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Leaf Protein Extraction from Water Hyacinth *Ecchornia crasspies* and its Various Uses

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Abstract: ***Climate change and its biological consequences are under way global impact of green house gases emission has caused a major biotic response and changes in physiology, penology and distribution of species are evidence of changes in biodiversity response to climate change. Fresh water eco systems are naturally sensitive to climate changes nutrient enrichment and pollution by human activities has increase the spread of a remarkable invasive species of aquatic leaf Ecchornia crasspies a troublesome water weed now present in all major water reservoirs, lakes, dams and river systems it has destroyed the flora and fauna of water bodies. The paper discusses the removal of water weed and its bio conversion ino a leaf protein concentrate which can be used as a potential protein source for humans and animals.***

Keywords: Ecchornia crasspies, Protein, Extract

1. Introduction

Global green house gases emission coupled with diverse human activity has resulted in a tremendous change place in aquatic system/surface fresh water in a very small fraction of global water and fresh water lakes constitute 0.009% of water in the biosphere but fresh water supply unevenly distributed over land surface and the real supply is even less than the small number indicate population growth has placed an increasing pressure of fragile fresh water eco system. The treat to fresh water systems falls in several broad categories – Nutrient enrichment, hydrological modification, habitat loss and degradation pollution increasing levels of UV light rapid land use change and changing climate has resulted in a explosive growth of water hyacinth (*Ecchornia crasspies*) its management today has become uneconomical and the damage caused by its growth to the already stressed fresh water ecosystem has resulted in destruction of valuable water resources. A new method was adopted to harness the potential for leaf protein production of leaves are potentially the most abandoned source of edible protein and looking at the twin problems of malnutrition and protein energy deficiency present in large parts of our country and our state Madhya Pradesh. Extracted leaf protein (LP) have many advantages such as being a product of photosynthesis they are highly renewable source, green plants are present in tropics where need for protein is most. And finally species rejected by humans and animals can also be potentially used for leaf protein extraction [1].

Leaf proteins also have many properties reflected in their balanced nutritive values and economically they remain one of the cheapest sources of edible proteins [8].

Water weed (*Echorrnia crassp*) is universally present in water bodies causing wide spread damage to ecology and environment of water bodies. The weed is not easily removed and shows fast growth rates. Water hyacinth also has a high potential for extraction of leaf proteins and due to the nature of weed it represents a rich source of untrapped protein reservoir. LP extraction from water hyacinth is a simple process which can easily be adopted by our village based communities for fulfilling their protein needs of their animals and LP from hyacinth after purification can also be added to human diets enriching their nutritive value and making there economically more viable [2].

2. Material and Methods

The water hyacinth (*Echorrnia crassp*) plant were collected from the study area, lower lake of Bhopal and were brought to the lab where they were washed with the clean water as it increases protein extraction. The leaves were cut and pulp was prepared, addition of 2% Na_2CO_3 to the pulp increases and stabilized leaf proteins. The pulp was squeezed through a cotton cloth of regular mesh size. The extracted juice was given a sharp heat treatment of 70^{o}C for five to ten seconds, causing coagulation in juice resulting in production of a curd like consistency which was taken for removal. The coagulated juice was kept in cloth stockings and hung up to drip. When the juice dripping stopped the cloth stockings were kept on a flat surface and using flat wooden plank placed on top of cloth stockings along with weight, pressure was created to remove extra whey water present.

The coagulated juice in stockings was removed by applying pressure for six hours and left to dry in clean dry area. The resulting moist cake of LP was taken for protein estimation by

modified Biurette method and crude protein was estimated to be 18% which confirmed the high protein value of LP.5

3. Results and Discussion

Water hyacinth (*Echhornia crassp*) was washed before extraction as wetting increased the extraction of protein. The simple methods of separation of extracted leaf protein has immense benefits in its use as a protein food supplement. The extracted proteins showed a strong stability in normal temperature conditions making them highly suitable to be used in versatile forms and products like fortified animal feed [7].

Water hyacinth a troublesome weed regarded as a problem weed an its constant removal from water bodies have caused great economics loss our developing state, but now it can serve as a viable alternative source for LP and its diverse uses, instead of removal it can serve as a rich substrate for extraction and preparation of LPC which with improved technology and better processing methods can serve as a valuable tool in combating malnutrition [5]. The pilot study confirms potential for LP extraction and can act as a model which can easily replicated in all parts of India [4].

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