EXTRACTS FROM THE MAIN BOOK

MASTERING PRACTICALS
COMMUNITY MEDICINE

SECOND EDITION

Poornima Tiwari • Shashank Tiwari

As per Competency-Based Medical Curriculum

Wolters Kluwer

Note from the Publishers

This booklet is designed by extracting pages from the book *Mastering Practicals: Community Medicine, 2nd edition,* for promotional purpose. This book is intended to help the students prepare for practical examinations with an extensive coverage of a wide variety of spots in question and answer format along with photographs of important specimens. The book has been thoroughly revamped and updated as per the new competency-based curriculum for Indian Medical Graduates introduced by the MCI.

This booklet is meant to provide you with an advance flavor of the main book. We sincerely hope you like the work and are encouraged to buy the main text. We would be delighted to hear your feedback. Please write to us at marketing@wolterskluwerindia.co.in

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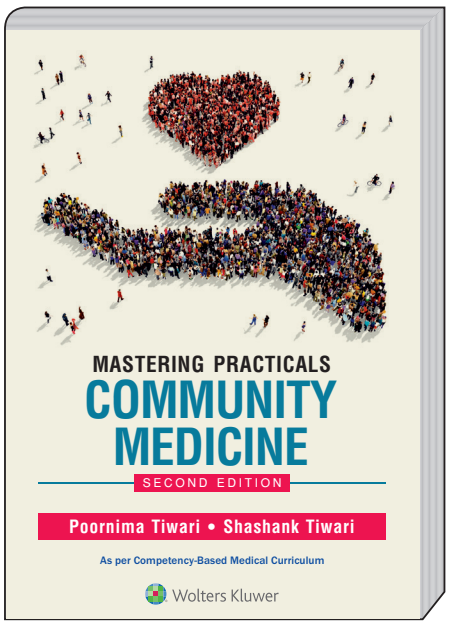

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Preface to the Second Edition

It gives us immense pleasure to come out with the second edition after the outstanding success of the first edition. Built on the foundation of the previous edition, it incorporates the exponential number of new developments that have happened in the field of Community Medicine.

This book is meant to serve as a course book covering the skill-based core competencies as outlined in the new curriculum of Community Medicine.

It includes the latest advances and guidelines issued for the field practice of the subject which are usually scattered across numerous different manuals and are otherwise difficult to find at one place. This edition presents not only the relevant recent advances in this field but also several new photographs for the benefit of the readers and to help them understand the text easily. This edition is brought in multicolor format so that the photographs can be well appreciated.

The topics covered in the previous edition have been retained, expanded, and refurbished. The section dealing with vaccines and immunization has been totally revamped keeping with the vast changes and introduction of additional vaccines in the National Immunization Program.

A new section on *Educational Visits* has been added. This includes information required to make the most out of the visits to water and sewage treatment plants.

We warmly welcome feedback, comments, and suggestions from faculties and students, and would gratefully acknowledge the same in subsequent editions.

Poornima Tiwari
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Detailed Table of Contents

- Complicated heart disease
- Chronic lung diseases (asthma or emphysema)
- Endometriosis
- Pelvic tuberculosis
- Fixed uterus due to previous surgery or infection
- Abdominal wall or umbilical hernia
- Postpartum or post abortion uterine rupture or perforation
- Hyperthyroidism
- AIDS[22]

Choice of Contraception

List the contraceptive choices available under the National program.

At present the public sector provides the following contraceptive methods at various levels of health system:

- IUCD 380 A and Cu IUCD 375
- Injectable contraceptive DMPA (Antara)
- Combined oral contraceptive (Mala-N)
- Centchromen (Chhaya)
- Emergency contraceptive pill (Ezy pill)
- Progesterone-only pill (POP)
- Condoms (Nirodh)
- Female sterilization
  - Laparoscopic
  - Minilap
- Male sterilization
  - No scalpel vasectomy
  - Conventional vasectomy

Above services are provided at various levels of public sector facilities as shown in Table 1.1.

Table 1.1 Contraceptive Choices Available Under the National Program

Family planning method	Service provider	Service location
Spacing methods		
IUCD 380 A, IUCD 375	Trained and certified ANMs, LHVs, SNs, and doctors	Sub centre and higher level
Oral contraceptive pills	Trained ASHAs, ANMs, LHVs, SNs, and doctors	Village level, sub centre, and higher level
Condoms	Trained ASHAs, ANMs, LHVs, SNs, and doctors	Village level, sub centre, and higher level
Emergency contraception		
Emergency contraceptive pills (ECPs)	Trained ASHAs, ANMs, LHVs, SNs, and doctors	Village level, sub centre, and higher level
Limiting methods		
Minilap	Trained and certified MBBS doctors and specialist doctors	PHC and higher level
Laparoscopic sterilization	Trained and certified MBBS doctors and specialist doctors	CHC and higher level
No scalpel vasectomy (NSV)	Trained and certified MBBS doctors and specialist doctors	PHC and higher level

Note: Contraceptives like OCPs, condoms are also provided through social marketing organizations.
Source: NHM, MoHFW, GOI website: http://www.nhm.gov.in/nrhm-components/rmnch-a/family-planning/background.html. Accessed 27th November 2017; Annual Report of Department of Health and Family Welfare 2017-18. New Delhi: MoHFW. Available at: https://mohfw.gov.in/basicpage/annual-report-department-health-and-family-welfare-2017-18.

MEAT

Comment on the proteins present in it.

- Protein content is 15–20 g per 100 g.
- Protein contains all the EAA.
- Protein has high biological value.

Comment on the iron content.

- Meat is rich in iron.
- The iron in meat is of heme variety which has high bioavailability.

Mention the disadvantages of consuming meat.

- Meat has a high content of fat which is mainly of saturated type.
- Meat is relatively expensive.[1,2]

FOOD QUALITY REGULATION IN INDIA

Which organization regulates food quality in India?

The "Food Safety and Standards Authority of India" (FSSAI) is responsible for protecting and promoting public health through the regulation and supervision of food safety. It is an autonomous body established under the Ministry of Health & Family Welfare, Government of India. The FSSAI has been established under the "Food Safety and Standards Act, 2006." FSSAI helps to regulate and it also supervises the functioning of the food businesses in India. It is mandatory for all the food business operators, distributors, retailers, and the storage houses to get an FSSAI license.

FSSAI is located in five regions:

1. Northern region with head office in New Delhi
2. Eastern region
3. North eastern region
4. Western region
5. Southern region

FSSAI has been mandated by the FSS Act, 2006 for performing the following functions:

- Lay down the standards and guidelines in relation to articles of food.
- Laying down mechanisms and guidelines for certification of food safety management for food businesses.
- Laying down procedure and guidelines for accreditation of laboratories and notification of the accredited laboratories.
- To provide scientific advice and technical support to central government and state governments in the matters of framing the policy and rules in areas which have a direct or indirect bearing on food safety and nutrition.
- Collect and collate data regarding food consumption, incidence and prevalence of biological risk, contaminants in food, residues of various contaminants in foods products, identification of emerging risks, and introduction of rapid alert system.
- Creating an information network across the country so that the public, consumers, panchayats, etc. receive rapid, reliable, and objective information about food safety and issues of concern.
- Provide training programs for persons who are involved or intend to get involved in food businesses.
- Contribute to the development of international technical standards for food, sanitary, and phytosanitary standards.
- Promote general awareness about food safety and food standards.

What is the Food Safety and Standards Act?

An Act to

- Consolidate the laws relating to food
- Establish the "Food Safety and Standards Authority of India"
  - To lay down science-based standards for articles of food
  - To regulate their manufacture, storage, distribution, sale, and import, to ensure availability of safe and wholesome food for human consumption.

Pre-exposure prophylaxis

- One dose (IM or ID) each on day 0, 7, and 21 (or 28)
- Booster doses of rabies vaccines are not required after a complete pre or postexposure prophylaxis with a CCV

Instead of routine boosters, antibody monitoring of personnel at risk is preferred, a booster is recommended only if the antibody titers fall to < 0.5 IU/mL.

Management of re-exposure in previously vaccinated individuals

Those who can document full pre- or postexposure prophylaxis (either by IM or ID route) with a cell-culture vaccine or PDEV:

- Two booster doses IM or CCVs ID (0.1 ml at 1 site) on days 0 and 3
- Proper wound toilet should be done
- Treatment with RIG (rabies immunoglobulin) is NOT required

Those who have previously received full postexposure treatment with nerve tissue vaccine or vaccine of doubtful potency or cannot document complete prophylaxis previously should be treated as fresh case and given treatment.

Who are the candidates for pre-exposure prophylaxis (PrEP)?

Pre-exposure vaccination may be offered to high-risk groups such as

- Laboratory staff handling the virus and infected material
- Clinicians and persons attending to human rabies cases
- Veterinarians
- Animal handlers and catchers
- Wildlife wardens
- Quarantine officers
- Travellers from rabies-free areas to rabies-endemic areas[1,31]

The Indian Academy of Pediatrics (IAP) has recommended pre-exposure prophylaxis of children. This may be considered on voluntary basis.[32] Pre-exposure vaccination is administered as one full intramuscular dose or 0.1 ml intradermally on days 0, 7, and either day 21 or 28.

Which types of vaccines are recommended for the intradermal schedules?

Only cell culture vaccines are recommended for the intradermal schedules.[1,31]

What needs to be done if an intradermal injection becomes subcutaneous?

If the vaccine is injected too deeply into the skin (subcutaneous), the classical bleb is not seen. Then the needle needs to be withdrawn and another ID dose should be given at an adjacent site.

Is it recommended to switch over from IM to ID route of administration or vice versa during PEP?

Shifting from one route to other, i.e., IM to ID or vice versa, during postexposure prophylaxis is not recommended as there is no sufficient scientific evidence on vaccine immunogenicity following changes in the route of vaccine administration during PEP.[31]

Table 4.2 Type of Vaccine, Dose, Route, Site of Administration and Side Effects of Vaccines under NIS

Name of vaccine	Type of vaccine	Diluent used	Recommended age under NIS	Dose, route, and site	Side effects	Storage
BCG	*Live*, attenuated bacterial	Normal saline	At birth	(0.05 ml until 1 month) 0.1 ml beyond the age of 1 month; intradermal; left arm just above deltoid insertion	Severe ulceration, lymphadenitis; rarely osteomyelitis, disseminated BCG infection	Long term: −15°C to −20°C 2°C to 8°C for a few weeks at the place of use During session: In the well of ice pack
Hepatitis B	*Killed*; recombinant type	None	At birth (birth dose)	0.5 ml; intramuscular; anterolateral side of mid-thigh—left	Pain, swelling, redness at injection site Anaphylaxis	2–8°C Do not freeze
bOPV	*Live*, attenuated virus	None	• At birth—OPV0 • At 6, 10, and 14 weeks for primary immunization • Booster at 16–24 months	2 drops; oral	Mild diarrhea Rarely vaccine-induced paralytic polio (VAPP) in recipient (1/million vaccines) or contact (1 in 5 million vaccines)	For long-term storage: −15°C to −20°C At health center: 2–8°C During immunization session—on the surface of ice pack
Pentavalent vaccine	*Killed*; Diphtheria toxoid Tetanus toxoid B. pertussis (whole cell) HBsAg (rDNA) Purified capsular Hib Polysaccharide (PRP)	None	6th, 10th, and 14 weeks of age	0.5 ml; intramuscular; anterolateral aspect of mid-thigh—left	Pain, swelling, redness at injection site Severe: Persistent (>3 hours) inconsolable screaming Seizures Hypotonic, hyporesponsive episode (HHE) Anaphylaxis encephalopathy	2–8°C Do not freeze During session: Outside ice pack; on the table

(*Continued*)

(*Continued*)

Name of vaccine	Type of vaccine	Diluent used	Recommended age under NIS	Dose, route, and site	Side effects	Storage
IPV (inactivated polio vaccine) NO	Killed	None	Fractional doses at ages 6 weeks and 14 weeks	0.1 ml; intradermal; deltoid area—right side	Local reaction Fever	2–8°C Do not freeze During session: Outside ice pack; on the table
Rotavirus vaccine	*Live*, attenuated	None	At 6 weeks, 10 weeks, and 14 weeks	5 drops; oral	Mild: Vomiting, diarrhea, cough, runny nose, fever, Irritability and rash Severe: Intussusception	2–8°C During session: On the ice pack
Measles/MR	*Live*, attenuated	Distilled water supplied with the vaccine	First dose: At 9 completed months to 12 months Second dose: At 16–24 months	Subcutaneous; upper arm—right	Mild fever, rash, conjunctivitis Severe: Febrile seizures, thrombocytopenia, Anaphylaxis, encephalopathy	2–8°C During session: Inside the well of the ice pack
Japanese encephalitis (in endemic districts)	*Live*, attenuated vaccine	Manufacturer supplied Diluent (phosphate buffer solution)	First dose: At 9 months to 12 months Second dose: At 16–24 months of age	0.5 mL; S/C; left upper arm	Local reaction Transient fever, rash and irritability	+2°C to +8°C During session: On the surface of the ice pack
DPT	*Killed*; diphtheria and tetanus are toxoids and pertussis is killed bacteria	None	Two boosters at: 16–24 months and 5–6 years age	0.5 mL; deep I/M; first booster: anterolateral aspect of thigh, second booster: upper arm—left	Fever ≥ 39°C Swelling and induration or pain Neurological side effects (encephalitis/encephalopathy, convulsions, infantile spasm, and Reye's syndrome) are primarily due to pertussis. Incidence is only 1 in 1,70,000 doses	+2°C to +8°C Do not freeze During session: On the table; outside the icepack
TT	*Killed*; toxoid	None	First dose early in pregnancy and second dose after 4 weeks Children: 10 and 16 years of age	0.5 mL; deep I/M; upper arm—right	Local pain and induration Severe: Brachial neuritis, anaphylaxis	+2°C to +8°C Do not freeze During session: On the table; outside the icepack

CHAPTER 6

Entomology

MOSQUITOES

The important genera of mosquitoes that are frequently asked in practical examinations are *Anopheles, Aedes,* and *Culex.*

The stages of a mosquito's life cycle, which are put as exhibits for identification, are as follows:

- Eggs
- Larva
- Pupa
- Adult mosquito

The larva, pupa, and egg are all displayed on a slide under a microscope. An adult mosquito may be displayed as such, or as a mounted slide under microscope.

Sometimes, only the mouth parts of the mosquito are kept for identification. When the mouth parts are put as spots, they are displayed under a microscope. Based on his/her observation, an undergraduate MBBS student is expected only to differentiate between tribe Anophelini (represented by *Anopheles*) and tribe Culicini, the prototype for which most frequently is *Culex*.

Broad division of mosquitoes

There are two main "tribes" of mosquitoes:

1. *Tribe Anophelini:* It has only one genus, i.e., *Anopheles.*
2. *Tribe Culicini:* It has many genera. The important ones present in India are *Culex, Aedes,* and *Mansonia.* Out of these three, the ones which are put up for spotting most commonly are *Culex* and *Aedes.*[1]

Steps for identification of an adult mosquito

If an adult mosquito is kept for identification, it is most likely to be one of the three—*Anopheles, Culex*, and *Aedes*.

1. First, look at the wings. Look at the anterior border of the wings. If you see spots at the anterior margin of the wings (Fig. 6.1), the mosquito is an *"Anopheles"*
2. If no spots are seen on the wings (Fig. 6.2), then look at the body of the insect. If there are white stripes on a dark body including the legs (Fig. 6.3), the mosquito is an *"Aedes"*
3. If none of the above features are seen, the displayed mosquito is a *"Culex"*

How to identify a male or female of any genus?

Look at the mouth parts of the mosquito. These consist of one proboscis for sucking blood or vegetation juice. There is a pair of antennae and a pair of palpi *(singular: palpus).*

The males of all the above three genera have bushy antennae which resemble moustache (Fig. 6.4) whereas the females have relatively lesser hair on antennae (Fig. 6.5).[2]

Indian homes, this is not a very acceptable thing. Hence, this is more appropriate for dietary assessment of institutions, hostels, etc.
- 24-hour recall method (questionnaire method) is explained in detail later
- *Food frequency questionnaire method*: This is for assessing how frequently an item is consumed during a fixed time period, e.g., in a week. It is more suitable for studying the diet patterns and dietary habits of a population
- *Food balance sheet method*: This method is suitable when information regarding the availability and consumption of food is required at a macro level like at the global, national, region, or state levels
- Duplicate sample method

24-Hour Recall (Questionnaire) Method

It is one of the easiest and most popular methods for conducting a dietary survey.[8–10] Studies have revealed that if properly conducted, the 24-hour recall method reveals reliable information regarding the food intake amount and quality.[11,12]

The interviewer asks the homemaker to recall all the foods consumed by the family in the past 24 hours. Assuming that the interview is done during late morning hours, e.g., 11 a.m. to 12 p.m., the individual is asked to think back in time and recall what was cooked and consumed for the breakfast on the day of the interview, for the dinner last night, and the lunch on the previous day. In short, it meant enquiring about all the food consumed after the previous morning's breakfast.

It is suggested that the recall should begin from the most recent meal and proceed backward in time.

In the first step, the individual is asked to recall the items consumed during the last 24 hours.

After this, the amount that was consumed is probed. This has to take into account the leftover portion which is to be deducted from the total amount cooked.

In the third step, the amount of each raw ingredient that went into cooking of the items is asked. Food models and household measuring instruments can be used to guess the portion sizes more accurately. Also, she/he can be asked to demonstrate the spoon and cups which were used to measure the particular ingredient. The interviewer can assess the volume by filling it with water and pouring the same in a measuring cup. It is a good idea to carry measuring spoons set and other measuring instruments such as measuring cups and cylinders.

Also examine the packages of the prepackaged food items consumed. Read the nutritional information per unit provided on these and note down the amount actually consumed out of these packets.

Some measures are suggested to obtain complete and truthful information:
- Explain to the homemaker that you need to know only what was actually eaten.
- Do not express either approval or disapproval of any food item that is mentioned, either by way of words or by facial expressions. Do not appear to be judgmental about any dietary item being "good" or "bad." No one can eat only the approved foods all the time.
- Do not ask leading questions that may suggest the homemaker that the family "should" have consumed a certain item and lead her/him to say, "Yes, we did."[13]

Some items such as *chapattis* and bread slices can be listed in terms of the number consumed.

The homemaker can also be requested to display the amount of flour that she would usually use for making 10 typical *chapattis.* One can guess the raw flour weight used for one *chapatti.* The number of calories in each *chapatti* consumed in the family can then be calculated on the basis of this amount. For bread slices, the amount and ingredients can be read off the label.

The amount of rice, wheat flour, pulses, vegetables, etc., is entered in a table.

Table 13.1 Modified Kuppuswamy Scale for Urban Area (1976)

Education of head of family	Score	Occupation of head of family	Score	Total family income per month (as given originally in 1976)	Score
Professional degree	7	Professional	10	₹2000 and above	12
Graduate	6	Semiprofession	6	₹1000–1999	10
Intermediate/diploma	5	Clerical/shop/farm	5	₹750–999	6
High school	4	Skilled worker	4	₹500–749	4
Middle school	3	Semiskilled worker	3	₹300–499	3
Primary school	2	Unskilled worker	2	₹101–299	2
Illiterate	1	Unemployed	1	Less than ₹100	1

Table 13.2 Socioeconomic Class Corresponding to the Total Score in Kuppuswamy's SES

Total score	Socioeconomic class
26–29	Upper class
16–25	Upper middle
11–15	Lower middle
5–10	Upper lower
Below 5	Lower

Income of The Whole Family

Since the time Kuppuswamy scale has been modified to determine the SES of the family rather than an individual, confusion has prevailed whether the income categories are meant to represent the total family income or per capita income. The general consensus is that the original modification might have been for the whole family income, even against the argument that this does not consider the family size and may misclassify large families.[7] We suggest that the student may calculate the socioeconomic class of the family by applying both, i.e. once by using "total family income" and next by using "per capita family income." The resulting categories can be compared and any difference may be commented upon while presenting the family to the examiner.

Per Capita Family Income

The income from all the sources should be added up. This is divided by the total number of members of the family, regardless of the age of the individual. For example, even a baby born on the same day is to be counted.[5]

The income groups are revised from time to time according to the prevailing All India Consumer Price Index (AICPI). The student should check for the latest cut offs. The last revision before this article has been done using price index of January 2019 (Table 13.3).

A formula has been developed for future regular updating of the income limits, which uses the latest Consumer Price Index for

Table 13.3 Recalculated Family Income Groups as in January 2019[8,9]

Original income group	Revised by using AICPI	Score
₹2000 and above	₹47348 and above	12
₹1000–1999	₹23674–47347	10
₹750–999	₹17756–23673	6
₹500–749	₹11837–17755	4
₹300–499	₹7102–11836	3
₹101–299	₹2391–7101	2
Less than ₹100	Less than ₹2390	1

APPENDIX

This section includes any additional information that is considered important but if included in the main body of the report can divert attention from the main methodology. For example, details of the scale used, questionnaires, etc.

Some Tips for Presentation of the Undergraduate Project Report

- All the members of the group should be given a chance to present some part of the project.
- All the members should be aware of all the steps of the project work, even though each member may have been responsible for one step.
- Do not write everything on the slide and then simply read out. Write in point form, not complete sentences. That way the audience will focus on what you are saying rather than what is written on the slide.
- Present only four to five lines per slide. Avoid using too many words. Use key words and key phrases only and not complete sentences.
- Use at least an 18-point font. Using a smaller font will make it difficult for the audience to read.
- The color of the font should be in sharp contrast with the background. For example, deep blue font on white background. If the color contrast is not sharp, the viewers may find it difficult to read.
- Do not use distracting animation, images, or clip art.
- Use different size fonts for main points and secondary points.
- Use a standard font such as Times New Roman or Arial. Do not use complicated fonts.
- Do not use only capital letters for the title or the text. It makes reading difficult.
- Do not use colorful decoration or distracting backgrounds. It distracts the audience and can be annoying.

References

1. Indrayanan A. Choice of Title. Tips for Thesis Writing and Preparing Research Papers. Available at: www.medicalbiostatistics.com/MainBodyOfReport.pdf. Accessed October 19, 2011.
2. Indrayanan A. Describing Methods; Tips for Thesis Writing and Preparing Research Papers. Available at: www.medicalbiostatistics.com/InitialPartsOfManuscript.pdf. Accessed October 19, 2011.
3. Randolph J. A guide to writing the dissertation literature review. Pract Assess Res Eval 2009;14(13).
4. International Committee of Medical Journal Editors [homepage on the Internet]. Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication. Available at: http://www.ICMJE.org. Accessed October 19, 2011.

CHAPTER 21

Tests of Significance

Tests of significance let us know if the observed difference between any two groups is significant or not.

By applying the tests of significance, we calculate the probability (*p* value) of the null hypothesis being correct. If this probability is too low ($p < 0.05$), the null hypothesis is rejected and the difference between the groups is considered to be significant and not by chance alone.

Null hypothesis assumes that the difference between the two groups is purely due to chance alone and is not significant.

Commonly applied tests of significance* are as follows:

- For qualitative data
  - Standard error of difference between two proportions ($SE_{P_1 - P_2}$)
  - Chi-square test (χ^2 test)
- For quantitative data
  - Unpaired *"t"* test (*t* test)—Used for small samples (<30 subjects in one or both groups).
  - *"Z"* test—Used for large samples (>30 each).
  - Paired *"t"* test—If we have both sets of values (of the attribute) from one sample only, e.g., mean heart rate before and after treatment, these are known as "paired values."

TESTS FOR QUALITATIVE DATA

Standard Error of Difference Between Two Proportions

Here the value of "*Z*" is calculated using the standard error of difference between two proportions. It is used for comparing

- Qualitative data
- Only two groups
- Large samples (≥30)

The results of the observations are in terms of proportions, e.g., 10% in one group and 16% in the other.

Steps

Step 1: Calculate P_1 and P_2.

(P_1 is the proportion in one of the groups)

(P_2 is the proportion in the second group)

Step 2: Calculate Q_1 and Q_2.

$Q_1 = 100 - P_1$

$Q_2 = 100 - P_2$

Step 3: Calculate the standard error of difference between proportions or $SE_{P_1 - P_2}$.

$$SE_{P_1 - P_2} = \sqrt{\frac{P_1 Q_1}{n_1} + \frac{P_2 Q_2}{n_2}}$$

*For detailed reading of qualitative and quantitative data, the tests of significance and their application, students can refer to the book *"Epidemiology made Easy," New Delhi: Jaypee Publishers; 2009.*

Activated Sludge Process

The effluent from the primary sedimentation tank is oxidized by mixing it with air in an "aeration tank" (Fig. 22.4b). The aeration is done by a continuous stream of compressed air from the bottom of the tank. The aeration may alternatively be accomplished by mechanical agitation of the sewage. Hence the contents remain suspended due to continuous mixing while the aerobic bacteria oxidize the organic matter.

This method of aerobic oxidation requires more skilled operation as compared to the "trickling filter method."

The oxidized sewage is led into the secondary sedimentation tanks, also known as "humus tanks."

Secondary Sedimentation Tank

In secondary sedimentation tank, the oxidized sewage from trickling filter/aeration tank is detained for 2–3 hours. Sedimentation of semisolids occurs and forms sludge. The sludge formed in secondary sedimentation tank is called as "aerated sludge." This can be dried into valued manure (Fig. 22.5).

The aerated sludge is fed into "sludge digestion tanks" (Fig. 22.6) where it is incubated at the appropriate temperature and pH. This converts into water, carbon dioxide, methane, and ammonia. This procedure takes 3–4 weeks.

The residue is much reduced in volume and non-offensive in smell. It dries easily and serves as an excellent source of manure.

The methane gas which is produced during sludge digestion can be used as a source of energy for various purposes, e.g. lighting and heating.[1–3]

Figure 22.5 Secondary sedimentation tank.

Figure 22.6 Sludge digestion tanks.

References

1. Park K. Environment and health. In: Park K. Park's Textbook of Preventive and Social Medicine, 24th edn. Jabalpur, Madhya Pradesh: Banarsidas Bhanot Publishers, 2017; pp. 799–802.
2. Khopkar, S.M. Environmental Pollution Monitoring and Control. New Delhi: New Age International, 2004; p. 299.
3. Bhargava A. Activated sludge treatment process—concept and system design. Int J Eng Dev Res 2016;4(2):890–96.

Figure 23.5 Rapid sand filter bed.

Chlorination

The last step of treatment is chlorination. Basic function of this is to kill bacteria and viruses and oxidize iron, manganese, and hydrogen sulphide. Chlorine also destroys some taste and odor-producing organisms.[1] A chlorination tank is shown in Figure 23.6.

Figure 23.6 Chlorination tank.

Reference

1. Park K. Environment and Health. In: Park K. Park's Textbook of Preventive and Social Medicine, 24th ed. Jabalpur, Madhya Pradesh: Banarsidas Bhanot Publishers, 2017; pp. 748–752.

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