: APPENDIX-2 :

MODE OF X^2 (Chi-Square) CALCULATION.

To test the hypothesis that "there is no significant difference between BULL BRAND and BULLOCK PAIR BRAND of mixed fertilizers regarding objective and subjective factors". Which was preffered by their respective consumers, Chi-square test was applied and mode of Chi-Square calculation is as below -

For example : The table below shows the Preference obtained by BULL BRAND and BULLOCK PAIR BRAND to Quality from their 50 customers each.

Brands	Preferences						Total
	1st	2nd	3rd	4th	5th	6th	
BULL BRAND	22	14	5	3	2	-	46
BULLOCK PAIR BRAND	30	7	6	5	1	1	50
Total:	52	21	11	8	3	1	96

Solution - To test the hypothesis that "there is no

significant difference between BULL BRAND

and BULLOCK PAIR BRAND of mixed fertilizers

regarding Quality, Chi-Square test is applied.

Weightages were allotted to the consumer

preferences,

1,2,3 ......6 to 6,5,4....... 1, for example,

BULL BRAND - 22x6 = 132, 14x5 = 70.

BULLOCK PAIR BRAND - 30x6 = 180, 7x5 = 35.

Brands	Preferences						Total
	1st	2nd	3rd	4th	5th	6th	
BULL BRAND	132	70	20	9	4	-	235
BULLOCK PAIR BRAND	180	35	24	15	2	1	257
Total:	312	105	44	24	6	1	492

From the above observed preferences, expected Preferences

were computed by using the formula :

$$\text{Expected preference} = \frac{\text{Total of row X Total of Column}}{\text{Grand Total}}$$

The expected preferences were obtained as follows :

BULL BRAND.

1. For first row, First Column = $\dfrac{312 \times 235}{492}$ = 149.02

2. " " " 2nd " = $\dfrac{105 \times 235}{492}$ = 50.15

3. " " " 3rd " = $\dfrac{44 \times 235}{492}$ = 21.01

4. " " " 4th " = $\dfrac{24 \times 235}{492}$ = 11.46

5. " " " 5th " = $\dfrac{6 \times 235}{492}$ = 2.86

6. " " " 6th " = $\dfrac{1 \times 235}{492}$ = 0.47

BULLOCK PAIR BRAND.

7. For Second row, First column = $\dfrac{312 \times 257}{492}$ = 162.97

8. " " " 2nd " = $\dfrac{105 \times 257}{492}$ = 54.84

9. " " " 3rd " = $\dfrac{44 \times 257}{492}$ = 22.98

10. " " " 4th " = $\dfrac{24 \times 257}{492}$ = 12.53

11. " " " 5th " = $\dfrac{6 \times 257}{492}$ = 3.13

12. " " " 6th " = $\dfrac{1 \times 257}{492}$ = 0.52

Applying X^2 test :

Sr. No.	Observed (O)	Expected (E)	(O-E)	(O-E)^2	$\dfrac{(O-E)^2}{E}$
1.	132	149.02	17.02	289.68	1.943
2.	70	50.15	19.85	394.02	7.856
3.	20	21.01	0.01	0.0001	0.04
4.	9	11.46	2.46	6.0516	0.528
5.	4	2.86	1.14	1.2996	0.454
6.	0	0.47	0.47	0.220	0.470
7.	180	162.97	17.03	290.02	1.779
8.	35	54.84	19.84	393.62	7.177
9.	24	22.98	1.02	1.04	0.045
10.	15	12.53	2.47	6.0100	0.486
11.	2	3.13	1.13	1.27	0.407
12.	1	0.52	0.48	0.23	0.443
					21.628

$$\sum \frac{(O-E)^2}{E} = 21.628$$

Degree of Freedom

$V = (r - 1)(c-1)$ Where: v = degree of freedom.

$V = (2-1)(6-1)$ r = rows, and

$V = 5$ c = Columns.

For $V = 5$, X^2 0.05 = 11.070

Here, 1. Calculated value of x^2, i.e. $\dfrac{(O-E)^2}{E}$ = 21.628, and

    2. Table value of Chi-square (x^2) for 5 degrees of freedom at 5 % level of significance is 11.07.

Conclusion :

The above statistics was subjected to x^2 (Chi-square) test to determine the significant difference.
The calculated values worked out to be 21.628 and table value to be 11.070 at 5 % level of significance. In view of this, the hypothesis; There is no significant difference between BULL BRAND and BULLOCK PAIR BRAND of mixed fertilizers as regards Quality, stand rejected.

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