

BIO ACTIVE CONSTITUENTS FROM POLYGONATUM VERTICILLATUM

P.S. Rajpoot

*Associate Professor, Laboratory of Natural Product
Department of Chemistry,
Govt. P.G. College, Chharra, Aligarh, UP, India*

ABSTRACT

The Kumaon Hills of Uttaranchal, India are very rich in medicinal and aromatic plants, hence a detailed survey is being conducted to assess their availability, for bioactive constituents and commercial uses. In this paper Chemical investigation for essential trace element from P.Verticillatum.

Keywords: *P.Verticillatum, Liliaceae, Rhizome, Essential Trace Elements*

INTRODUCTION

Polygonatum Verticillatum (Liliaceae) is an erect glabrous natural herb growing at an altitude of 9000-12500 ft. of Kumaon Himalayan Mountains in Uttaranchal, India. The plant belongs to Astvag group medicinal Plants rhizomes used is as an ingredient of Chyvanprash and an important Ayurvedic tonic. It is useful in vitiated conditions of Pitta and Vata, Burning sensation, fever, strangury seminal weakness, female weakness and in problems of reproductive systems.

Essential trace elements-Cr, Cu, Fe, Mn, Ni, Zn etc. are daily required in adult human body (Schroeder et al., 1966b, 1966c; Underwood, E.J., 1977; Davidson, S., 1972). The bio-chemical functions (Albert, L., 1984; Davidson, S., 1977), correlative functions (Holested, 1974; Prasad, A.S., 1976), deficiency diseases (Smith, J.L., 1976; Underwood, E.J., 1975) and compositions in various parts of human body (Iyenger, G.V., 1978, 1981) of essential trace elements – Cr, Cu, Fe, Mn, Ni, Zn etc. have been reported in various studies. The most important functions of trace elements – Mn, Cu, Zn, Cr, Ni etc. has been reported in reproductive processes (New Horizons of Health aspect, 1990).

In this paper P.Verticillatum Chemically Investigated for essential trace elements and found rich in essential trace elements.

RESULTS & DISCUSSION

Chromium, Copper, Iron, Manganese, Nickel, Lead, Cadmium and Zinc were identified from the sample of *P.Verticillatum* by the method Inductively Coupled Plasma Emission Spectrometer with Polychromator Labtum 8440 Plasma Lab, discussed earlier. Analysis revealed that Chromium was found as 1.08 µg/gm, and Zinc 43.4 µg/gm, Cadmium 0.04 µg/gm, Iron 201.51 µg/gm, Manganese 21.54 µg/gm, Nickel 1.35 µg/gm, Lead 2.30 µg/gm, and Zinc 43.4 µg/gm. These trace elements have been found to be essential component of living matter. The

concentrations of essential component of living matter. The concentrations of essential trace elements found in rhizomes of *P. Verticillatum* were as – (Table-1).

Table-1: CONCENTRATIONS OF ESSENTIAL TRACE ELEMENTALS FOUND IN RHIZOMES OF *P. VERTICILLATUM*

ESSENTIAL TRACE ELEMENT	CONCENTRATION IN $\mu\text{g/gm}$.
Cr	1.08
Cu	4.37
Fe	201.51
Mn	21.54
Ni	1.35
Zn	43.4
Cd	001
Pb	2.30

The daily requirements of these trace elements in our body were comparable to the daily by an adult human body (Table-2). Spectral analysis revealed that in the sample of *P. Verticillatum* Iron was in maximum concentration (201.51 $\mu\text{g/gm}$) indicated that plant is rich in Iron compounds. Cadmium in minimum concentration. Chromium, Copper, Manganese and Nickel were found as approx. Similar (Table-2). The concentration of Zinc present in the sample as the 43.4 $\mu\text{g/gm}$ is good content, which is most important element to cure various diseases related to reproduction process etc.

The presence of correlative elements in this plant indicate that one of them reduce the toxic behavior of other elements. The risk factor Cadmium can be minimized by proper dietary supplementation with elements like Zinc and Copper. In the sample of rhizomes of *P. Verticillatum* both elements were present in good content. For proper utilization of Iron, small amount of Copper is required, both elements were present in rhizomes of *P. Verticillatum*.

The presence of Nickel and Manganese in the sample indicated that *P. Verticillatum* is newer essential trace elements. Nickel and Manganese activate several enzymes systems and used in the synthesis of phosphorylation, cholesterol and fatty acids.

Table-2: DAILY REQUIREMENTS OF ELEMENTS IN ADULT HUMAN BODY

ELEMENT	CONTENTS
Cr	50.0-200 $\mu\text{g/day}$
Cu	2.5-5.0 mg/day
Fe	7.0-12.00 mg/day
Mn	2.0-9.00 mg/day
Ni	20-25 $\mu\text{g/day}$
Zn	10-20 mg/day
Pb	3.2 $\mu\text{g/day}$
Cd	5.0 $\mu\text{g/day}$

(Schroeder H.A., 1966b; Underwood, EJ, 1977; Davidson, S. 1975; Frieden, E., 1972; MRS Fox. 1976).

ESSENTIAL TRACE ELEMENTS OF *P.VERTICILLATUM* AND THEIR BIOCHEMICAL FUNCTIONS:

(Alvert, L., 1984; Frieden, E., 192; Davidson, S., 1975;

Wegner, 1976; Underwood, E.J., 1997; Holested, 1974)

ELEMENT	BIOCHEMICALS FUNCTIONS
Chromium	: Plays an important role in carbohydrate, lipid, and protein metabolism, True potentiator of insulin and is known as glucose tolerance factors (GTF), regulates optimum levels in serum, Cr supplementation is beneficial for body weight gain, proper utilization of blood glucose. Chromium in <i>Verticillium</i> has been found 1.08 µg/gm.
Copper	: Essential component of enzymes-cytochromes oxidase, catalase, tyrosinase, monoamine oxidase, uricase, lysis oxidase, essential for utilization of iron, biosynthesis of myoglobin Copper in <i>P.Verticillatum</i> has been found 4.37 µg/gm.
Iron	: Prosthetic group of heame enzyme-catalase, cytochrome oxidase, peroxidase. For proper utilization of Iron small amount of Copper is required. Iron in <i>P.Verticillatum</i> has been found 201.51 µg/gm.
Nickel	: It activates several enzymes systems-arginase, carboxylase, trypsin and acetyl COA synthesis. Cofactor of urease, the hydrolysis of urea to ammonia and carbonic acid. Nickel in <i>P.Verticillatum</i> has been found 1.08 µg/gm.
Manganese	: Cofactor of enzymatic reactions-peptidase, polymerases, carboxylase, pyruvate carboxylase. Phosphorylation, cholesterol and fatty acid synthesis. Manganese in <i>P.Verticillatum</i> has been found 21.54 µg/gm.
Zinc	: Zinc is nutritionally essential metal. More than 200 metalloenzymes require Zn as cofactor. Zn as integral part of their molecules structure- carbonic anhydrase, carboxypeptidase. Cofactor of dehydrogenases, NAD and NADP. DNA and RNA Polymerases. The hormone insulin is stored in Zinc complex. Role of Zn is the proper functioning of the taste and smell receptions of the tongue and nasal passages. (Holested, 1974). Zinc in <i>P.Verticillatum</i> has been found 43.4 µg/gm.

- Cadmium** : Cd is not essential but average amount of Cd in the daily diet exceeds in many countries (Fox MRS 1976). Risk factor of Cd can be minimized by proper dietary supplementation with elements like Zn and Cu.
- Lead** : No biological function of Pb is known.

The trace elements that have been found to be essential components of living matter are Fe, Cu, Ni, Cr, Zn, Mn, etc. In addition to macro elements, there are certain other elements which are required in small amounts, almost in micro or nanograms by the body and these elements are known to perform some definite functions in the body, (New Horizon of Health aspect, 1990). The remaining elements Cd and Pb have been reported in human blood, kidney, liver (Iyengar, 1981) but no function of these elements is known in the body, no deficiency disease pertaining of these elements is known, hence it is difficult to say at present whether these elements are required at all by the body but the presence of these elements in human body parts in kidney, blood, liver (Iyengar, 1978) proved that these elements required by the body and having unknown function in the body.

Keeping in view the diverse role of different trace elements in reproduction etc. *P. verticillium* proved to be a good nutraceutical rich in different and essential trace elements.

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