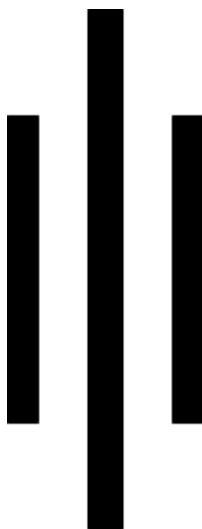


NATIONAL ACADEMY OF SCIENCE AND TECHNOLOGY



A Project Report On
7 Purification Techniques of Water



Submitted To:
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ACKNOWLEDGEMENT

Any achievement, be it scholastic or otherwise does not depend solely on the individual efforts but on the guidance, encouragement and cooperation of intellectuals, elders and friends. We would like to take this opportunity to thank them all.

First of all, we would like to thank the NAST for providing us with all the necessary requirements for our project.

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DECLARATION

We Aashish Chand, Amrit Pant, Ashish Rai, Dikshyant Bam students of Computer Science of Science group of NAST affiliated to NEB, hereby declare that the work undertaken in this Educational tour entitled “**7 Purification Techniques of Water**” is the outcome of our own effort and is correct to the best of our knowledge. This work has been accomplished by obeying the social ethics; and it contains neither materials published earlier or written by another person/people nor materials which has been accepted for the award of any other degree of the school or other institution, except where due acknowledgement has been made in the document.

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(<<Aashish Chand>>)

Date:

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(<<Amrit Pant>>)

Date:

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(<<Ashish Rai>>)

Date:

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(<<Dikshyant Bam>>)

Date:

CERTIFICATE

This is to certify that the report entitled “**7 Purification Techniques of Water**” is a report of the work carried out by our group under the guidance and supervision of Mr.DB Khadka for the partial fulfillment of secondary school grade XI certificate level degree of Computer Science by National Examination Board.

To the best of our knowledge and belief, this work embodies the work of candidates themselves, has duly been completed, fulfills the requirement of the ordinance relating to the Grade XI degree of the school and is up to the standard in respect of content, presentation and language for being referred to the examiner.

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Introduction

Water purification is the process of removing impurities, contaminants, and other unwanted substances from water to make it safe for drinking, cooking, and other purposes. The purification process can involve several steps, depending on the quality of the source water and the desired level of purity.

The first step in water purification is usually screening or pre-treatment, which involves removing large particles and debris such as sticks, leaves, and rocks from the water. This is typically done using screens or settling tanks.

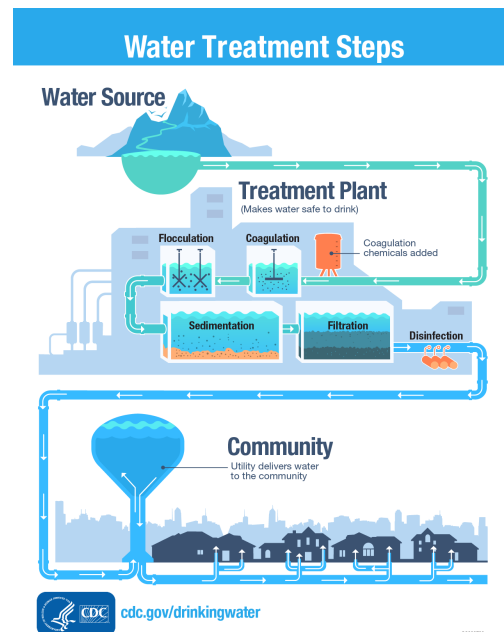
The second step is typically coagulation and flocculation, which involves adding chemicals that cause small particles and impurities to clump together and form larger particles, making them easier to remove. This step is followed by sedimentation or settling, in which the larger particles settle to the bottom of the tank.

After sedimentation, the water is filtered through a series of filters, which can be made of sand, gravel, activated carbon, or other materials. These filters remove smaller particles and impurities that were not removed in the previous steps.

Next, the water is disinfected to kill any remaining bacteria, viruses, and other microorganisms. This is typically done using chemicals such as chlorine, ozone, or ultraviolet light.

Finally, the water may be treated with additional chemicals to adjust its pH or mineral content, depending on the specific needs of the community or region.

Overall, the purification of water is a complex process that requires careful monitoring and maintenance to ensure that the water is safe for consumption.



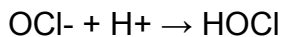
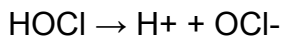
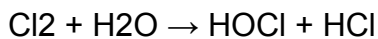
1st Method of Purification of water

Boiling

Boiling is a simple and effective method of purifying water that involves heating it to a temperature that kills bacteria, viruses, and other microorganisms. The process works by denaturing the proteins and enzymes in the microorganisms, causing them to die. The chemical reaction involved is the denaturation of proteins, which is a process that involves breaking the bonds that hold the protein together.

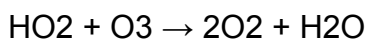
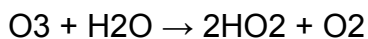
Chlorination

Chlorination is a method of disinfecting water that involves adding chlorine gas or a chlorine compound to the water. Chlorine reacts with water to form hypochlorous acid (HOCl) and hydrochloric acid (HCl), which then react with bacteria and other microorganisms in the water to kill them. The overall chemical reaction involved is:



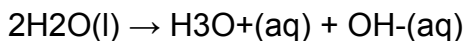
Ozonation

Ozonation is a method of disinfecting water that involves adding ozone gas to the water. Ozone is a powerful oxidizing agent that reacts with bacteria and other microorganisms in the water, breaking down their cell walls and killing them. The overall chemical reaction involved is:



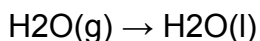
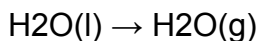
Reverse osmosis

Reverse osmosis is a method of purifying water that involves forcing it through a semipermeable membrane under high pressure. The membrane allows water molecules to pass through, while blocking larger molecules such as salts and other impurities. The overall chemical reaction involved is:



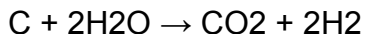
Distillation

Distillation is a method of purifying water that involves boiling it and then condensing the steam back into liquid form. The process separates the water from any dissolved impurities that have a higher boiling point than water. The overall chemical reaction involved is:



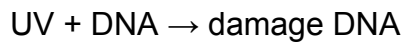
Activated carbon filtration

Activated carbon filtration is a method of purifying water that involves passing it through a bed of activated carbon. The carbon removes impurities from the water by adsorption, which is a process in which molecules are attracted to the surface of the carbon and stick to it. The overall chemical reaction involved is:



UV radiation

UV radiation is a method of disinfecting water that involves exposing it to ultraviolet light. The light damages the DNA of bacteria and other microorganisms in the water, making them unable to reproduce and causing them to die. The overall chemical reaction involved is:



Overall, these seven methods of water purification are effective in removing different types of impurities and making water safe for drinking and other uses.

Conclusion

In conclusion, water purification is a critical process that involves removing impurities and contaminants from water to make it safe for consumption and other uses. The purification process may involve several steps, including screening, coagulation and flocculation, sedimentation, filtration, disinfection, and treatment with chemicals to adjust the pH or mineral content of the water. Each of these methods has its advantages and limitations, and the choice of method depends on the quality of the source water and the desired level of purity. Overall, water purification is a complex and ongoing process that requires careful monitoring and maintenance to ensure that the water is safe for consumption and other uses.

References

"Water Treatment Principles and Design" by MWH Global, 2012

"Water and Wastewater Treatment: A Guide for the Nonengineering Professional" by Joanne E. Drinan, 2005

"Principles of Water Treatment" by Malcolm Pirnie, Inc., 2005

"Handbook of Water and Wastewater Treatment Technologies" by Nicholas P. Cheremisinoff and Paul N. Cheremisinoff, 2002