

Taste Sensitivity to Phenylthiocarbamide and Colourblindness in Chettibaliyas of Andhra Pradesh, South India

K. Santhi Devi, N. Lakshmi and P. Veeraju

Department of Human Genetics, Andhra University, Waltair 530 003, Andhra Pradesh, India

KEY WORDS Andhra Pradesh. Caste Population. Chettibaliyas. Colourblindness. Phenylthiocarbamide.

ABSTRACT The ability to taste phenylthiocarbamide (PTC) and the incidence of colourblindness was investigated in 155 individuals belonging to Chettibaliya caste population of Visakhapatnam city, Andhra Pradesh, South India. The incidence of non-tasters in males was 52.6 per cent and in females 27.8 per cent. The frequency of non-tasters for both sexes combined was 40 per cent. Regarding colourblindness, four individuals were found to be of strong deutan type among Chettibaliyas.

INTRODUCTION

In the present paper an attempt has been made to examine the tasting ability to phenylthiocarbamide and colourblindness in Chettibaliya caste population inhabiting the Kobbarithota area of Visakhapatnam city, Andhra Pradesh, South India. The members of this caste migrated from different surrounding places of Visakhapatnam city, such as Sabbavaram, Vadarevupalli (Poodimadaka), Tadi, Patipalli etc. Most of them are labourers, cycle-rickshaw pullers and some of them are in petty trade.

The ability to taste PTC is an autosomal polymorphic trait (Vogel and Motulsky, 1986). Tasters with genotypes TT or Tt, have the ability to taste the substance while non-tasters are homozygous for the recessive allele *t*.

The defective colour vision has long been used as a genetic marker in the study of human variation. Red-green colourblindness is one of the few known X-linked polymorphic traits in man.

MATERIALS AND METHODS

For the present study a total of 155 unrelated subjects were screened for PTC and colour-

blindness. Out of these 76 were males and 79 females, all aged above 20.

The ability to taste phenylthiocarbamide was determined by the serial dilution method described by Harris and Kalmus (1949). Solution No. 1 contained 0.13 g phenylthiocarbamide per 100 ml of distilled water, the subsequent solutions (upto 14) were prepared by serial two-fold dilutions.

Ishihara plates (1972) were used to test colourblindness. Tests were performed under day light conditions. Instructions were followed to test colourblindness for both literates and illiterates.

RESULTS AND DISCUSSION

Table 1 exhibits the distribution of PTC tasters and non-tasters among Chettibaliyas. In line with earlier investigations (Harris and Kalmus, 1949; Kaplan et al., 1965; Scott-

Table 1: Numbers tested and percentage and allele frequencies of tasters and non-tasters among Chettibaliyas

Sex	n	Tasters		Non-tasters		Allele Frequencies	
		No.	%	No.	%	T	t
Male	76	36	47.4	40	52.6	0.275	0.725
Female	79	57	72.2	22	27.8	0.473	0.527
Total	155	93	60.0	62	40.0	0.3675	0.6325

Emauakpor, 1975) females of the present study were found to be more sensitive to the taste of PTC than males and in fact this bisexual difference was found to be statistically significant ($\chi^2 = 10.76$, d.f = 1, $0.01 > p > 0.001$).

Table 2: Distribution of PTC taste thresholds among Chettibalijs

Sex	PTC serial dilution														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Male	15	18	7	4	7	9	6	5	2	2	1	—	—	—	—
Female	8	11	3	3	9	16	12	11	4	1	1	—	—	—	—

However, it may be pointed out here that some of the other studies revealed no significant sex differences inspite of occurrence of somewhat higher frequencies of tasters among females (Sint and Maya-Tu, 1974; Ibraimov and Mirra Khimov, 1979; Bokesoy and Togan, 1987). It may be presumed that the smoking habits in males may exert a modifying influence on sensitivity to PTC in the present data as suggested by Kaplan et al. (1965).

Table 2 shows the distribution of PTC taste thresholds among Chettibalijs. The distinction between tasters and non-tasters was ascertained from the antimode which was at dilution 3 for males and between 2 and 3 for females. The mean threshold values for males were 3.05 and for females 4.33.

Table 3: Frequency of Colourblindness among Chettibalijs

Sex	n	Colourblind	
		No.	%
Male	76	4	5.26
Female	79	—	—

Table 3 exhibits the frequency distribution of red-green colourblindness among Chettibalijs. Four males were found to be of strong deutan type. The frequency of colourblindness

was 5.26% in the present sample, whereas it was reported 11.36% in another sample of this caste population reported by Chakravarti et al. (1971).

REFERENCES

- Bokesoy, I and Togan, I. : Taste sensitivity to phenylthiocarbamide in Turkey. *Gene Geography*, 1: 99-101 (1987).
- Chakravarti, M.R., Veerraju, P. and Satyanarayana, M.: Frequency of colourblindness in a coastal district of Andhra Pradesh. *Soc. Cult.*, 2: 149-156 (1971).
- Harris, H and Kalmus, H. : The measurement of taste sensitivity to phenylthiourea. *Ann. Eugen.*, 15: 24-31 (1949).
- Ibraimov, A. and Mirra Khimov, M.M. : PTC-tasting ability in populations living in Kirghizia with special reference to hypersensitivity : Its relation to sex and age. *Hum. Genet.*, 46: 97-105 (1979).
- Ishihara, S. : *The Series of Plates Designed as a Test for Colour-Blindness*. 4th Ed., 38 plates. Kanehara Shuppan, Tokyo (1972).
- Kaplan, A.R., Glanville, E.V. and Fisher, R. : Cumulative effect of age and smoking on taste sensitivity in males and females. *J. Gerontol.*, 20: 334 (1965).
- Scott-Emuakpor, A.B., Uviowo, J.E. and Warren, S.T. : Genetic variation in Nigeria. *Hum. Hered.*, 25: 360-369 (1975).
- Sint, T.T. and Maya-Tu, M.: Taste sensitivity to phenylthiocarbamide in a Burmese population sample. *Hum. Hered.*, 24: 554-557 (1979).
- Vogel, F. and Motulsky, A.G. : *Human Genetics : Problems and Approaches*. Springer-Verlag, Berlin, 2nd Edition (1986).