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Research Article

Energy Dispersive X-ray Spectroscopy (EDX) analysis of *Curculigo orchioides* Gaertn. root tubers

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ABSTRACT

Curculigo orchioides Gaertn. (Amaryllidaceae) is an endangered medicinal plant. The root tubers of the plant have been used extensively in India in indigenous medicine. Its root tubers were investigated for its metal mineral content by using Energy Dispersive X-Ray Spectroscopy (EDX). The elemental analysis was performed to estimate eleven numbers of elements (C, O, Mg, Al, Si, Cl, K, Ca, Fe, Cu & Zn). The analysis of EDX showed that root tubers possesses only seven type of essential elements. The root tubers was found deficient in Mg, Al, Si and Fe.

Keywords: *Curculigo orchioides*, Energy Dispersive X-Ray Spectroscopy (EDX), Elemental Analysis

INTRODUCTION

Curculigo orchioides (Amaryllidaceae) is a small annual herb with elongated tuberous root stock, tuber black having several lateral roots, linear, lanceolate, membranous leaves close to the ground level, occurring wild in sandy situation of hotter regions of India from near sea level to 2300m altitude. *Curculigo orchioides* (Amaryllidaceae) commonly known as kalimusli, in Orissa as Talmuli. It is used in the medicine as a substitute for 'Safed Musali (*Chlorophytum borivilianum*)'. *Curculigo orchioides* Gaertn. (Amaryllidaceae) have been used as folkmedicine and as ingredient in various Ayurvedic preparation. It is extensively used by the Ayurvedic practitioners, particularly an ingredients of aphrodisiac preparations. In Unani system of medicine, the drug is employed in bronchitis, ophthalmic conditions, vomiting, diarrhea, dyspepsia, lumbago, pain in the joints and in the diseases of nerves [1-4].

The root tubers of this plant was much more used in traditional as well as in modern era. The root tubers widely used as tonic for strength, vigour and vitality due to the presence of flavonone glycoside and other steroidal saponins. It was showed the presence of various types of saponins, the phenolic glycosides, resins, tannins,

and polysaccharides. Pharmacological study revealed hepatoprotective, anti-pyretic, anticancer, hypoglycemic and aphrodisiac properties [5-9].

An EDX analysis is a surface sensitive technique used to measure almost every element from Na to Pu in the periodic table. X-rays observed in fluorescent analysis typically have energies ranging from 1-100 KeV. These photons can only penetrate a few millimeters into substance so that it reflects the composition of the substance. The penetration of photons into the substance reflects the composition of the substance and this is seen from the peaks obtained at respective energies for elements.

MATERIALS AND METHODS

The root tubers of *Curculigo orchioides* (Amaryllidaceae) was collected from the rural belt of Barpali in the district of Bargarh, Orissa. The plant was authenticated from Botanical Survey of India (BSI), Howrah, Kolkata, India (Ref.no.CNH/I-I(5)/2009/ Tech.II/35). An authentic herbarium specimen was deposited in the Herbarium Museum of Department of Pharmacognosy, The Pharmaceutical College, Barpali for future reference.

The root tubers were dried under shade and powdered by the help of mechanical process. The powder root tubers have stored in airtight container for further studies.

Elemental analysis:

EDX of the *Curculigo orchioides* was prepared by fixing the *C. orchioides* powder on copper specimen stubs, sticky carbon tape followed by coating with gold sputter coater (JEOL, Japan). The

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samples were then examined using a JEOL scanning electron microscope (JSM-6390 Japan) at an accelerating voltage of 10 kV [10]. The results were shown in the table 1.

Table 1: Elemental analysis of Root tuber of *C. orchioides*

Sl. No.	Element	Weight %	Atomic%
1	Carbon	50.05 ± 0.705	59.79 ± 0.950
2	Oxygen	43.76 ± 2.640	39.18 ± 0.195
3	Chloride	0.31 ± 0.015	0.12 ± 0.005
4	Potassium	0.54 ± 0.025	0.20 ± 0.001
5	Calcium	0.14 ± 0.005	0.05 ± 0.001
6	Copper	0.96 ± 0.075	0.22 ± 0.010
7	Zinc	0.76 ± 0.015	0.17 ± 0.010
8	Aluminum	-	-
9	Silicone	-	-
10	Magnesium	-	-
11	Iron	-	-

RESULT AND DISCUSSION :

The elemental analysis was performed to estimate 11 elements namely C, O, Mg, Al, Si, Cl, K, Ca, Fe, Cu, Zn. The finding showed root tuber of *C. orchioides* has only seven type of essential elements (C, O, Cl, K, Cu, Ca & Zn). The root tuber has deficient of Mg, Al, Si and Fe.

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