

A Review on Hydrogen Peroxide (H₂O₂) Based Treatment for Water

Aditya Dhananjay Rahate¹, Priyanka Bhongade², Shweta Meshram³
(Civil Department, Smt. Radhikatai Pandav Collage Of Engineering, Nagpur)
(Civil Department, Smt. Radhikatai Pandav Collage Of Engineering, Nagpur)
(Civil Department, Smt. Radhikatai Pandav Collage Of Engineering, Nagpur)

Abstract:

Hydrogen peroxide (H₂O₂) is a strong powerful oxidiser that exist into an environmental compatible product (water and oxygen), Formation of H₂O₂ is taken in under the action of sunlight on natural surface waters along with the presence of natural organic constituents (cooper & zika). This mechanism is effectively used within the environment to water purification, H₂O₂ can be used for water treatment with or without combination with UV light, a catalyst and/or other oxidants, the hydrogen peroxide-based processes are capable or versatile and organics can be treat, along with microbial contamination and some inorganic compounds can be treated by using H₂O₂. this treatment can be used both for municipal(drinking) water purification (e.g. to extraction of bacteria, micro-pollutants, odour, etc.), and for municipal or industrial wastewater treatment.

I. INTRODUCTION

Hydrogen peroxide (formula= H₂O₂) liquid is a very pale blue in colour, in a dilute solution it appears colourless, water is less viscous than H₂O₂. It is weak as an acid. It has properties of strong oxidizing power and is therefore a powerful bleaching agent, but has also found that it can use as a disinfectant and also as an oxidizer.

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II. APPLICABILITY IN FIELD OF CIVIL ENGINEERING

H₂O₂ is having the property of strong oxidant power that's makes it able to destroying of a various of pollutants for example bacteria, some metals and toxic organic compounds. Applications

in drinking water production: taste control, odour control, metal extraction, hydrogen sulphide extraction, ozone enhancement and disinfection. H₂O₂ is used in municipal water treatment, it can also use in the process of Disinfection wastewater treatment plants. In combination with UV light and catalysts or other oxidant along with the H₂O₂ is used and this combination is very effective, the resulting treatment is more efficient in destruction of organics present in high strength wastewaters. H₂O₂ is used without any additive, the cost of operation is limited to input of H₂O₂. While using of "catalysed" H₂O₂ treatments, the more complex design is creating and additional power along with or without input of chemicals is required.

III. PROCESS OF HYDROGEN PEROXIDE

Hydrogen peroxide is having an active part known as the peroxide group, this is an oxidant similarly to chlorine and ozone. H₂O₂ dissolved in water, then its naturally split-up into water and oxygen. This process of decomposition creates or produced the reactive oxygen species (ROS), which is able to oxidise certain metal ions and organics and can also

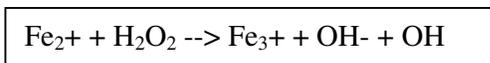
pathogens is killed. Optimisation of conditions using H₂O₂ to destroy pollutants involve control of pH, reaction time and temperature. No additives are required additionally.

IV. HYDROGEN PEROXIDE WITH “CATALYSED”

In combination with UV light and catalysts protheroxidant along with the H₂O₂ is used and this combination is very effective. During production of an oxidising agent (ROS) called hydroxyl radical (OH), along with H₂O₂ the UV light is allowed (refer below equation). One of the strongest oxidants known is OH, alone hydrogen peroxide is not more efficacious than OH, hence OH kills microorganisms very effectively and degrading organics in water.



In other way, in generating of hydroxyl radical from H₂O₂, the catalyst is used. The iron ions are in use as a catalyst and then referred to as Fenton process (emitting of sun light).



Above reaction is improving or enhanced by using solar light (Photo-Fenton). If the both hydrogen peroxide and ozone (peroxone) is combined added to wastewater, then its speed up the decomposition of ozone and improve the production of hydroxyl radical.

V. COST

Costs depend on the requirement according to application needs, etc. (e.g. H₂O₂ strength and grade, packaging and delivery volumes, volume per year, and location/proximity to production plant, etc.). The price is approximately a few moneys/rupees per kg, for 20% to 30% H₂O₂.

VI. QUICK LOOK

1. Principle of working: H₂O₂ is split up (with a catalyst or Naturally) into water which producing reactive species that can be reacts with microorganisms and pollutants.
2. Sufficiency/Capacity: At a certain degree, especially high-tech equipment required for a “catalysed” H₂O₂ treatments.
3. Performance/An Activity: Performing or working in the best possible manner with least waste time and effort, high efficiency.
4. Self-help Compatibility: comparatively, Engineers are required for the mapping out.
5. Managing: need of incessant input if H₂O₂.
6. Reliability: When the treatment is mapout for application reported to each application then it is reliable.
7. Strength: capable of or Very versatile and environment friendly or compatible oxidising agent.

8. VII. ADVANTAGES

1. It can be able to exterminate toxic organic compounds efficiently without pollutants transfer to another phase
2. It does not create or produce any harmful residues.
3. It Can also be able to combined with other oxidisers and also with catalysts.
4. It is efficient in treating nearly or all organic pollutants and also efficient in wipe away some toxic metals.
5. Works very effectively on microorganism's destruction present in water

and effectively disinfect the water (Disinfection) **IX. REFERENCE**

VIII. Disadvantages

1. Due to need of incessant inputs of H₂O₂ relatively superior operation costs is required. Engineers and additional supplementary like power and/or chemicals needed for the map out of “catalysed” H₂O₂ treatment systems

1. H₂O₂ Compiled by: Félicien Mazille (Aqaxis, cewas international centre for water management services), Dorothee Spuhler (seecon international gmbh)
2. Hydrogen Peroxide, O P E N CHEMISTRY D A T A B A S E, National Center for Biotechnology Information, U.S