

# A Review on Experimental investigation of floating wetland treatment on different types of waste water

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**Abstract** - Waste water management is a major issue in India these days, even more so than rainwater harvesting. A significant amount of soil water needs to be stored for treatment, but there aren't always enough water treatment facilities to store and purify this water. The amount of chemicals used in the treatment process causes additional issues, such as a bad chemical odor that puts residents near the treatment plant at risk for respiratory illnesses. Additionally, the treated water cannot be released into the water resources because it could harm aquatic life and natural freshwater sources. This is the floating wetland treatment method, which is predicated on the process of natural purification. With the help of plants, it filter out pollutants from soil water and allow natural resources to seep in, floating wetlands can purify waste water. This review paper discusses the purification of domestic water, which is defined as water from sinks and toilets in any other type of structure, including buildings. The approach of the floating wetland technology and the plant finds that will work well for it are included in the paper.

**Key Words:** Waste water management, floating wetlands, Industrial waste and Domestic waste water purification.

## 1. INTRODUCTION

Natural methods for treating wastewater, such as constructed wetlands, floating wetlands, and reed beds, are increasingly favored over traditional technologies due to their cost-effectiveness and positive environmental impact. In India, various floating wetland initiatives have been implemented in rivers and ponds. These rivers are vital to local communities, supplying essential water for daily needs. Therefore, purifying these water bodies in an economical and low-maintenance manner is crucial. Additionally, these initiatives contribute to urban green spaces, support sustainable development, and enhance the visual appeal of cities. Domestic wastewater can be categorized into two types: gray water, which includes discharges from sinks, showers, washing machines, and dishwashers, and black water, which originates from toilets. The selection of plant species for wastewater treatment depends on several factors, including their capacity to absorb pollutants and effectively process water through their root systems. Floating plants, or

macrophytes, are effective for wastewater treatment, while non floating plants tend to have higher treatment efficiency due to their extensive root systems. Unlike conventional systems that require continuous aeration to maintain oxygen levels for microorganisms, floating treatment wetlands operate without the need for mechanical aeration

### 1. Aim

To find a long-term, affordable, environmentally friendly, and simple-to-build water treatment wetland to replace the current water treatment facility. Additionally, to locate a plant that is readily available locally in India and that can effectively purify waste water without leaving behind any hazardous deposits.

### 1.2 Objective:

- 1: To identify a cheap and readily available plant that can be used to rehabilitate floating marsh
2. To locate a plant that can survive in wastewater
3. The vegetation that shouldn't restrict aquatic animals' ability to exchange oxygen.
4. Identifying the plant that can develop quickly on wasted water.

## 2. Problem Statement:

Aquatic plants are utilized for floating wetland, but not all aquatic plants may be used for the same purpose. You can use plants that have grown more quickly in domestic water. Plant roots in floating wetlands contribute to sedimentation by capturing and filtering dispersed particles. Floating wetlands require plants with quicker root development. Some plants with greater roots grow only in fresh water. Plants' ability to grow roots quickly and thrive in domestic water is crucial. Plant biomass **development** is affected by species, support mat, wastewater type, and water trophic level.

## 3. LITERATURE SURVEY:

- Author and Year: Rajnikant Prasad et al (2022)
- Title: Developed Wetland and Its Point of view.

- Conclusion: Authors have appeared a taken a toll inviting way of treatment of water where it's troublesome to have treatment plants. Macrophytes are utilized as a sedimentation medium due to their long roots. Their support is moreover vital the plants which are not required ought to be expelled. Oceanic plants like are Phragmites australis, Typha latifolia Eichhornia crassipes, Lemna are utilized to decrease BOD, TSS
- Author and year: Ritesh Tandekar (2022)
  - Title: Determination of plant for drifting treatment wetland
  - Conclusion : From this explore till presently they found out that the canna indica and the money plant are compelling for cleaning the dark water , given they require an open expansive region to breath and survive, expansive tub where this plant seem drift will work. Common water hyacinth appeared great rate of decontamination of water caanna indica
- Author and Year: Monika Kumari et al. (2021)
  - Title: A Audit on Coasting Treatment Wetlands: An Eco-Friendly Strategy For Wastewater Reclamation
  - Conclusion: Coasting wetland it can be a eco-friendly strategy for squander water treatment. The wetland can gotten to be prudent if we utilize normally get materials such as bamboo and coconut, still the detail investigate is required for supplanting polyester sheets, pvc channels, froth, etc. Utilize of existing plant which are developed on water bodies can be a great alternative for treatment reason in little scale lakes since this sea-going plant causing the issue of choking the stream water which eventually makes the surge circumstance in overwhelming rain drop zone where seepage of water is must require.
- Author and year: Alberto Barco et al (2020)
  - Title: Treatment exhibitions of drifting wetlands: A decade of considers in North Italy.
  - Conclusion: This ponder evaluated the depuration exhibitions of eight diverse FTWs (1 pilot-scale and 7 full-scale plants) treating civil wastewaters, agrarian runoff and digestate fluid division, in North Italy. Metropolitan wastewater was only treated by I. pseudacorus, P. australis and T. latifolia while waterway wastewater was enhanced by I. pseudacorus,
- Author and Year: Barco Alberto et al (2020)
  - Title: Plant species for coasting treatment wetlands: A decade of tests in North Italy
- Conclusion: Authors point to think about five diverse plant species beneath drifting treatment plant. Phragmites australis, Iris pseudacorus, Typha latifolia, Carex spp. and Lythrum salicaria are the plants considered by them. Eight case ponders on FTWs were actualized in distinctive areas of North Italy amid ten a long time of inquire about. The comes about clearly demonstrated that pseudacorus, P. australis and T. latifolia appeared the best development exhibitions when introduced in metropolitan wastewater. All these species had a moderately tall normal survival rate.
- Author and Year: Leticia Z. S. Caputo et al (2019)
  - Title: Impacts of graywater on the development and survival of fancy plants in nature-based systems.
  - Conclusion: The point of Authors is to see the execution of this plants by having light gray water. Canna lily develop greater in the pilot framework. And it develops greater in the gray water than that of tapwater. Mammoth horsetail values were moreover more in case of pilot framework. And there were small distinction in tap and gray water where tap water was on higher side.
- Author and Year: Hopi Stiyati Prihatini et al. (2019)
  - Title: Execution of Coasting wetland to diminish the natural matter in stream water.
  - Conclusion: Fruitful comes about of evacuating natural toxins from the water with the offer assistance of Drifting wetland treatment by utilizing locally accessible plants (Echinodorus palaefolius and Limncharis flava) in the water test of Kerukan Waterway (Banjarmasin, South Kalimantan Indonesia) which was coasted into a plastic-coated plywood reactor.
- Author and year: - Munazzam Jawad Shahid et al (2019)
  - Title: Possibilities of drifting wetlands for the treatment of contaminated water of waterway Ravi, Pakistan
  - Conclusion: The pH diminished altogether in all medicines with a sharp decrease in vegetated medications as compare to non- vegetated treatment and control. The way better abundance of vaccinated microscopic organisms was followed in the root/shoot insides of P. australis. The execution of P. australis was way better than B. mutica in the nearness and nonappearance of microbes.

- Author and Year: Meera Prajapati et al. (2017)
- Title: Assessment of wastewater expulsion by macrophytes in wetlands.
- Conclusion ;Plants utilized in the test; - 1. New plants - (Reeds), 2. Drifting plants - (Azolla, Filamentosa, Duckweed, Duckweed), 3. Eatable plants - (Lactuca sativa) Benefits, drifting plants Pistia stratiotes and eatable plants Lactuca sativa deliver the best results
  
- Author & Year: Suhail N. Abed et al (2017)
- Title: Mesocosm Engineered Dark Water - Treatment of Scale Drifting Treatment Wetlands
- Conclusion: The nearness of plants viably ( $p < 0.05$ ) progresses the biodegradation potential of dim water by expanding the five-day organic oxygen request (BOD) and diminishing the chemical oxygen request (COD) concentration. 54% of nitrogen evacuation in *P. australis* planted wetlands is essentially due to collection of natural nitrogen
  
- Author and year: Diminish Nichols et al (2016)
- Title: Observational think about in urban watersheds Coasting Treated Wetlands
- Conclusion: Advanced FTW is frequently composed of a combination of woven plastic, natural tangle and fiberglass. Youthful plants develop straight forwardly on this drifting zone and their roots develop into the water. Lake FTW on Bribble Island, Queensland, Australia has changed. Among them ,the water stream is made of woven plastic, natural mats and fiberglass. Utilize youthful plants.
- Author and year: Lingwei kong (2016)
- Title: Making strides water treatment proficiency of coasting treatment wetlands utilizing biofilm carrier. Drifting tangle + plant + biofilm carrier 2. Drifting tangle + plant 3. Drifting tangle + biofilm
  
- 4. Coasting tangle as it were after 6 months perception Drifting tangle + plant + biofilm carrier area Completed
  
- Author & Year: Lloyd H.C. Chua et al (2012)
- Title: Treatment of Rough Oil Water in Coasting Wetlands with Vetiver
- Conclusion: The reason behind this explore is to discover a arrangement to fathom water contamination caused by oil in Indonesia. The explore was carried out in water sullied with unrefined oil, and rough oil constituted 1% of the add up to water volume. Include 25 ml of water, 2.5 ml of rough oil and 125 ml of hydroponic supplements to the holder. The plant utilized is *V. zizanioides* local to northern India. 4 weeks, the comes about appear that the surface expanded with the concentration of unrefined oil and decontaminated water.
  
- Author and Year: G. De Stefani et al (2011)
- Title: Execution of a coasting treatment wetland for in-stream water enhancement in NE Italy.
- Conclusion: The Tech-IA coasting framework was exceptionally simple to introduce and oversee and did not grant any issues as plants developed in streaming water conditions. It too performed exceptionally well in terms of buoyancy and steadiness indeed when single components were joined together to shape multi-line obstructions. Tech-IT is comprising of 8 windows with lattices given in it to maintain plants. Its stack capacity is 20kg. Inner structure not retain the water and the fabric utilized for this is recyclable. Plants utilized for this are Cav, Common reed, truffled sedge, delicate surge, broadleaf cattail, ventiver grass, bur reed, orchardgrass. The development of roots in this explore is moderate and BOD & COD lessening in the middle & changeability.
  
- Author and Year: T. R. Headley et al (2008)
- Title: Coasting Treatment Wetlands: - An Imaginative Choice For Stormwater Quality Applications.
  
- Conclusion: In this, drifting plants which drift either as a lean layer on the water surface like duckweed & azolla are utilized or have specially-adapted buoyant leaf-bases like water hyacinth, water Lettuce and salvinia. Coasting treatment wetlands (FTWs) are in numerous ways a hybridisation of all of these frameworks, utilizing established emanant plants developing on a tangle coasting on the surface of a lake like water body or maybe than established in the dregs. Different ways to coasts the plants are clarified in this paper 1) Ethereal see of a Polyester Drifting Tangle 2) Rigit Outlines 3) Plants bolstered at the water surface by cables suspended over the lake 4) FTW made by joining buoyant sub-units
  
- Author and Year: Lisa M. Avery et al (2007)
- Title: Built wetlands for dim water treatment.
- Conclusion: Authors have compared vertical stream and flat sub surface frameworks with Develop (green roof water reusing framework) for treatment of household dim water. *Lobelia cardinalis* ,was the plant that was utilized in expansive sum. The result appears development wetlands were more productive in decreasing

BOD and COD and on the other hand Develop was great in decreasing suspended solids and turbidity.

- Author and Year: Chris C Leather treater et al (2004)
- Title: Drifting treatment wetlands –an inventive arrangement to upgrade expulsion of fine particulates,
- coppe
- Conclusion: In this, test is done on manufactured stormwater arrangement which is collected 10 months some time recently. Turbidity, Cu & Zn is decided by this test. Out of 6 best 4 plants are utilized Schoenoplectus tabernaemontani, Juncus edgariae, Carex virgata, Cyperus ustilatus. Most extreme developed plant is Juncus edgariae and its profundity is 87cm. FTW expelled roughly one third of the exceptionally fine suspended particals.

**4. CASE STUDY:**

**4.1 MWW (Municipal Waste Water )**

((Water hyacinth/Eichhornia crassipes)The brilliant plant known as the common water hyacinth was taken from umred Lake. It coasts on water. Oxygen consuming microscopic organisms may thrive in the root structures of water hyacinths, which makes a difference them dispose of numerous sorts of contaminants from water. The disposal of flocs and a diminish in natural matter in the water have been famous as a result of the impact of WH, which has essentially decreased turbidity



BEFORE

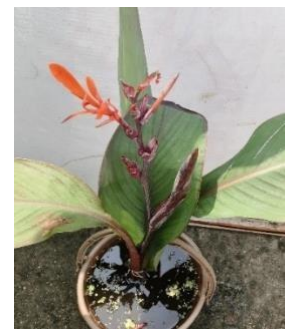


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- ((Canna Indica): We found canna indica in an umred, a neighborhood angle gathering region. It was utilized to decontaminate the water in nearby lakes and lakes, and an article around it was too distributed in the Hindustan Times. The Poisar Stream was put interior a greywater tub and cleared out for seven days; amid that time, it didn't pass on and was able to successfully clean the water in fair two days. Plants that provide the soil in the root zones oxygen incorporate Canna indica (Kalvazhai).



BEFORE



AFTER

Soil microorganisms use this oxygen to break down natural atoms in dim water, cleaning the water in the handle. We suspended the plant's root interior the greywater holder by tying it to a adhere since it wasn't a coasting plant. The reason of the extend was to see whether money plants may be a reasonable elective for treating dim water in drifting wetland environments.

The **money plant** was kept in dark water on Eminent 6, 2022. Water was accumulated from the washing machine and sink and utilized to wash clothing. The thought begun out with fair one leaf and no root development. To begin with, it was famous that the plant's takes off and, to a lesser degree, its roots, were developing. The water turned from dim to pale in color. Current perception: - The plant's development has ceased. The to begin with leaf got to be bone-dry. The fungus-like fabric has settled close the water's foot



BEFORE



AFTER

**OVERVIEW OF LITERATURE SURVEY :** From above observation we selected water hyacinth for further processes



4.2 IWW (Industrial Waste Water);

- Water hyacinth/*Eichhornia crassipes*) The brilliant plant known as the common water hyacinth washou taken from umred Lake. It drifts on water. Oxygen consuming microbes may prosper in the root structures of water hyacinths, which makes a difference them dispense with numerous sorts of contaminants from water. The end of flocs and a diminish in natural matter in the water have been famous as a result of the impact of WH, which has essentially decreased turbidity



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BEFORE



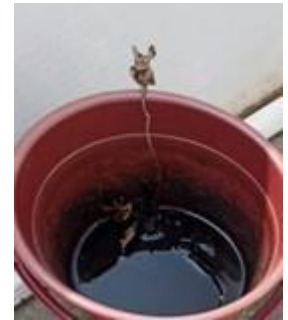
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BEFORE



AFTER

## 6. CONCLUSION

Our research has led us to figure out that money plants , water hyacinth and *canna indica* are useful for clearing grey water, provided they have access to a vast, open space for survival. A large tub that allows the plant to float will be ideal for this purpose. *Canna Indica* began to purify water in just two days, showing a good rate of water filtration compared to common water hyacinth.

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