WATER QUALITY IMPROVEMENTS USING DIFFERENTFILTERMETHODS

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ABSTRACT:
Groundwater typically becomes polluted when rainfall soaks into the ground and comes in contact with buried waste or other sources of contamination, picks up chemicals and carries them into groundwater. Sometimes the volume of a spill or leak is large enough that the chemical itself can reach ground water without help of infiltrating water. Arsenic occurs in many minerals usually in the combination with Sulphur and metals. Zinc is chemically similar to magnesium. According to these two chemicals lead and cadmium plays a major role in ground water due to this groundwater is polluted. Humans affected with several health disorders like reduce in blood cell production and brain damage. In this circumstance by using natural methods, we can clean the groundwater at sub ground level with natural products like corn, coal powder, neem bark, wood activated carbon, alum, rice husk and gravel. By this method we can purify groundwater and control the entering of chemicals into the food chain thus we can control the food borne diseases.

Keywords: Groundwater, contamination, Arsenic, infiltrating, zinc, coal.

1. INTRODUCTION:

Water purification is the process of removing undesirable chemicals, biologicalcontaminants,suspendedsolids,andgases fromwater.Thegoalistoproducewaterfitforspecificpurposes. Most wateris purified anddisinfected for humanconsumption.Water purification may also be carried out for a variety of other purposes, includingmedical,pharmacological,chemical,andindustrialapplications.Themethodsusedinclude physicalprocessessuchasfiltration,sedimentation,anddistillation.Thebiological processes such as slow sand filters or biologically active carbon. The chemicalprocesses such as flocculation and chlorination and the use of electromagnetic radiationsuch as ultraviolet lights. Water purification may reduce the concentration of particulatematter including suspended particles, parasites, bacteria, algae, viruses, and fungi as wellasreducetheconcentrationofarrangeof dissolved and particulate matter.

The standards for drinking water quality are typically set by governments or byinternationalstandards.Thesestandardsusually includeminimumandmaximumconcentrationsof contaminants,depending ontheintendeduseofthewater.Visualinspection cannot determine if water is of appropriate quality. Simple procedures such asboiling or the use of a household activated carbon filter are not sufficient for treating allpossiblecontaminants that may bepresent in water from an unknownsource.

Even natural spring water considered safe for all practical purposes in the 19thcentury must now be tested before determining what kind of treatment, if any, is needed.Chemical and microbiological analysis, while expensive, are the only way to purify thewater.

INDUSTRIALWATERPURIFICATION
SALINEWATERPURIFICATION
MUNICIPALWATERCONSUMPTION
WASTEWATERCONSUMPTION

OBJECTIVESOFTHISPROJECT:

The scope of this project is to study the existing water filtration methods and usethe knowledge to design a low cost water filtration technique. This water filtration systemwill focus on cutting down the cost while maintaining Filter effectiveness. By providingaffordable water filters for rural and remote areas will greatly improve people's quality oflivingand reducetherisk ofwaterbornediseases**.**

In this project study an appropriate house hold filters is designed.Theinitial quality ofwateris basedon naturalmethod process**.**

1) Flyash
2) Activatedcarbon
3) Alum
4) Sand
5) Gravel
6) Charcoal
7) Neembark
8) Wastesamplecollectedfromsaroornagartankbund.

MATERIALS

Fly ash:

Flyash,alsoknown as"pulverizedfuel ash" intheUnitedKingdom, isoneof coalcombustion,composed ofthefineparticlesthataredrivenoutof theboilerwith thefluegases.

Ash that falls in the bottom of the boiler is called bottom ash. In modern coal-fired power plants, fly ash is generally captured by electrostatic precipizz other particlefiltrationequipment beforethe flue gasesreachesthechimneys.

Together with bottom ash removed from the bottom of the boiler, it is known ascoalash.Dependinguponthesourceandmakeup ofthecoalbeingburned,thecomponents of fly ash vary considerably, but all fly ash includes substantial amounts ofsilicon dioxide (SiO2) (both amorphous and crystalline), aluminium oxide (Al2O3) andcalciumoxide(CaO), themainmineral compounds incoal-bearingrock state.

TYPESOFGRAVELS

Bank gravel: Naturally deposited gravel intermixed with sand or clay found in andnextto rivers andstreams. Alsoknown as"bank run "or"river run".

Bench gravel: A bed of gravel located on the side of a valley above the present streambottom,indicating theformerlocationofthestreambedwhenitwasatahigher level.

Creek rock or river rock: This is generally rounded, semi-polished stones, potentially ofa wide range of types that are dredged or scooped from stream beds. It is also often usedasconcrete aggregate and less often as apaving surface.

Crushed stone: Rock crushed and graded by screens and then mixed to a blend of stonesand fines. It is widely used as a surfacing for roads and driveways, sometimes with tarapplied over it. Crushed Stone may be Made from granite, limestone, dolomite, and otherrocks.Also Known as"Crusher run".

Finegravel: Gravel consistingofparticleswithadiameterof 2to 8mm.

Stonedust:Fine,crushed,gravelfromthe finalstageofscreenseparation,suchthatthegravel is not separated out from fine dust particles.

Lag gravel: A surface accumulation of coarse gravel produced by the removal offinerparticles.

Pay gravel: Also known as "paydirt" a nick name for gravel with a high concentration ofgoldand otherprecious metals. The metalsarerecovered throughgold panning.

Pea gravel: Also known as "pea shingle" is gravel that consists of small, rounded stonesused in concrete surfaces. Also used for walkways, driveways and as a substrate in homeaquariums.

Piedmont gravel: A coarse gravel carried down from high places by mountain streamsanddeposited on relatively flatground, wherethewaterrunsmoreslowly.

Plateau gravel: A layer of gravel on a plateau or other region above the height atwhichstream-terrace gravel is usually found.

METHODOLOGY

PLANOFWORK:

Plan of my workis identifying the good irrigated

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landandcheckthat land issuitable for ground water cleaning by some methods. If that land is a black soil land it isnotcompletelygoodforthegroundwatercleaning process,andifthatlandisasandsoilit is also, not good for the groundwater cleaning process because these two types of landsare not having the good capacity tohold the water. A suitable irrigated land, 10 cementrings, sand, small gravels, cast iron turnings, wood activatedcarbon, alum oxidationzone, neem bark, rice husk, ash are required. The first step is to select the land and dig thewell with 10 feet's depth. In the second step arrange the cement rings one by one withoutgaps. In the first layer spread the sand and gravel, along with the alum. In the next layerspread the sand, charcoal and wood activated carbon. In the third layer add the neem barkandricehuskalongwiththesandinthenextlevel treatthewaterinoxidationzone.Inthe fourth step give connections to another emptywell. In the fifth step collect thegroundwater by bore well and give connection to the newly form well which is filled withsandmainlybyfiltration,sedimentation,precipitation,oxidation-reduction,sorption-desorption,ion-exchangeand biodegradation.

Sample (purified water)	pH	Turbidity (NTU)	Arsenic (µg/l)	Zinc (µg/l)	Lead (µg/l)	Cadmium (µg/l)
Tap Water	6	4	7	5	9	5
Ground Water	7	4	5	1	13	8
SurfaceWater	6	3	5	1	6	4

Sample(un Purified water)	pH	Turbidity (NTU)	Arsenic (µg/l)	Zinc (µg/l)	Lead (µg/l)	Cadmium (µg/l)
Tap Water	9	10	12	15	11	19
Ground Water	10	13	13	12	19	12
Surface Water	9	11	11	16	16	8

WATERPOLLUTION:

Polluted ground water is less visible, but more difficult to cleanup, than pollutioninriversandlakes.Groundwaterpollution mostoftenresultsfromimproperdisposal wastes on land. Major sources include Indus trial and household chemicals and garbagelandfills, industrial waste lagoons, tailings and process wastewater from mines. oil fieldbrine pits, leaking underground oil storage tanks and pipelines, sewage sludge and septicsystems. Polluted ground water is mapped by sampling soils and ground water nearsuspected or known sources of pollution, to determine the extent of the pollution, and toaid in the design of groundwater remediation systems. Preventing groundwater pollutionnear potentialsourcessuchaslandfillsrequireslining the bottom of a landfillwithwatertight materials. collecting any leachate with drains, and keeping rainwater off anypotential contaminants, along with regular monitoring of nearby groundwater to verifythat contaminants have not leaked into the groundwater. Groundwater pollution, frompollutants released to the ground that can work their way down into groundwater, cancreateacontaminantplumewithinanaquifer.Pollutioncanoccurfromlandfills,naturally occurring arsenic, on-site sanitation systems or other point sources, such aspetrol stations with leaking underground storage tanks, or leaking sewers. Movement ofwater and dispersion with in the aquifer spreads the pollutant over a wider area, itsadvancingboundaryoftencalledaplumeedge.Which

canthenintersectwithgroundwater wells or daylight into surface water such as seeps and springs, making thewater supplies unsafe for humans.

Unpurified water

Purified water

CONCLUSION:

Thegroundwateris cleanedbynaturalmethods. Theheavymetalsintheunpurified

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wateraredecreased afterthis process.
Foodbornediseasescanbereduced.
FlyAsheffectiveinmaintainingtheAcidity,Alkalinity,andremovestheTurbidity, and fluoride.
Hence Fly Ashis thegoodAdsorbent.
The filtration capacity of the filter can be improved by adding 0.0001µ filterpaper.
It can also be concluded that the filter designed is effective in removing manywater quality parameters without consuming any power and wasting water unlike inreverseosmosis technologies.
In these natural projective all are concluding that Musi of SAROORNAGRwaste sample of pH is 7.

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