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"EFFECT OF SULPHUR APPLICATION ON THE YIELD AND
QUALITY OF ONION (*ALLIUM CEPA* L.)"

Sulphur is one of the essential plant nutrients which forms a constituent of protein in plants. It is one of the important secondary nutrients required for the plants for the synthesis of amino acids, cystine, and methionine and hence for protein elaboration. Tisdale *et al.* (1950) observed that in alfalfa the percentage of methionine and cystine increased with increase in concentration of sulphur. Schwimmet *et al.* (1962) found that the pyruvic acid formed was one of the measure of pungency of onion and garlic. The present study was undertaken to gain a better understanding of the effect of different sources of sulphur on the quality of onion in the two soils of Coimbatore district.

A pot experiment was conducted to study the effect of different forms of sulphur on the quality of onion using two representative soils viz. Red (Irugur series) and Black (Dasarpatti series). The soils were ground well to pass through 2 mm sieve and 5 kg of soil was taken in each pot. There were seven levels of sulphur treatments (Vide Table I). All the treatments received recommended doses of N.P.K. The entire quantity of sulphur was applied as basal dose two days prior to sowing. Onion variety culture 1094-63B of Millet Breeding Station, Tamil Nadu Agricultural University, Coimbatore was used. The crop was harvested after 75 days and the bulbs under different treatments were analysed for sulphur containing amino acid and pyruvic acid following Block *et al.* (1958) and Hart and Fisher (1971) methods respectively.

Results are given in Table 1. Significant differences between soil types was observed with respect to bulb yield; black soil recorded higher yield. This might be due to the larger amounts of available nutrients like nitrogen, phosphorus and sulphur. There was no response to sulphur beyond the level of 20 kg/ha. In case of straw also the same trend was observed. The results agreed with the findings of Paterson, *et al.* (1960).

The amino acid content cystine and methionine increased with increase in dose of sulphur. This was in accordance with the report of Tisdale *et al.* (1960). Red soil was found to be significantly superior to black soil. Among the treatments also there were significant differences with regard to the content of cystine. Application of sulphur 30 kg/ha was superior to other treatments in both the soils. Among the sources calcium sulphate was found to be superior. The increase in concentration of sulphur containing amino acids took

Table 1 Yield, amino acid and pyruvic acid content of onion bulb (Mean values)

Soil type	Treatments		Yield (g/pot of 5		Amino acid In (g)		Pyruvic acid moln/g
			Straw	Bulb	Cystine	Methionine	
Red	0.0 kg	Sulphur (control)	22.5	17.5	15.50	12.25	2.0
do	10.0 kg	do as ammonium sulphate	22.5	17.5	17.25	13.47	2.0
do	20.0 kg	do do	12.5	27.5	20.50	17.75	2.7
do	30.0 kg	do do	20.0	32.5	22.75	20.50	4.0
do	10.0 kg	do as calcium sulphate	15.0	20.0	16.75	21.70	1.7
do	20.0 kg	do do	27.5	32.0	22.0	36.37	2.2
do	30.0 kg	do do	15.0	32.5	24.50	38.97	3.5
Black	0.0 kg	Sulphur (control)	17.5	28.5	12.00	11.62	2.0
do	10.0 „	do as ammonium sulphate	27.5	32.5	16.00	21.25	2.2
do	20.0 „	do do	25.0	45.0	17.75	29.12	3.2
do	30.0 „	do do	17.5	25.0	25.00	31.25	4.0
do	10.0 „	do as calcium sulphate	17.5	45.0	17.50	22.75	1.2
do	20.0 „	do do	22.5	46.0	20.50	34.50	2.2
do	30.0 „	do do	17.5	32.5	22.25	62.75	2.9

Cystine	C. D. (P = 0.05) = 0.563	Methionine	C. D. (P = 0.05) = 0.289
Treatment	C. D. (P = 0.05) = 0.791	Soil	C. D. (P = 0.05) = 1.06
Source	C. D. (P = 0.05) = 0.563	Treatment	C. D. (P = 0.05) = 1.05

place through "all or none" process which was controlled by the synthesis of plant protein.

There was no significant differences between red and black soils with reference to the pyruvic acid content of the bulbs. Among the treatments, application of sulphur at 30 kg/ha was found to be superior but it was on par with 20 kg/ha. There was an increase in pyruvic acid content with increase in sulphur application and this may be due to increased synthesis of volatile sulphur compounds.

സംഗ്രഹം

ഉള്ളിലെടികൾക്കു ഗന്ധകാംശമുള്ള വളം ചേർക്കുന്നതുകൊണ്ടു വിളവെടുക്കുന്ന ഉള്ളിയിൽ 'സിസ്റ്റിൻ' 'മിതയോണിൻ' എന്നീ അമിനോ ആസിഡുകൾ വർദ്ധിക്കുന്നതായികണ്ടു. ഹെക്ടറിനു 20 kg എന്ന തോതിൽ ഗന്ധകം ചേർക്കുന്നതാണു നല്ലതെന്നും 'അമോണിയം സൾഫേറ്റ്' എന്ന വളം ഈ ആവശ്യത്തിനു യോജിച്ചതാണെന്നും പരീക്ഷണങ്ങൾ തെളിയിച്ചു.

REFERENCES

- Block, R. J., E. L. Durrum and G. Zweig, 1959. *A Manual of Paper chromatography and Paper electrophoresis. Academic Press Inc., New York, 710*
- Hart, A. M. and H. J. Fisher, 1971. Vegetable and Vegetable Products. *Modern Food Analysis* 416—438.
- Peterson, D. R., H. T. Black Hurst and S. H. Siddique, 1960. Some effects of nitrogen and phosphoric acid on the pre-matured seed stalk development. Yield and composition of three onion varieties. *Proc. Amer. Soc., Hon. Sci., 76, 460—467.*
- Scwimmer, *et al*, 1962. Determination of Pyruvic acid in dehydrated onion quoted by Hart and Fisher in *Modern Food analysis* 416—438
- Tisdale S. L., R. L. Davis and E. T. Mertz., 1950. Methionine and Cistine content of two strain of Alfalfa as influenced by different concentrations of sulphore ion. *Agron. J.* 42, 221—225.

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