

Physico-chemical Parameters of Parthenium from Morshi Region, Part-I

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Parthenium possesses harmful and useful properties in the same plant. Therefore it appeared sufficiently interesting when from 1st July 2001 to 30th September 2001 in the Morshi region we undertook a programme to explore the chemistry of parthenium by analysing some of its physico-chemical parameters, viz., percentage of moisture, ash content, solubility in cold and hot water, NaOH and HCl, and its flowers and leaves.

Key Words: Physico-chemical parameters, Parthenium.

INTRODUCTION

It is studied that the flowers of parthenium seed emit millions of pollen grains which are responsible for causing asthma, bronchitis, dermatitis, high fever, skin diseases and mental depression in human beings. The small hair present on the stem of parthenium when come in contact with human beings and animals cause different types of lethal skin diseases. The roots of parthenium weed secrete many lethal chemicals harmful to other plants present in their vicinity. These chemicals are responsible for the fast spread of this weed. These chemicals kill the valuable medicinal plants present in our forests. Daily, many farmers and their cattle are coming in contact with this obnoxious weed and it becomes a problem for wild life also. It is a very difficult task to estimate the extent to which wild life, human life, crops, useful medicinal plants etc. are being damaged by this weed daily. It was noted and studied in Australia that thousands of currency worth of meat got infected by parthenium.

The scientific name of this plant is *Parthenium hysterophorus*. It belongs to the family Asteraceae and its common names are parthenium weed, parthenium, white top, false ragweed, chatak chandani, ramphool, congress grass, etc. Parthenium is not a native of India. It came here along with the imported grains (i.e., milo and redwheat) from U.S.A. in 1950 during the famine in India. In one year, there are four generations of parthenium weed and each plant produces more than 25000 seeds. Due to the absence of natural enemies it is spreading very rapidly. It is likely to grow in any area with a summer rainfall greater than 500 mm/annum. Parthenium is one of the worst weeds for agriculture, human health, animal health, crops and other important useful plants and for the environment¹.

It is the native of Mexico and U.S.A. It is prolifically spread in Central Queensland, Caribbean, Brazil, Argentina, Bolivia, Chile, Paraguay, Peru, Uruguay and Australia. It is also notable in African and Asian regions. The probable geographic centre of origin are the countries around the Gulf of Mexico. Management of parthenium is not an easy task because the general people are not aware about it. It is a bitter truth that very few people are aware of the harmful effects of this handsome looking plant. The Australian and American governments are trying hard to warn their people about this obnoxious weed but the efforts are not enough. Very few scientists around the world are working on parthenium; even not much published literature is available on parthenium and there is lack of coordination among these scientists. A biological central program has been undertaken since 1977 in Mexico, Brazil and Argentina²⁻⁸. Eight species of insects and rust diseases have been introduced for parthenium biocontrol^{3, 9-16}. Sesquiterpene, lactones, caffeic acid, vanillic acid, anisic acid, *p*-anisic acid, chlorogenic acid and para-hydroxybenzoic acid have been chemically analysed^{17, 18}.

Literature survey shows that it is the worst plant in the plant kingdom and very harmful and toxic for animals and plants. It also affects the agricultural values of the plants and soil, destroying crops, medicinal and important plants.

It is also observed from literature survey that some species of parthenium possess medicinal value also which is quite interesting. *Parthenium hysterophorus* is used as tonic febrifuge; its root decoction is useful in dysentery¹⁹⁻²⁶. Parthenium possesses antitumour properties²⁷. It also possesses pharmacological values²⁸. Parthenium is also used as a folk remedy²⁹. It is used externally for skin disorders and also taken internally as a decoction³⁰.

From the above literature survey, it is obvious that very little research work has been carried out its chemistry. It is also interesting that parthenium possesses both harmful and useful properties in the same plant. Therefore it appeared sufficiently interesting when from 1st July 2001 to 30th September 2001 in the Morshi region we undertook a programme to explore the chemistry of parthenium by analysing some of its physico-chemical parameters, *viz.*, percentage of moisture, ash content, solubility in cold and hot water, NaOH and HCl, and its flowers and leaves.

EXPERIMENTAL

All chemicals used were of pure analytical grade as required.

Collection of samples: The samples, *i.e.*, flower (A) and leaf (B), were collected early in the morning at 6 a.m. by cutting with scissors. These samples were collected on trace paper in a petridish.

Moisture content: 1 g each of samples (A) and (B) was kept in an oven at 105°C for 2 h. It was weighed and kept in the oven till it showed constant weight.

Ash content: 1 g each of dried samples (A) and (B) was taken in different silica crucibles and heated over a Bunsen burner, then placed in a desiccator and weighed till it showed constant weight.

Cold water solubility: 1 g each of dried samples (A) and (B) was put in 100 mL distilled water for 48 h. It was filtered through a sintered glass crucible,

washed with distilled water, dried in an oven at 105°C and weighed till it showed constant weight.

Hot water solubility: 1 g each of dried samples (A) and (B) was put in 150 mL distilled water and was heated over boiling water bath for 2 h and filtered through a sintered glass crucible. The residue was washed with hot water, dried in an oven and weighed till it showed constant weight.

Solubility in 1% NaOH: 1 g each of dried samples (A) and (B) was put in 1% 100 mL sodium hydroxide. It was heated in a water bath for 2 h and filtered through a sintered glass crucible, washed with hot water, then by 10% aqueous acetic acid followed by cold water. The residue was dried and weighed till it showed constant weight.

Solubility in 1% HCl: 1 g each of dried samples (A) and (B) was put in 1% 100 mL hydrochloric acid solution. It was heated in a water bath for 2 h and filtered through a sintered glass crucible, washed with hot water, then by 10% aqueous ammonium hydroxide followed by cold water. The residue was dried and weighed till it showed constant weight.

The observed results are presented in Table-1.

TABLE-1
PHYSICO-CHEMICAL PARAMETERS OF PARTHENIUM IN THE MORSHI REGION
FROM 1st JULY 2001 TO 30th SEPTEMBER 2001

Samples	per cent					
	Moisture	Ash content	Cold water solubility	Hot water solubility	1% NaOH solubility	1% HCl solubility
Flower (A)	29.70	0.1423	50.5	28.4	44.6	43.58
Leaves (B)	23.18	5.2000	52.5	2.7	54.2	53.68

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