ISSN 2664-4010 (Print) & ISSN 2664-6730 (Online)
**South Asian Research Journal of Agriculture and Fisheries**
*Abbreviated Key Title: South Asian Res J Agri Fish*

**| Volume-7 | Issue-4 | Jul-Aug -2025 |** **DOI: https://doi.org/10.36346/sarjaf.2025.v07i04.001**

**Original Research Article**

# Effect of Chromium and Iron on Physiological Characteristics of *Myriophyllum verticillatum* and *Schoenoplectus litoralis*

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**Article History**
Received: 07.06.2025
Accepted: 15.07.2025
Published: 25.07.2025

**Abstract:** The study's objectives were to determine the amounts of total chlorophyll and protein content, as well as to assess the impact of different concentrations of iron and chromium (10, 20, and 30 mg/L) on the physiological characteristics of Schoenoplectus litoralis and Myriophyllum verticillatum. For a month, the study was carried out. When compared to the control sample, the research findings showed that the water plants utilized for the study had higher component concentrations at the end of the study. Furthermore, there were reduced amounts of protein and chlorophyll in the water plants that were subjected to the effects of heavy metals.

**Keywords:** Chromium, Iron, Myriophyllum V, Schoenoplectus L, protein and Chlorophyll.

## INTRODUCTION

Aquatic plants are particularly crucial in tackling the primary environmental issue of heavy metal pollution of the water because they play a critical role in influencing the aquatic ecosystem [1]. Because certain plants have physiological, chemical, and genetic characteristics that are environmentally benign, using them to clean contaminated water is a novel approach to removing contaminants [2]. Chemicals, on the other hand, have negative effects on the environment. Because of the diversity of aquatic plants, their extensive distribution in water bodies, and their high resilience to changing environmental conditions, several plant families have been used as biological evidence to investigate heavy metal pollution of water. Their ability to draw heavy elements out of water and store them in tissues has also led to their extensive use in the bio-filtration sector [3]. The practice of using plants to remove pollutants from soil, groundwater, surface water, and wastewater is known as phytoremediation because the biological processes of plants facilitate "green treatment." In addition to their quick growth and low environmental requirements for adaptation to a variety of habitats, several of these plants offer compelling evidence of heavy element contamination in water due to their larger capacity to store heavy elements in their tissues than in the aquatic environment [4]. Depending on the plant species and the organ being studied, various plant bodies may collect varying concentrations of heavy metals [5, 6]. The purpose of this study was to look at how Chromium and Iron affected the growth and physiological characteristics of *Myriophyllum verticillatum and Schoenoplectus litoralis*.

## MATERIALS AND METHODS

Whether aquatic plants such as Schoenoplectus litoralis and Myriophyllum verticillatum could remove specific heavy metals was the aim of the investigation. After being weighed at 500 gm each, the plants were cultivated independently in 15-liter plastic containers. Each container held 10 liters of water contaminated with iron and chromium at three different concentrations (10, 20, and 30 mg/liter) [7, 8]. Samples were collected every ten days for a month in order to comply with the necessary test. The levels of protein, chlorophyll, and heavy metals were measured by taking plant samples from the ponds. Aquatic plant tissues were examined for protein levels and total chlorophyll content using techniques [9, 10].

## RESULTS & DISCUSSION

The study's findings demonstrated that, by the conclusion of the experiment, the concentration of heavy metals in the aquatic plants under investigation had increased. The aquatic plant tissues of Myriophyllum Canadensis exhibited accumulation of Fe and Cr (4.791 and 4.233) in comparison to the control (4.889 and 5.193), while the aquatic plant tissues of Schoenoplectus litoralis exhibited concentrations of Fe and Cr (5.934 and 5.078) in comparison to the control (4.897 and 4.956) respectively. To put it another way, the aquatic plant Schoenoplectus litoralis accumulates more lead chloride than the aquatic plant Myriophyllum Canadensis, but the aquatic plant Myriophyllum Canadensis accumulates more cadmium chloride in its tissues. This suggests that the aquatic plants under study are able to preserve this material within their tissues, have a special method of transporting a lot of elements, or absorb elements in high concentrations that are then transformed into inactive vacuoles. The element's reception, physiological condition, and species differences may all contribute to variations in the concentrations of elements gathered within the plant bodies. When plants are subjected to heavy metals, they produce phytoplankton, which impairs their capacity to detoxify and keep the heavy elements in a healthy equilibrium. It should be noted that a number of environmental factors, including salinity, pH, and the effectiveness of complex organic and inorganic compounds, influence both the physical and chemical mechanisms that control the rate at which heavy metals accumulate in an organism's tissues and metabolic processes like temperature, light intensity, and oxygen content. In addition, the level of the element in the natural environment and the characteristics of the environment affect bioaccumulation [11-13].

According to the study's findings, the overall concentration of chlorophyll in the aquatic plants under investigation decreased at the conclusion of the experiment. Figure (2) illustrates the concentration of chlorophyll in Schoenoplectus litoralis aquatic plants at 30 ppm of Fe and Cr (3.988 and 3.565) in comparison to the control (3.889 and 3.709). exposure to varying concentrations of heavy metals, which inhibits enzymes involved in the synthesis of carotene and chlorophyll, is one of the factors contributing to a decrease in the amount of chlorophyll in plant tissues, as evidenced by the concentrations of Fe and Cr in the aquatic plant Myriophyllum Canadensis tissues (3.883 and 3.896) in comparison to the control (3.175 and 3.898). Which leads to a decrease in the amount of chlorophyll in plant tissues in addition to inhibiting a small number of enzymes that help in the synthesis of chlorophyll [14, 15].

Figure (3) is displayed. The protein content in the tissues of the aquatic plants Schoenoplectus litoralis at 30 ppm of Fe and Cr (2.718 and 2.311) was lower than that of the control (4.815 and 4.121) and the aquatic plant Myriophyllum Canadensis tissues at concentrations of Fe and Cr (3.094 and 2.989) were lower than those of the control (3.116 and 2.988). The reason for this decrease in protein content in these plants' tissues is that they consume some basic activities or metabolic processes that occur within them in order to withstand the concentration of elements, which lowers the percentage of protein content in their tissues and is directly proportional to the duration of exposure [16, 17].

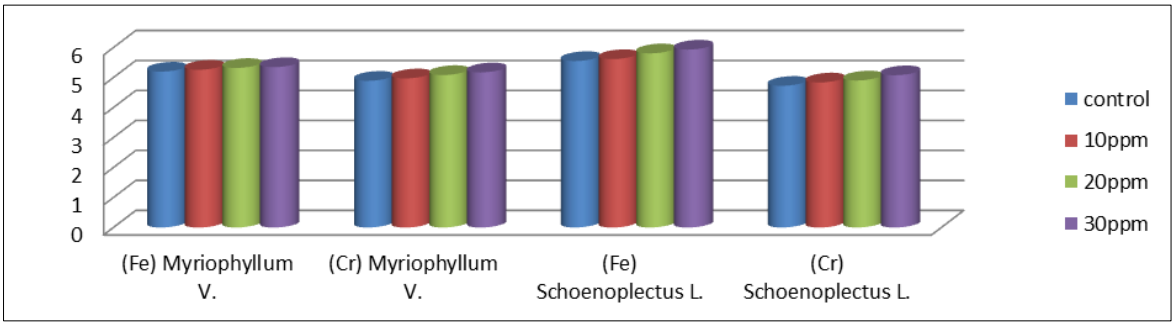


**Figure 1: Concentrations of Fe and Cr in *Myriophyllum verticillatum and Schoenoplectus litoralis* tissues**

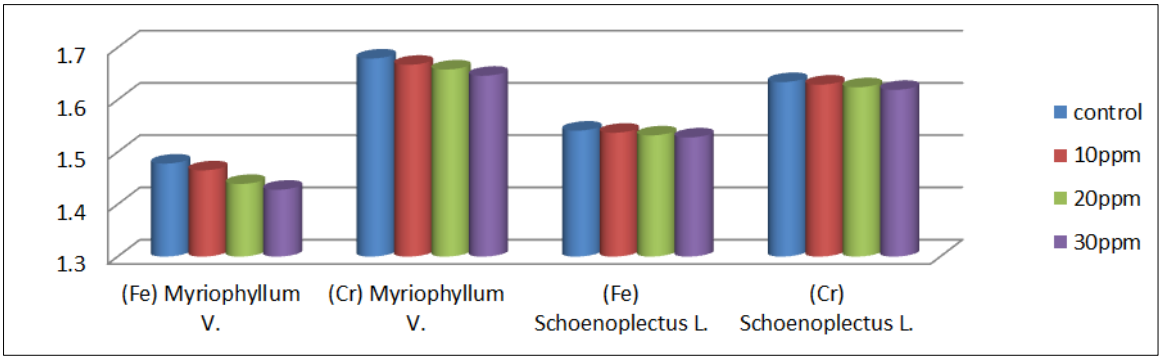


**Figure 2: Concentration of chlorophyll in *Myriophyllum verticillatum and Schoenoplectus litoralis* tissues**

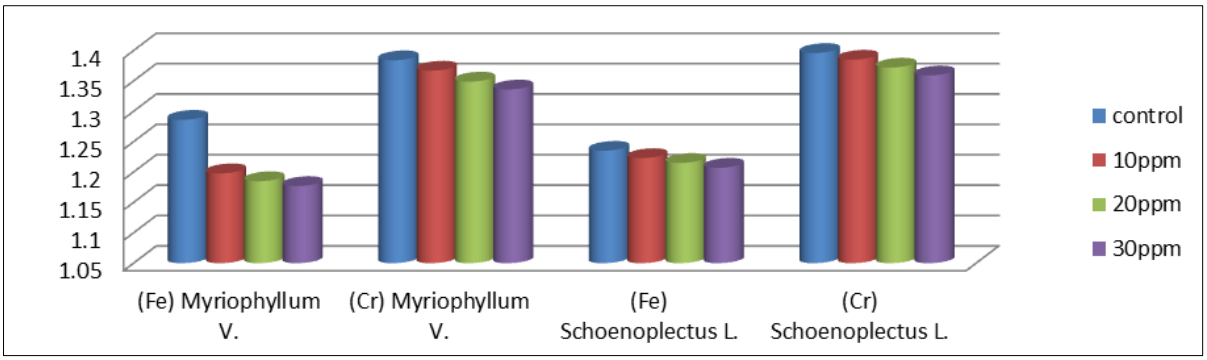


**Figure 3: Protein content in Myriophyllum verticillatum and Schoenoplectus litoralis tissues**

## CONCLUSION AND RECOMMENDATIONS

The aquatic plant Myriophyllum Canadensis shows a larger accumulation of Cr in its tissues than Schoenoplectus litoralis, while Schoenoplectus litoralis shows a higher accumulation of Fein in its tissues than Myriophyllum Canadensis. The metals most dramatically reduced the quantities of protein and chlorophyll in Schoenoplectus litoralis and Myriophyllum verticillatum. Plant species are chosen based on their effectiveness as a biological tool for removing toxins from heavily contaminated environments.

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