

**NOTE**

**Development of Spot Testing Strip for Determination of Urea and Neutralizer in Milk**

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The phenomenon of colour change by reacting reagents has been employed for development of spot testing strips for checking the purity of milk on the spot. The spot testing strips were treated with *p*-dimethyl aminobenzaldehyde and rosolic acid solutions in different concentrations and for different soaking times and tested for their effectiveness in detection of neutralizer and urea in milk.

Milk is extensively consumed countrywide due to its nutritive importance by people of all age-groups, specially infants, and adulteration of milk has taken a new dimension. The recent spurt in the incidences of adulteration of milk by synthetic milk has drawn the attention of consumers and food scientists alike. So, it was felt that a quick and handy test be developed to test the presence of urea and neutralizer (sod. bicarbonate) in milk. To attain this objective special chemical formulation treated paper strips have been developed and tested.

Urea<sup>1</sup> and neutralizers<sup>2</sup> are the most hazardous toxic adulterants of milk. Presence of urea in milk is determined by the reaction of *p*-dimethyl amino benzaldehyde solution (1.6% solution in alcohol + 10 mL of conc. HCl); in the presence of urea in milk the colour of this solution is changed to pale yellow. Rosolic acid solution (0.05% in 60% alcohol) gives red colour to milk in the presence of neutralizer (sod. bicarbonate). Both these tests can be carried out only in a laboratory having facility of wet chemical analysis. It is difficult to carry out these tests outside the laboratory. This problem is generally faced by food law enforcement authorities and by the general public alike. To overcome these limitations, spot testing strips have been developed.

**Urea Testing Strips:** Strips of Whatman No. 1 were cut in the dimensions of 3 cm × 12 cm and impregnated with *p*-dimethyl aminobenzaldehyde solution in the following concentrations and durations.

S. No.	Concentration in % of <i>p</i> -dimethyl amino benzaldehyde in alcohol + 10 mL conc. HCl	Duration (in min)		
1.	1.60	2	10	20
2.	1.80	2	10	20
3.	1.85	2	10	20
4.	2.00	2	10	20

The strips were air dried up to the moisture level of  $3.62 \pm 1.0\%$ . Butter paper was placed between the treated strips. A bunch of five strips of single type was made for convenience.

**Neutralizer Testing Strips:** Strips of Whatman filter paper No. 1 are cut in the dimension of  $3 \text{ cm} \times 12 \text{ cm}$  and soaked in rosolic acid solution in different concentrations and durations.

S. No.	Concentration of rosolic acid in % dissolved in 60% v/v EtOH	Time of soaking (in min)		
1.	0.05	2	10	20
2.	0.06	2	10	20
3.	0.08	2	10	20
4.	0.10	2	10	20

The strips were air dried upto the moisture level of  $3.62 \pm 1.0\%$ . Butter paper was placed between the treated and dried strips, a bunch of five such strips was made for convenience.

Standard solutions of 1500 ppm, 2000 ppm and 2500 ppm of sodium bicarbonate (LR grade) were made with pure milk for testing the neutralizer and standard solutions of 250 ppm and 500 ppm of urea (LR grade) were made with pure milk for testing urea. A sample of this milk was introduced with the help of a glass rod. The change in colour on strips was observed visually.

For rosolic acid treated strips, the colour changed with the development of a red spot at the place of introduction of neutralizer adulterated milk. The spot was moderate for strip No. 1 treated for 2, 10 and 20 min with 2000 ppm and 2500 ppm neutralizer (sod. bicarbonate) added milk. The spots was prominent on strips Nos. 2 and 3 soaked for 10 and 20 min with 1500 and 2000 ppm neutralizer and milk solution. Strip No. 4 show good results for 2, 10 and 20 min soaked strips. Strip No. 3 with 20 min soaking time was judged as optimum result giving for 1500, 2000 and 2500 ppm neutralizer + milk solution. The colour change can be noticed even after 10 days of application.

Standard of pure milk was also introduced on strips for comparison.

For *p*-dimethyl amino benzaldehyde treated strips, the colour changed with the development of a yellow spot at the place of introduction of urea adulterated milk. It was feeble for strip No. 1 soaked for 2 and 10 min in 250 ppm solution. It was better for 500 ppm solution of urea and milk. The observations for

strips Nos. 2 and 3 for 10 and 20 min soaked strips were comparable. It was noticeable for strip No. 4. ever for 2 min soaked strip. For 10 and 20 min soaked strip of No. 4 it was prominent. Strip No. 3 with 20 min soaking time was evaluated as the optimum result giving. The strip tested good for 250 ppm urea + milk solution and best for 500 ppm urea + milk solution. A standard of pure milk was also introduced simultaneously on strips for comparison. The colour change was permanent and can be noticed even after 15 days.

The conclusion, these strips are very useful and convenient for testing the adulteration of milk, adulterated with urea or neutralizer, by common consumers, food laws enforcing authorities and food scientists. The results can be obtained at the spot.

### REFERENCES

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