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Effect of Salt Solution Spray on Paddy Grain Maturity

By

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ABSTRACT

A field experiment conducted to study the effect of salt solution spray on the ears of paddy revealed that there was appreciable reduction in moisture content of grain and the grain colour changed from green to yellow, which helped the advancement of harvest. The treatment did not affect the viability of the grain. Significant differences were observed in protein content of kernel and 1000-grain weight. However, there was no significant difference in the carbohydrate content of kernel and the milling qualities of grain.

INTRODUCTION

It would be a distinct advantage if the ripening of paddy grain which now takes 15 days or more can be hastened within a few days after the grain maturation. This would lead to an early harvest helping to minimise the field losses on account of scattering, damage by rodents and bird etc., which accounts for 10-20 per cent of grains (Bhole *et al.*, 1970). This would also facilitate harvesting of *kuruvai* crop before the onset of monsoon and timely planting of the succeeding *thaladi* crop in Tamil Nadu.

Smith *et al.* (1959) observed that spraying with a mixture of sodium and magnesium on the ears of paddy at 20-27 per cent moisture could reduce the moisture content at the rate of 1 per cent per day. Similar result by spraying sodium chloride was reported by Pillaiyar *et al*, (1973). A field experiment was laid out during *kuruvai* season, 1973, with a view to study the effect of spraying of sodium chloride solution (15 per cent) on the maturity, millage and biochemical qualities of CO 33 (Karuna) paddy grain.

MATERIALS AND METHODS

The experiment was laid out in randomised block design with four treatments and five replications. The plot size being 3 x 2 m and seedlings planted with a spacing of 15 x 10 cm. A common fertilizer dose of 50:25:25 kg/acre of N, P and K was adopted.The

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seedlings were raised on 23—6 - 73 and planted on 19—7 - 73.

Common salt (Sodium chloride) at 15 per cent concentration was sprayed on the ears of paddy using a high volume sprayer. The harvest was taken up in four stages on the third day of spraying and the control plots were harvested without salt solution spray after the normal duration of the crop. The grain moisture of both sprayed and unsprayed paddy was determined by gravimetric method of harvest.

The biochemical qualities, protein and carbohydrate content and the milling qualities viz., suncracks, head rice recovery and brokens were assessed as per approved methods. Germination tests were also conducted for all the treatments.

The treatments consisted of spraying salt solution on paddy ears 20 days after 50 per cent flowering (S_1) 25 days after 50 per cent flowering (S_2) 30 days after 50 per cent flowering (S_3) and control (S_4) (no spraying and harvested 35 days after 50 per cent flowering).

RESULTS AND DISCUSSION

i) **Grain moisture:** Grain moisture reduction was quickly accomplished and the less was from 2.3 to 3.7 per cent in sprayed plots in the course of 72 hours, while the loss in natural course was only 0 to 1.6 per cent over a period of 5 days (Table 1). The movement of water from the kernel into the outer medium is facilitated through exosmosis process (Vasan *et al*, 1973). This accomplishment

TABLE 1. Effect of salt solution spray on the ears of paddy Co. 33

Stages	Moisture content of grain at harvest per cent		Grain yield [kg/plot at 11% m. c.	1000 grain weight [g]	Kernel protein [%]	Kernel Carbohydrate [%]	Head grain [%]	Brokens [%]	Suncracks [%]	Seed viability [%]
	Unsprayed	Sprayed								
S1	24.6	22.3	2.174	16.455	9.59	83.21	96.8	3.2	7.2	95.1
S2	24.4	21.8	3.006	16.491	9.80	83.10	96.4	3.6	7.8	95.3
S3	22.8	20.5	3.367	17.229	10.08	81.96	93.8	6.2	8.6	93.0
S4	21.6	...	3.474	17.177	9.31	82.65	94.4	5.6	8.4	97.2
S. em	...	...	0.18	0.184	0.049	NS	NS	NS	NS	NS
CD 5%	...	...	0.392	0.396	0.106	...	...	...	...	...

would be an added advantage in drying process.

ii) **Colour change:** The change of grain colour from green to yellow was very marked in the salt sprayed plots, within few hours of spray. The effect of the spray on the quick transformation of chlorophyll into xanthophyll and other pigments was noticed. These changes were observed in all the salt solution sprayed treatments.

iii) **Grain yield:** The results showed significant differences in yield in the various treatments. The unsprayed control recorded the maximum yield, while stage 1 recorded the minimum. Though the yields recorded in the stages 2 and 3 were less when compared to the control plots there is an added advantage of early harvest, when the weather hazards interfere at the critical periods thereby saving the grain and grain quality. At such times it is advisable to save the crop by resorting to salt solution spray, instead of allowing it to be damaged by rain hazards.

iv) **Test grain weight:** There was significant difference in 1000-grain weight due to spraying of salt solution. As could be expected stage 3 and stage 4 (normal harvest) recorded higher test grain weight than the early stages. It is obvious that proper growth and development and dry matter accumulation of grain occurs only upto a certain stage. Probably in this study also the dry matter accumulation attains its maximum by about the third stage.

v) **Kernal protein content:** Significantly higher protein percentage was recorded in stage 3 and lower protein content in stage 4. From the data it is observed that the protein content progressively increases from stage 1 to stage 3 as the grain matures but there was a sudden decrease in protein content in the stage 4 (Normal harvest - no spray). This does not lead to the identification of any definite trend. Further work, however, is needed for arriving at any conclusion.

vi) **Kernel carbohydrate content:** There was no significant difference due to the spraying of salt solution in various stages.

vii) **Milling qualities:** After milling, the percentage recovery of head rice, broken grain and development of suncracks were determined. It is observed that the percentage of full grain and broken grain after milling and sun cracks were not influenced by salt solution spray.

viii) **Viability:** The germination tests conducted, revealed no significant differences among the treatments.

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