J. Phytol. Res. 9 (1): 73–74, 1996

MINERAL COMPOSITION OF *MURRAYA KOENIGII* SPRENG INFECTED WITH LEAF CURL DISEASE

T. G. NAGARAJA
Department of Botany, The New College, Kolhapur-416012, India.

The mineral analysis of leaves of *Murraya koenigii* Spreng infected with leaf curl disease was done. The infection stimulates, the accumulation of elements like calcium, magnesium, cobalt and lead. On the contrary sodium, potassium, manganese, iron, nickle and copper contents decreased in the infected leaves.

Keywords: Leaf curl; Minerals; *Murraya koenigii*.

The *Murraya koenigii* Spreng is one of important perennial medicinal shrub, used as a tonic[1] as well as to flavouring the food stuff, being exported on large scale to England[2]. It is generally cultivated by seeds in kitchen gardens for its leaves. This shrub often gets affected by various diseases. An attempt was made to study the mineral contents of *Murraya koenigii* Spreng leaves infected by leaf curl virus disease.

Freshly harvested healthy and infected leaves of *M. koenigii* Spreng were used for the mineral study. The 500 mg of dried healthy and infected leaves were acid digested, according to the method of Toth *et al.*[3] The minerals like sodium, calcium and potassium were estimated by Flame Photometer method, whereas the elements like magnesium, manganese, iron, cobalt, lead, nickle and copper were estimated by Atomic Absorption Spectrophotometer model Perkin Elmer 3030.

The results were depicted in the Table 1. The sodium and potassium contents in the leaves of *M. koenigii* Spreng shows a considerable decreased amount in young and mature infected leaves (Table 1). The reduced content of sodium in the leaves may be due to rapid uptake by the pathogen for its growth as reported by Allen and Arnon.[4] The increased content of calcium in the infected leaves of *M. koenigii* Spreng may be due to resistance of pectin substances and cell wall against enzymatic degradation as reported by Kiraley and Gilley[5] or infection causes deviation in calcium translocation which may result in its accumulation at infection site as repoted by Panopoulos *et al.*[6]

The magnesium content get increased in the infected leaves of *M. koenigii* Spreng (Table 1). The increased content of magnesium indicates, the non-utilization by the pathogen, thereby it get accumulated in the infected site[7]. Iron is essential for enzymes of respiration, hence it increased, may be due to failure to be translocated or to move to physiologically active site as reported by Brown[8]. The manganese content in the leaves of *M. koenigii Spreng* (Table 1) get decreased in diseased parts. This reduced manganese content indicates, the utilization by the pathogen.

The trace elements such as cobalt and lead contents were considerably increased in the infected leaves of *M. koenigii* Spreng (Table 1). The cobalt is essential and its participation in respiration and energy metabolism was shown by Yagodin[9]. The cobalt content in the young infected leaves shows decreased content, but in the mature infected leaves it reveals enchanced condition. The element lead alters various enzyme activities in the plants. The increased contents

Table 1. Mineral composition of *Murraya koenigii* Spreng leaves infected with Leaf curl disease.

Minerals*	Young Healthy	Young Infected	Mature Healthy	Mature Infected
Sodium	1500.0	1260.0	1210.0	1190.0
Potassium	970.0	440.0	750.0	370.0
Calcium	1430.0	2135.0	2530.0	3725.0
Magnesium	913.0	771.0	1188.0	2057.0
Manganese	4.0	3.8	4.2	3.6
Iron	51.4	64.4	60.6	60.4
Cobalt	6.0	4.8	3.8	4.0
Nickle	6.4	7.2	7.8	5.2
Lead	19.8	21.2	20.6	21.4
Copper	3.0	2.4	1.8	1.6

*Expressed as mg 100^{-1} g dry tissue.

of cobalt and lead indicates that pathogen stimulates more uptake of these elements for its metabolism and disease development[7].

The elements such as nickle and copper reveals reduced contents in the infected leaves of *M. koenigii* Spreng (Table 1). The copper is required as co-factor for several enzymes, hence it consumed by the pathogen. Similarly element nickle get reduced in mature infected leaves indicates its essentiality to the pathogen, obviously at initial stage of infection, nickle was not consumed by the pathogen (Table 1).

Acknowledgement

The author is very much thankful to U. G. C. authorities for providing financial assistance.

References

1. Anonymous 1980, *Nutritive value of Indian Food.* National Institute of Nutrition, Indian Council of Medical Research Hyderabad.
2. Lalitha S, Thamburaj S and Thangarj T 1995, *Kisan World 22 (7)* 56
3. Toth S J, Prince A L, Wallace A and Mikkelsen D S 1948, *66* 466
4. Allen M B and Arnon D J 1955, *Physiol. Plant. 8* 660
5. Kiraley Z and Gilley A 1976, *Rept. First Nat. Symp. Plant Immunity* Nov 29-2 Dec Kostin
6. Panopoulos N J, Faccioli G and Gold A H 1972, *Plant Physiol. 50* 270
7. Nagaraja T G 1994, *Indian bot. Reptr. 13 (1+2)* 32
8. Brown J C 1976, *In: Proc. Workshop on Plant Adaptation to Mineral Stress in Problem Soils* (Ed) Wright M J and S A Ferrai Pb. Cornell University, Ithaca. New York, 94
9. Yagodin B A 1970, *Nauck,* Moscow pp 343