

FOLIAR CONTENT OF NUTRIENTS IN RAPE-SEED

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Summary

Rape-seed is a crop that has only recently been introduced in Spain, and it is interesting now to determine the normal levels in adult leaf of the most important --- macro and micro-elements. Mean values found were: Nitrogen (%) 3.31; phosphorus(%) 0.22; potash(%) 2.05; calcium (%) - 4.33; magnesium(%) 0.74; iron(p.p.m.) 112; manganese(p.p.m.) 133; copper(p.p.m.) 6; zinc(p.p.m.) 18.6; and boron -- (p.p.m.) 28. Analysis were carried out on leaves from five cultivars(Quinta, Si-7440/76, R-51, Libelle, Librador); -- the material of each of the four repeats came from a random block assay, located in Malpica de Tajo(Toledo), carried out during the 1980/81 season.

Introduction

The first historic reference of interest in this rape-seed crop in Spain is due to NAVARRO (1773), although the first systematic attempts to introduce it pertain to our present century. The most recent one was in 1976 (SOBRINO, 1978) and during the present 1982/83 season a sown area of around Hec. was obtained.

During the introduction, various problems have arisen, and one very important was the severe drought that most parts of the Spanish Peninsula have suffered over the last four years. It does however seem possible that the rape-seed crop will be definitively established in Spain and reach an important position among extensive crops.

Based on this, it has been considered interesting to determine the normal values in adult leaf of the most important macro-elements (N,P,K,Ca,Mg) and the micro-elements (Fe,Mn,Zn, - Cu,Mo,Bo), since this data has not been found in the bibliography that was consulted, and a knowledge of same could prove useful in studying deficiency symptoms that may appear when the crop has widespread growth.

Material and Methods

The plant material comes from a random block cultivars test, located in Malpica de Tajo (Toledo) during the 1980/81 season, on soil of slime-sandy texture; the analysis is given in table 1, and made under dryland conditions. The adult leaves of the middle part of the stalk were taken from each of the 4 replication at the same vegetative moment (full bloom), for each cultivar, set out in table 2. The samples that were taken in this area was because no nutritive deficiency had been detected or any other abnormality of any kind that restricted the growth of the rape-seed, in addition to it being one of the places of irradiation of the crop.

The leaves selected were washed in the laboratory with water and after drying in forced air heater at 65°C, they were ground up. The techniques used were chosen in accordance with MONTAÑES et col. (1972) and were as follows:

On green matter:

- Nitrogen: Kjeldahl method, using metal selenium as catalyst.

On the ashes:

- Total phosphorus: vanadatum-molybdatum method and reading of colour in Beckman DB spectrophotometer at 420 nm.

TABLE 1.- Chemical definitions of the soil where the test was made.

pH (H ₂ O)	8.30
Total carbonates %	9.58
Organic matter %	0.921
Total nitrogen %	0.077
Assimilable phosphorus mg/110 g	35.40
Assimilable potash mg/100 g.....	18.00
Assimilable calcium (p.p.m.)	3.000
Assimilable magnesium (p.p.m.)	350
Conductivity extract 1/5 mmhos/cm	0.522
Fe (ppm) Total.....	14,600.0
Assimilable (DTPA).....	3.3
Mn (ppm) Total.....	308.0
Assimilable (DTPA).....	6.7
Cu (ppm) Total.....	11.0
Assimilable (DTPA).....	0.4
Zn (ppm) Total.....	40.0
Assimilable (DTPA).....	0.4
Co (ppm) Total.....	11.0
Assimilable (DTPA).....	0.1
Ni (ppm) Total.....	16.0
Assimilable (DTPA).....	0.2

TABLE 2.- Cultivars used with their origin and characteristics.

CULTIVAR	ORIGIN	CHARACTERISTICS
Quinta	N.P.Z. (Germany)	Low erucic.
Si-7440	N.P.Z. (Germany)	Low erucic.
R-51	Ringot (France)	Low erucic.
Libelle	D.S.V. (Germany)	Low erucic.
Librador	D.S.V. (Germany)	Low erucic and Low glucosinolates

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- Potash: flame photometry.
- Calcium, Magnesium, Iron, Zinc, Copper and Manganese: by --
atom absorption (Perkin-Elmer 303)
- Borum: by azometrine H.

Results and Discussion

The contents of diverse macro and micro-elements obtained as mean of the four analysis for each cultivar, are compiled in table 3. Significant differences (at level 5%) are only observed in the Mg content, whereas they are not observed in the content of the remaining macro and micro-elements analysed, in spite of the different origin of the cultivars used, one of them (Librador) -- "double zero" type, which in addition to the low content in erucic acid also has a low content in glucosynolates.

The mean values of the five cultivars used are set out in -- table 4 and are considered normal levels in adult leaf for the -- area where the test was developed.

References

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TABLE 3 -- Mean contents(4replications) of various macro and micro nutrients in adult leaf, in five -- rape-seed cultivars.

CULTIVAR	N (%)	P (%)	K (%)	Ca (%)	Mg (%)	Fe (ppm)	Mn (ppm)	Cu (ppm)	%n (ppm)	Do (
Quinta	3.19	0.225	1.83	4.61	0.77	103	139	5	18	:
Si-7440/76	3.44	0.222	1.89	4.95	0.86	120	146	6	18	:
R-51	3.33	0.240	2.26	4.54	0.74	121	149	8	24	:
Libelle	3.26	0.228	2.34	3.54	0.63	105	110	5	17	:
Librador	3.28	0.208	1.93	4.00	0.70	112	119	5	16	:
	N.S.	N.S.	N.S.	N.S.	S.	N.S.	N.S.	N.S.	N.S.	N.

N.S. = Not significant at level 5%

S. = Significant at level 5%

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TABLE 4.- Mean contents obtained in 5 cultivars of diverse macro and micro-nutrients in adult leaf of rape-seed.

MACRO-ELEMENTS	MEAN OF 5 CULTIVARS
N (%)	3.31
P (%)	0.223
K (%)	2.05
Ca (%)	4.33
Mg (%)	0.74
MICRO-ELEMENTS	
Fe (ppm)	112
Mn (ppm)	133
Cu (ppm)	6
Zn (ppm)	19.6
Bo (ppm)	28