

RELATIONS BETWEEN CHLOROPHYLL AND PROTEIN LEVELS IN ALFAFA LEAVES, *Medicago Sativa* L.

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INTRODUCTION

Some alfafa dealers' advertisements are made claiming that "the darker alfafa is, the more protein it has". Since there is an apparent theoretical support for this statement (2a, 2b, 3, 4, 5, 6 and 7) it seems to be reasonable to attempt to verify experimentally the degree of certitude of the dealers' claim.

MATERIAL AND METHODS

Aerial parts of nine varieties of alfafa, *Medicago sativa*, L., cultivated in Arizona, U.S.A., were analyzed for Chlorophyll content according to the method of Kirk(3) and protein by the Kjeldahl method. The varieties were: NK 919, Washoe, Moapa, El Camino, Joaquin II, Lahotan, Mesilla, Advance AS 13, and Mesa Sirsa. The field experiment comprised three repetitions, with one blank for better randomization, with mechanized harvesting, on irrigated soil.

RESULTS AND DISCUSSION

The results expressed for total chlorophyll, chlorophyll A and B, dry matter, and crude protein in percentages on wet basis are presented on Table I. On wet basis the average results for crude protein and total chlorophyll, in this order, were: NK 919, 7.64 and 0.18%; Washoe, 6.24 and 0.14%; Moapa, 8.54 and 0.19%; El Camino, 7.36 and 0.13%; Joaquin II, 7.99 and 0.20%; Lahotan, 8.67 and 0.18%; Mesilla, 7.75 and 0.17%; Advance AS 13, 8.08 and 0.17%; Mesa Sirsa, 6.54 and 0.16%. The regression analysis showed a correlation coefficient of +0.64.

As noted by the majority of the authors (1-6), sampling is the principal problem in pigment analysis. Possibly the use of the whole plant instead of just aerial parts as sample would decrease this kind of error. It is also advisable to conduct the experiment in greenhouses, where the effect of the position of the plant in relation to the sun is minimized, among other factors. Also it is suggested the necessity of the determination of carotenoid pigments, at least by the use of the spectrophotometric equations derived by Kirk and Allen(4), as a first action method.

CONCLUSIONS

There is a positive correlation between crude protein and total chlo-

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TABLE I

Average Content of Chlorophylls and Crude Protein in Alfafa Leaves. Tucson, Arizona, USA, 1976

Variety	Dry Matter (%)	Crude Protein (%)	CHLOROPHYLL (%)		
			Total	A	B
NK 919	31.25	7.64	0.18	0.10	0.08
Washoe	22.86	6.24	0.14	0.08	0.06
Moapa	30.48	8.54	0.19	0.11	0.08
El Camino	27.94	7.36	0.13	0.07	0.06
Joaquin II	29.20	7.99	0.20	0.11	0.09
Lahotan	29.46	8.67	0.18	0.10	0.08
Mesilla	29.44	7.75	0.17	0.10	0.07
Advance	30.44	8.08	0.17	0.11	0.06
Mesa Sirsa	30.29	6.54	0.16	0.09	0.07

rophyll percentages on the alfafa varieties studied, except for the variety El Camino. This preliminar work, however, deserves further studies and the authors suggest its continuation at least based on the considerations above discussed. The lowest protein content was found in leaves of the variety Washoe (6.24%) and the highest in the variety Lahotan (8.67%), being the later considerably darker than the former.

SUMMARY

Nine varieties of alfafa (*Medicago sativa*, L.), NK 919, Washoe, Moapa, El Camino, Joaquin II, Lahotan, Mesilla, Advance AS 13, and Mesa Sirsa were tested for crude protein content versus total chlorophyll percentages. There was a positive correlation between average results of these compounds. Further studies were suggested and some considerations were presented.

SUMÁRIO

Nove variedades de alfafa (*Medicago sativa*, L.) cultivadas no Estado do Arizona, U.S.A., NK 919, Washoe, Moapa, El Camino, Joaquin II, Lahotan, Mesilla, Advance AS 13, e Mesa Sirsa foram analisadas e os teores de proteína bruta e clorofila total foram estatisticamente comparados. Foi constatada uma correlação positiva entre os valores individuais médios destes dois compostos. Foram sugeridos, pelos autores,

estudos mais detalhados dessas variáveis e algumas considerações foram apresentadas.

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