions and other social stigmas connected to menstruation influences the sanitary waste disposal conduct of women within the campus is very much appreciated. The Management is taking care of adolescent girls and ladies significantly in terms of their personal hygiene and safe.

9. Best Practices followed on Hygiene in the Organization

No person is suffering from a disease or illness or with open wounds or burns among the students, teaching and non-teaching staff members including supportive staff and management people across NASC Campus.

College campus observed during the hygiene audit which indicated the Management Nehru College of Arts & Science is very keen interest in providing good hygiene atmosphere to the stakeholders.

- The sanitizing materials such as soap, liquid detergent, tissue paper role, hand gloves, hand towels, etc. are made available nearby the washbasins and restrooms focussing tow
- Towards the personal hygiene and sanitation related concerns to the stakeholders.
- Appropriate dustbins and eco-friendly covers are made available at laboratories, canteens, food courts, cafeteria and hostels across the campus to control the spread of wastes and contaminants from one place to another place and without harming the environmental health.
- The pest management strategies adopted (cockroach traps, rodents control measures, insect repellents and other control facilities) at NASC campus is very good. The laboratories, classrooms, hostels, canteens, foot courts and toilets / restrooms are very neat and clean with proper ventilation and exhaust system.
- Food handlers are equipped with suitable personal safety materials like disposable hand gloves, full cover aprons and caps to minimize contamination and fire hazards at hostel dining halls and canteens to minimize contamination and fire hazards.

- Maintenance of equipment and machinery items is very good and being carried out regularly as per the instructions of the manufacturer. They are neatly maintained without any dusts and covered with the appropriate covers.
- Pest control programmes for cockroach, house flies, mosquitos, rodents and etc. are effectively implemented and pest control activities (eggs, larvae, pupa, faeces, etc.) are carried out by trained and experienced personnel and no signs of pest activity or infestation in the Organization premises are noticed.

10. Recommendations for Personal and Environment hygiene

- The Quality Policy of the Organization regarding personal, environmental, food, water and occupational hygiene may be developed generously to provide good hygiene to the stakeholders.
- Hygiene audit team comprising of management representatives, faculties, staff members and social aware members may be formed to inspect the different places like laboratories, classrooms, seminar halls, auditorium, hostels, canteens, food courts and toilets / restrooms to check the cleanliness and maintenance.
- In order to conduct hygiene audits effectively in organizations, training of personnel is a prerequisite for which efforts may be taken by the Organization.
- Lot of awareness programmes on personal and environmental hygiene, pest management strategies adopted, sanitation methods, hygiene maintenance and instructions to be followed for the stakeholders may be conducted regularly through hygiene clubs, forums, cells and associations.
- All food handlers have basic food hygiene certificates by attending training programmes, seminars, conferences, workshops and skill up gradation events to update their knowledge as well as to know the latest techniques in food science and technology.

11. Conclusion

Nehru College of Arts & Science Campus is a well-established Technical Institute in TamilNadu state and it stands outstanding in India in terms of academic activities, efforts are continuously made in providing an eco-friendly hygiene atmosphere to the students, research scholars, parents and staff members. The laboratories, canteens, food courts, cafeteria, hostels and corridors across the campus are very neat campus which reflected low level of contamination source and rate of contaminants including microflora in the water and air. The air quality is very good in terms of least number of microflora such as bacteria, fungi and actinomycetes in the air. The water samples were analyzed for various quality parameters such as pH, Turbidity, Conductivity, Total hardness and *E. coli* population density which showed that all parameters were found to be within the permissible limits. The pH and total hardness value were measured from 6.8 to 8.2 and 80 and 320 mg/l. The water sample analysis report indicated that the waters supplied to the stakeholders are drinkable one and safe.

The washbasins and restrooms are equipped with the sanitizing materials such as soap, liquid detergent, tissue paper roll, hand gloves, hand towels, etc. and are made available to the stakeholders to improve their personal hygiene and sanitation. Monitoring of

efficient hand wash, urinals and latrine and bath room facilities in the campus are highly appreciated. Campus ecosystem is supported in making a sustainable environment to promote sanitation and cleanliness which enhance the teaching and learning. To conclude the hygiene audit report NASCCampus is an eco-friendly campus and providing pure atmosphere and personal safety to the stakeholders in terms of various hygienic measures such as regarding personal, environmental, food, water and occupational hygiene. In addition, a large number of awareness programmes on personal and environmental hygiene, pest management strategies adopted, sanitation methods, hygiene maintenance are being conducted to the stakeholders regularly through hygiene clubs, forums, cells and associations which supports to the nation as a whole in terms of providing hygienic environment.

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