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A STUDY OF CHEMO TOXICITY AND TRACE ELEMENTS INTAKE BY STEM, SEED AND LEAF OF PHASELOUS AURUES

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ABSTRACT

Soil degradation from various inorganic and organic contaminants, is not only an ecological risk, but simultaneously it is also a Socio-economic issue, such soils become poor in physicochemical properties, susceptible to erosion, loss of productivity, sustainability and diminished food chain quality. Soil samples were prepared with soil + NPK + chemical waste effluent for analysis. Analysis were carried out for selected parameters intake by stem, seed and leaf of phaselous aurues i.e.total phosphorous, total nitrogen, K, Mn, Zn, Mo, B and Cu etc. Results indicate the variation in parameters.

Keywords-Chemical Waste Effluent, Chemo Toxicity, NPK, Physicochemical Analysis, Soil Productivity

I. INTRODUCTION

The term "soil testing" refers to the full range of chemical, physical and biological tests that may be carried out on a submitted sample of soil, though in the present context only nutritional aspects will be considered. Soil testing has a long history in Australian agriculture, and has contributed significantly to the development of modern scientifically-based production systems. More recently, it has become an important, but all too often a misused, tool for turf producers and turf managers. The present paper explains the principles on which good soil testing is based, how the results should be interpreted, and what can realistically be expected of a soil test in turf situations. Soil testing may be carried out for various purposes. Its main uses include:

1) Assessment of land capability for various forms of agriculture,
2) Identifying and quantifying soil constraints (e.g. salinity),
3) Monitoring of soil fertility levels.
4) Providing guidelines as to the type and amount of fertiliser to be applied for optimum plant growth on the particular site and
5) As a diagnostic tool to help identify reasons for poor plant performance.

II. BASIC REQUIREMENTS

There are three basic steps that must be followed if meaningful results are to be obtained from soil testing. These are:

1) To take a representative sample of soil for analysis,
2) To analyze the soil using the accepted procedures that have been calibrated against fertiliser experiments in that particular region and
3) To interpret the results using criteria derived from those calibration experiments.

Soil analysis provides information which can be used to improve soil fertility through management. The extent to which soil fertility can be improved depends on the inherent properties of the site – soil texture, mineralogy, slope and climate. Soil structure is also key to plant performance as it affects the ability of plant roots to access available nutrients. Soil analysis is important in organic farming for nutrient management planning (e.g. rotational plans, making best use of manures, fertilizer application), to prevent long term nutritional and health problems (crop and livestock), prevention of pollution and for derogations for use of restricted inputs.

A one-off soil analysis simply provides a snapshot of nutrient availability at a particular time.

Soil analysis should be repeated at regular intervals to identify trends in nutrient availability and adjust nutrient management accordingly. The soil analysis itself is only the first step. Specialist interpretation and recommendations are equally important. Soil analysis should be interpreted in rotational context. Large quantities of nutrients can be exported when selling a single crop, e.g. potash in potatoes. Interpretation should take account of the local conditions and crop; it may not be cost effective to set the same targets for lowland as for upland sites. Use annual soil analysis from one or two representative fields alongside nutrient budgets to track soil fertility changes over time.

III. ESSENTIAL NUTRIENTS

In addition to carbon, hydrogen and oxygen which form the basis of all organic compounds, healthy turf grass requires sufficient amounts of 14 essential nutrient elements. These essential elements are divided into **macronutrients**(required in larger quantities because of their structural roles in the plant) and **micronutrients**(required in smaller quantities because they tend to be involved in regulatory roles in the plant). Nitrogen (N), phosphorus (P) and potassium (K) are the primary macronutrients, and the ones most often in short supply in soils. The elements N, P and K are therefore the most likely to require replenishment in the form of applied fertiliser. Deficiencies of the secondary macronutrients—calcium (Ca), magnesium (Mg) and sulphur (S)—are less commonly encountered. The micronutrients required are iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), molybdenum (Mo), boron (B), chlorine (Cl) and nickel (Ni); but in practice the main micronutrient deficiencies that concern us with turf grasses are iron and manganese.

Any of the above essential elements may also be present in excessive amounts, which can result in toxic effects (e.g. B and Mn). Other elements or groups of elements (e.g. sodium, bicarbonate) may also contribute to the toxic effects seen, for example, in saline or sodic soils. Sodium (Na) has been demonstrated to be an essential element for some plants with a special photosynthetic pathway, but in practice problems result from excessive amounts of Na, not deficiencies.

IV. MATERIALS AND METHODS

Soil samples were prepared with different composition of soil + NPK + CWE for six different experiments. All the chemicals used were of AR grade.Double distilled water was used for the preparation of reagents and solutions.

V. RESULTS AND DISCUSSION

The table shows the variation in parameters with different compositions of soil, NPK and CWE.

S. No.	Parameter	Unit	Stem						Seed						Leaf					
			1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
1	Total N	%	4.0	4.3	4.9	5.3	5.5	6.0	0.16	0.16	0.17	0.23	0.33	1.2	0.13	0.17	0.19	0.24	0.27	0.32
2	Total P	%	2.9	3.0	3.1	3.6	3.5	4.3	2.3	2.4	2.6	3.1	3.1	3.4	4.8	5.3	5.3	5.8	5.8	6.1
3	K	%	0.33	0.284	0.27	0.31	0.34	0.45	0.93	0.98	0.99	1.20	1.30	2.30	0.130	0.150	0.150	0.160	0.190	0.240
4	Zn	Ppm	6.2	7.1	7.8	8.8	9.0	9.2	1.3	2.3	2.8	2.9	3.6	3.9	3.9	4.0	4.1	4.1	5.3	6.5
5	Mn	%	5.5	5.4	5.5	5.7	5.7	6.0	0.50	0.50	0.51	0.54	0.58	0.63	5.3	5.3	5.4	5.5	5.6	6.0
6	Mo	%	0.11	0.11	0.12	0.13	0.17	0.17	0.03	0.03	0.04	0.05	0.06	0.08	0.14	0.15	0.17	0.18	0.27	0.29
7	B	%	1.57	1.52	1.54	1.58	1.59	1.59	0.13	0.14	0.10	0.11	0.20	1.2	1.4	1.4	0.10	1.3	1.4	1.1

8	Cu	ppm	5.2	5.0	4.9	5.3	5.9	5.9	3.29	3.40	3.40	3.50	3.30	3.60	5.4	5.4	5.4	5.6	5.7	5.9

1. Soil + NPK
2. Soil 90 % + NPK + 10 % CWE
3. Soil 80% + NPK + 20 % CWE
4. Soil 70% + NPK + 30 % CWE
5. Soil 60 % + NPK + 40 % CWE
6. Soil 50 % + NPK + 50 % CWE

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