

PTC Taste Sensitivity and Colour Blindness Among Koppala Velama Caste From Andhra Pradesh

G. Sudhakar¹, B.V. Babu² and V. Padma¹

1. Department of Human Genetics, Andhra University, Visakhapatnam 530 003, Andhra Pradesh, India

2. Department of Anthropology, Andhra University, Visakhapatnam 530 003, Andhra Pradesh, India

KEY WORDS Genetic Markers. Variation. Andhra Caste.

ABSTRACT The distribution of PTC taste sensitivity and red-green colour blindness among Koppala Velama Caste of Andhra Pradesh is reported. Among Koppala Velama, 40.14% are non-tasters and 1.92% are colour blind. The frequencies of non-tasters and colour blind genes are 0.6336 and 0.0430, respectively. The results are discussed with other studies of Andhra populations.

INTRODUCTION

Human geneticists use phenylthiocarbamide (PTC) taste sensitivity and red-green colour blindness as genetic markers in the studies of human population variation. The variation of PTC taste sensitivity and its inheritance as simple autosomal trait were suggested by Fox (1931) and Snyder (1932). The red-green colour blindness is controlled by gene situated on X-chromosome. The present paper aims to report the distribution of these two markers among Koppala Velama, a peasant caste of Andhra Pradesh.

MATERIAL AND METHODS

The sample consists of 212 men and 204 women of Koppala Velama caste living in Veeravasaram region of West Godavari district, Andhra Pradesh. The sorting technique by serial dilution method of Harris and Kalmus (1949) was employed to determine the taste threshold of individuals. The classification of individuals into tasters and non-tasters was

done based on the bimodal distribution of taste thresholds. The red-green colour blindness was tested using Ishihara's (1980) plates during day time. The allele frequencies were computed following the methods illustrated by Balakrishnan (1988).

RESULTS AND DISCUSSION

The particulars regarding phenotype and allele frequencies of PTC taste sensitivity among Koppala Velama are presented in table 1. It in-

Table 1: Distribution of threshold numbers, phenotype and allele frequencies of PTC taste sensitivity among Koppala Velama

Particulars	Males (No. 212)		Females (No. 204)		M + F (No. 416)	
	No.	%	No.	%	No.	%
Threshold numbers						
<1	20	9.4	19	9.3	39	9.4
1	24	11.3	21	10.3	45	10.8
2	21	9.9	16	7.8	37	8.9
3	12	5.7	17	8.3	29	7.0
4	8	3.8	9	4.4	17	4.1
5	20	9.4	8	3.9	28	6.7
6	20	9.4	12	5.9	32	7.3
7	28	13.2	32	15.7	60	14.4
8	30	14.2	31	15.2	61	14.7
9	16	7.6	10	4.9	26	6.3
10	5	2.4	9	4.4	14	3.4
11	3	1.4	10	4.9	13	3.1
12	1	0.5	5	2.5	6	1.4
13	2	0.9	2	1.0	4	1.0
14	2	0.9	3	1.5	5	1.2
PTC tasters	127	59.9	114	55.9	249	56.9
Non-tasters	85	40.1	90	44.1	167	40.1
Allele frequencies ± SE						
T	0.367±0.027	0.336±0.026	0.366±0.019			
t	0.633±0.027	0.664±0.026	0.634±0.019			

$\chi^2_{(1)}$ values for phenotypic difference between men and women = 0.6905; $p > 0.05$

2. Present Address : Regional Medical Research Centre (ICMR), C.S. Pur, Bhubaneswar 751 016, Orissa, India

indicates that nearly 10 per cent of Koppala Velama people are not tested at any threshold number. This distribution shows the bimodality with an antimode lying at threshold number 4, 5 and 4 among men, women and total sample, respectively. The incidence of non-tasters is 40.14% and the frequency of non-taster gene (t) is 0.6336. The review on genetic diversity of PTC taste sensitivity among Andhra populations (Babu et al., 1996) reports that Andhra castes exhibit higher gene diversity at PTC locus than tribes, which is attributed to wider and clear social stratification and the practice and endogamy among castes. Also, the average t gene frequencies of both castes (0.5329) and tribal populations (0.5869) are lower than that of present study population.

The distribution of phenotype and allele fre-

quencies of colour blindness (Table 2) shows the presence of both the types of red-green colour blindness, namely, protan (red) and deutan (green) with relatively a low incidence among Koppala Velama. The deutan type is observed only among men. The review on colour blindness among Indian populations (Naidu et al., 1988) shows that the frequency of deutan type is twice that of protan type. This also shows that 3.25% among caste people and 1.64% among tribes in Andhra Pradesh are with colour blindness.

REFERENCES

Table 2: Distribution of phenotype and allele frequencies of colour blindness among Koppala Velama

Phenotype/ Allele	Males (No. 212)		Females (No. 204)		M + F (No. 416)	
	No.	%	No.	%	No.	%
Normal Vision	206	97.2	202	99.0	408	98.1
Colour Blind:						
Total	6	2.8	2	1.0	8	1.9
Protan	4	1.9	2	1.0	6	1.4
Deutan	2	0.9	-	2	0.5	
Allele frequencies \pm SE						
Normal	-	-	-	-	0.957	± 0.008
Colour blind-	-	-	-	-	0.043	± 0.008

- Babu, B.V., Kusuma, Y.S. and Naidu, J.M. : Genetic diversity of PTC taste sensitivity among tribal and caste populations of Andhra Pradesh, India. *Z. Morph. Anthrop.*, **81** : 217-221 (1996).
- Balakrishnan, V. : Hardy-Weinberg equilibrium and allele frequency estimation : pp. 39-93. In : *Statistical Methods in Human Population Genetics*. K.C. Malhotra (Ed.) IBRAD, ISI and ISHG, Calcutta (1988).
- Fox, A.L. : Taste blindness. *Science*, **73** : 14 (1931).
- Harris, H. and Kalmus, H. : The measurement of taste sensitivity to phenylthiourea (PTC). *Ann. Eugen.*, **15** : 24-31 (1949).
- Ishihara, S. : *The Series of Plates Designed as a Test of Colour Blindness*, 38 Plates Edition. Kanehara & Co. Ltd., Tokyo (1980).
- Naidu, J.M., Sachi Devi, S. and Ramana, G.V. : *Colour Blindness in Indian Populations. Series on Bibliographies on Human Genetics in India*, ISHG, Pune (1988).
- Snyder, L.H. : The inheritance of taste deficiency in man. *Ohio J. Sci.*, **32** : 436-440 (1932).