

Incidence of PTC Tasters and Defective Colour Vision Among the Koch of West Garo Hills, Meghalaya, North East India

Murali Kotal

*Anthropological Survey of India, North East Regional Centre, Upper Lachumiere, Shillong 793 001
Meghalaya, India*

KEY WORDS Genetic Markers. Variation. Koch. Meghalaya.

ABSTRACT A study of PTC taste perception and defective colour vision was carried out among the Koch in West Garo Hills district of Meghalaya, North East India. It was found that the frequency of taster gene (*T*) among the Koch is 0.4437 and percentage frequency of red-green colour blindness was 3.6.

INTRODUCTION

The ability to taste phenylthiocarbamide (PTC) is one of the well known examples of the polymorphic traits in human populations. The differences in the taste perception were first classified by Fox (1932) into tasters and nontasters and this character was shown to be governed by a pair of alleles *viz* *T* and *t* at one locus, the former being dominant form of the gene. This taste sensitivity to PTC has been observed to vary among different populations (Das 1966), and there by it is considered as one of the important genetic trait for the study of human variation.

Another important genetic trait in the field of human genetics is that of red green colour blindness, a sex linked character. It has been suggested that natural selection operates in higher intensity colour deficiency among many primitive populations (Pickford, 1963; Roberts, 1967).

In India, studies have revealed that the incidence of colour blindness is different from one population to another (Bhasin et al., 1992, 1994). If the hypothesis prepared by Pickford (1963) is true, it indicates that natural selection is operating in Indian populations with different intensities.

The present paper reports the PTC taste sensitivity and colour blindness among the Koch population in the West Garo Hills districts of Meghalaya North East India. The Koch are di-

vided into several sub groups such as Sanga, Wanang Chapra, Tintikiya, Sankar Satpari, etc. Their main occupation is agriculture, some are also engaged in business and government services.

MATERIALS AND METHODS

A sample of 462 unrelated healthy individuals of the both sexes 250 males and 212 females was studied for the PTC tasting ability and its threshold levels were determined by the serial dilution technique of Harris and Kalmus (1949). The male individuals were also tested for defective colour vision. Redgreen colour blindness was tested with Ishihara (1972) plates numbered 1 to 38.

RESULTS AND DISCUSSION

The taste thresholds for PTC among males and females of the Koch population is shown in table 1. These follow a bimodal distribution pattern with antimode falling at solution number 3 for males and 2 for females. Table 2 shows that the frequency of tasters is lower among males (40.80%) than in the females (80.66%), and the frequency of the taster allele '*T*' is high among females (0.5602) compared to the males (0.3613). The difference between the sexes for PTC tasting was statistically highly significant ($\chi^2 = 24.722$; d.f. = 1, $P < 0.001$).

Pooled data showed the frequency of 0.4436 for the taster gene in this tribal population, which is lowest so far reported from Meghalaya (Das 1971; Jaswal, 1981).

Table 3 shows the incidence of defective colour blindness among the Koch (3.6%; 1.6% protan and 2.0% deutan types).

In the tribal population of Meghalaya, Barua

Table 1: Distribution of PTC thresholds among the Koch

Solution no.	Males		Females		Total	
	No.	%	No.	%	No.	%
0	56	12.12	33	7.14	89	19.26
1	10	2.16	6	1.30	16	3.46
2	19	4.11	2	0.43	21	4.55
3	17	3.68	10	22.16	27	5.84
4	34	7.36	14	3.03	48	10.39
5	33	7.14	18	3.90	51	11.04
6	34	7.36	39	8.44	73	15.80
7	27	5.84	47	10.17	74	16.02
8	15	3.25	35	7.58	50	10.82
9	3	0.65	6	1.30	09	1.95
10	-	-	1	0.22	01	0.22
11	1	0.22	1	0.22	02	0.43
12	-	-	-	-	-	-
13	1	0.22	-	-	01	0.22
14	-	-	-	-	-	-
Total	250	54.11	212	45.89	462	100.00

Table 2: Distribution of phenotypes and allele frequencies of PTC taste sensitivity among the Koch

Sex	Number tested	Phenotype		Allele frequency	
		Tasters	Non-tasters	T	t
Male	250	148 (59.20%)	102 (40.80%)	0.3613	0.6387
Female	212	171 (10.66%)	41 (19.34%)	0.5602	0.4398
Total	462	319 (69.05%)	143 (30.95%)	0.4437	0.5563

(1985) has reported frequency of 3.8% colour blind individuals in Hajong, Mukherjee (1963) found the same incidence in the Khasis, while Berthakur et al. (1997) failed to find any colour blind individuals in the Dalu. Thus the incidence of colour blindness among the Koch of the

Table 3: Incidence of red-green colour blindness among the Koch males

Category	Phenotype	
	Number	%
Normal	241	96.4
Protan	4	1.6
Deutan	5	2.0
Total	250	100.0

present study is almost similar to those reported for other tribal populations of the state.

ACKNOWLEDGEMENT

The author wishes to express his deep sense of gratitude to his teacher Dr. S. Sengupta, Department of Anthropology, Dibrugarh University, Dibrugarh and Dr. R. Khongsdier, Department of Anthropology, North East Hill University, Shillong, for their constant guidance and inspiration during the course of this study.

REFERENCES

- Barua, S.: Red-green colour blindness and earlobe attachment among the Hajong of Meghalaya. *Human Science*, 38: 118-123 (1985).
- Berthakur, P., Sengupta, S. Ghosh, A.K.: A note on some morphogenetic variables among the Dalu of Meghalaya. *J. Hum. Ecol.*, 8(6): 481-483 (1997).
- Bhasin, K.M., Walter, H. and Danker-Hopfe, H.: *The Distribution of Genetical, Morphological and Behavioural Traits Among the Peoples of Indian Region*. Kamla-Raj Enterprises, Delhi (1992).
- Bhasin, M.K., Walter, H. and Danker-Hopfe, H.: *People of India. An Investigation of Biological Variability in Ecological, Ethno-economic and Linguistic Groups*. Kamla-Raj Enterprises, Delhi (1994).
- Das, S.R.: Application of phenylthiocarbamide taste character in the study of racial variation. *J. Indian Anthropol. Soc.*, 1: 63-80 (1966).
- Dutta, P.C.: Variability and regional differences of colour blindness in India. *Humangenetik*, 2: 204-206 (1966).
- Fox, A.L.: The relation between chemical constitution and taste. *Proc. Natl. Acad. Sci.*, 18: 15 (1932).
- Harris, H. and Kalmus, H.: The measurement of taste sensitivity to P.T.C. *Ann. Eugen. London*, 15: 25 (1949).
- Ishihara, S.: *Tests for Colour Blindness* 38 Plates. 4th Ed. Kanehara Shuppar, Tokyo (1972).
- Jaswal, I.J.S.: Taste sensitivity to phenylthiourea among Khyntiem Khasi of Meghalaya. *Indian Anthropologist*, 11: 125 (1981).
- Mukherjee, D.P.: Variation in defective colour vision among some tribals of Assam. *Bull. Anthropol. Surv. India*, 12: 39-42 (1963).
- Pickford, R.W.: Natural selection and colour blindness. *Eugen. Rev.*, 55: 97-101 (1963).
- Roberts, D.F.: Red green colour blindness in Niger Delta. *Eugen. Quart.*, 14 (1): 7-13 (1967).
- Srivastava, R.P.: Incidence of colour blindness in Assam and its variability among Indian population. *Indian Anthropologist*, 13: 51-62. (1983).