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APPENDIX

Appendix I

Analysis of Variance for Table 8-4

pH (A)	Temperature (°C) (B)			Totals
	40	50	60	
4	77.79	79.48	66.91	
	78.06	80.45	68.61	
	155.85	159.93	135.52	Σ 451.30
5	76.58	80.09	60.95	
	73.55	79.13	63.02	
	150.13	159.22	123.97	Σ 433.32
6	79.33	80.36	61.99	
	77.88	82.16	60.73	
	157.21	162.52	122.72	Σ 442.45
				Σ 1327.05

Factor A is pH.

Factor B is temperature.

Sum of square total (SSy) $= \left[\Sigma\Sigma\Sigma\, Y^2_{ijk}\right] - \left[(\Sigma\Sigma\Sigma Y_{ijk})^2/n\right]$

$= \left[(77.79)^2 + (78.06)^2 + (76.58)^2 + \ldots (60.73)^2\right] - \left[(77.79 + 78.06 + \ldots 60.73)^2\right] /18$

$= 98852.12 - 97839.71$

$= 1012.41$

Sum of square factor A $= \left[(\Sigma Y^2_{i..}/br)\right] - \left[(\Sigma\Sigma\Sigma Y_{ijk})^2/n\right]$

(SS_A)

$= \left[(451.30)^2 + (433.32)^2 + (442.45)^2\right]$
$/6 - \left[(77.79 + 78.06 + \ldots 60.73)^2\right]/18$

$= 97866.65 - 97839.71$

$= 26.94$

Sum of square of factor B (SS_B) $= \left[(\Sigma Y^2.j./ar)\right] - \left[(\Sigma\Sigma\Sigma Yijk)^2/n\right]$

$= \left[(157.21)^2 + (162.52)^2 + (122.72)^2\right]/6$
$- \left[(77.79 + 78.06 + \ldots 60.73)^2\right]/18$

$= 98772.57 - 97829.38$

$= 943.19$

Sum of square interaction AB (SS_{AB}) $= \left[(\Sigma\Sigma Y^2ij./r)\right] - \left[(\Sigma\Sigma\Sigma Yijk)^2/n\right]$
$- SS_A - SS_B$

$= \left[(155.85)^2 + (159.93)^2 + (135.52)^2\right]/2$
$- \left[(77.79 + 78.06 + \ldots 60.73)^2\right]/18$
$- SS_A - SS_B$

$= 98839.50 - 97839.71 - 26.94 - 943.19$

$= 29.66$

Sum of square of error (SS_E) $= SS_Y - SS_A - SS_B - SS_{AB}$

$= 1012.41 - 26.94 - 943.19 - 29.66$

$= 12.62$

Source of variation

Source	Degree of freedom	Sum of square	Mean square
A	2	26.94	13.47
B	2	943.19	471.50
AB	4	29.66	7.41
Error	9	12.62	1.40

Test for hypothesis

For interaction ;

$H : (\alpha\beta)ij = 0$

$f\ 9.99/1.40 = 7.136$

$f\ 0.05, 4, 9 = 3.62$

One may have at least 95% confident level that interaction exits.

For factor A

$H : \alpha i = 0$

$f\ (MS_A/MS_E) = 13.47/1.40 = 9.42$

$f\ 0.05, 2, 9 = 4.26$

At 95% confident level, pH affects percentage yield of nitrogen in autolysed yeast .

For factor B

$H : \beta j = 0$

$f\ (MS_B/MS_E) = 471.50/1.40 = 336.78$

$f\ 0.05, 2, 9 = 4.26$

At 95% confident level, temperature affects percentage yield of nitrogen.

Appendix II

Yate's Method for Table 8-6 (Cochran, 1957)

Treatment combination	total	1	2	3	Contrast means
1	113.89	256.52	569.99	1187.26	Mean effect = 74.20
a	172.63	283.47	617.27	191.3	A +23.91
b	114.38	307.31	113.45	-0.4	B -0.05
ab	169.09	309.96	77.85	-7.24	AB -0.91
c	133.39	58.74	-3.05	47.28	C +5.91
ac	173.92	54.71	2.65	-35.6	AC -4.45
bc	136.32	40.53	-4.03	5.7	BC +0.71
abc	173.64	37.32	-3.21	0.82	ABC +0.102

Appendix III

Vegetable Protease Concentrate (Cariya papaya)

Auxiilase liquid ® (papain) is a clear, yellow-coloured, viscous solution with an odour characteristic of the proteases. Glycerol is employed as carrier. The density of the product is 1.26 (Merck No. 7138), activity is 160 CDU/ml , specific activity is 84.2 CDU/mg protein (Result of preliminary analysis). Activity was determined at OD_{280} compare to standard curve of tyrosine at OD_{280}.

CDU (casein digestion unit) indicates microgram of tyrosine that liberated from casein, it was digested with papain for 1 minute at 37 °C.

Appendix IV

Specificaation and Standard

Requirements for yeast extract in Indian Standard

Total solids percent by mass min	65
Total nitrogen percent by mass min	7
Sodium chloride percent by mass max	15
Ash percent by mass max	10

Yeast extract obtained are readily soluble in water.

VITA

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