



## REVIEW OF RESEARCH



### TO STUDY THE CHANGES IN CHEMICALS ASSOCIATED WITH THE STORAGE OF LUCERNE LEAF JUICE

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#### ABSTRACT

Attempts have been made during present investigation to study the changes associated with the storage of leaf juice of Lucerne (*Medicago sativa* L.) juice. Leaf juice was extracted from green foliages of Lucerne (*Medicago sativa* L.) and stored for 48 hours. Studies on biochemical changes during storage revealed that the dry matter (DM), pH of the juice, nitrogen (N) content in juice and chlorophyll content in the juice gradually decreased and increase in the amount of lactic acid is observed when the juice was stored upto 48 hours.



**KEYWORDS:** *Lucerne, Leaf Juice, Biochemical changes, Lactic Acid, Chlorophyll content.*

#### INTRODUCTION

Lucerne (*Medicago sativa* L.) leaves were employed for extraction of leaf juice by mechanical fractionation. As the leaf juice releases the autolysis process leads to catabolism which involves breakdown of complex chemical compounds including protein. As a result of this the recovery of protein decreases with the decreases in the yield of leaf protein concentrate (LPC). To avoid this situation and to prevent nutrient losses, the delay between harvesting, pulping, pressing recovering the juice and heating is to prepare LPC should be avoided (Pirie, 1978). The leaf juice is prone to chemical change and its composition changes rapidly Nasi (1983). Proteolytic activity, chlorophyll breakdown anaerobic fermentation and microbial growth deteriorate the juice involving formation of lactic acid and decrease in the protein content (Chessman, 1977, Stewart and Houseman, 1977; Pirie, 1978). Singh (1962) observed that from 7 to 20 % of protein was autolysed due to the incubation of leaf extract for 2 hours at 37 °C. The overall results indicate that storage of leaf juice for few hours leads to depletion of nutrient and other organic compounds. Attempts have been made during present investigation to study biochemical changes associated with the storage of leaf juice extracted from green foliage of Lucerne (*Medicago sativa* L.).

## MATERIAL AND METHODS:

Fresh leaves of Lucerne (*Medicago sativa* L.) were obtained early in the morning from local vegetable market. Fresh leaves were immediately brought to the laboratory washed with water and the leaves were crushed and pressed to release the leaf extract. The leaf juice released during pressing was employed for the experimental purpose. The samples of juice were stored at room temperature (23 to 36 °C) in conical flask plugged with cotton and the samples of stored juice were collected after every 04 hours till 48 hours of preservation.

The juice sample was dried in oven at  $60 \pm 05$  °C till constant weight for the determination of dry matter (DM). The pH of the juice was measured using glass electrode on pH meter. Method of Barker and Summerson (1941), described by Oser (1979) was employed for the estimation of lactic acid. The amount of chlorophyll, chlorophyll a and chlorophyll b were estimated following Yoshida et. al., (1976). Dry samples of leaf extracts were taken for the estimation of nitrogen (N). The nitrogen content was estimated following microKjaldhal method (Bailey, 1967). Statistical analysis of data is done by following (Mungikar, 1997).

## RESULT DISCUSSION:

**Table 1: Biochemical changes associated with the storage of Lucerne leaf juice.**

Time of storage	% Dry matter (DM)	pH	Lactic Acid (% of DM)	Nitrogen (N) % of DM in Juice	Chlorophyll mg / ml			Chlorophyll a:b ratio
					Total	Chlorophyll- a	Chlorophyll- b	
00	9.10	5.7	-	5.83	1.31	0.72	0.59	1:0.81
04	9.00	5.6	-	5.62	1.23	0.68	0.55	1:0.80
04	8.90	5.5	-	5.41	1.15	0.63	0.56	1:0.88
12	8.70	5.4	0.16	5.20	1.07	0.59	0.47	1:0.79
16	8.30	5.3	0.32	5.00	0.99	0.55	0.44	1:0.80
20	8.00	5.2	0.65	4.79	0.92	0.51	0.40	1:0.78
24	7.60	5.0	1.00	4.58	0.84	0.47	0.36	1:0.76
28	7.40	5.0	1.22	4.36	0.76	0.43	0.33	1:0.76
32	7.35	4.9	1.49	4.16	0.68	0.39	0.24	1:0.61
36	7.25	4.8	1.72	3.95	0.60	0.35	0.25	1:0.71
40	7.10	4.7	1.97	3.75	0.53	0.31	0.22	1:0.70
44	7.00	4.6	2.10	3.54	0.45	0.27	0.18	1:0.66
48	6.90	4.6	2.18	3.32	0.37	0.22	0.14	1:0.63
Mean	6.50	5.11	1.28	4.57	0.83	0.47	0.36	1:0.74
S. D.	1.54	0.37	0.73	0.81	0.30	0.16	0.14	1:0.07
C. V. %	23.69	7.24	57.03	17.72	36.1	34.0	38.9	0:10.6

The biochemical changes associated with the storage of Lucerne (*Medicago sativa* L.) leaf juice are given in table 1. With the storage of juice the dry matter (DM) content was decreased from the initial value of 9.10 % to 6.90 % at the end of 48 hours due to the catabolic activity. With the decrease in dry matter (DM) pH also decreased from 5.7 to 4.6 due to the formation of lactic acid at the end of 48 hours. Fermentation of leaf extract was speculated due to the formation of lactic acid during storage which was 2.18 % of DM of juice at the end of experiment. Such results were experienced and confirmed by earlier workers (Reddy and Mungikar, 1988b; Salve and Mungikar, 2009) is confirmed during this studies. The nitrogen content of dry matter (DM) in juice gradually decreased from 5.83 to 3.32 %. Medium variation was experienced in % of dry matter (C.

V. = 23.29). Large variation in lactic acid content was experienced (C. V. = 57.03 %). The chlorophyll content was also decreased during 48 hours while the chlorophyll a: b ratio remains almost unchanged and varied within the limits of 1: 0.81 to 1: 0.63.

The overall results presented in table 1 indicated the depletion of dry matter (DM), nitrogen (N), pH, chlorophyll and increase in the amount of lactic acid. The results also indicated that the nutrient content of fresh juice changes gradually.

### **SUMMARY AND CONCLUSIONS:**

The overall results showed that the dry matter (DM) content, nitrogen content, pH, total chlorophyll, chlorophyll-a, chlorophyll-b and chlorophyll-a: b ratio was decreased when the juice was stored upto 48 hours whereas gradual increase in lactic acid content is observed.

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