

Since its discovery in 1932, PTC paper has been a popular activity for students studying genetics. It is used to determine the genotypes of individuals, and is bitter tasting. It has been tied to the evolutionary advantage allowing some primates to detect toxins in a potential food. Foods containing PTC like substances may be avoided by tasters (broccoli, water cress).

In 2004, a publication, *Investigating Safety: A Guide for High School Teachers* was written by 3 teachers:

- Juliana Texley (Teacher K-12, Superintendent, Editor of *The Science Teacher*)
- Terry Kwan (Teacher Middle School, Science Supervisor and Trainer)
- John Summers (Teacher Environmental Science, Biology, Chemistry)

In that publication the authors suggested that the PTC content on commercial PTC paper was high enough to be of concern. They indicated that a single strip of PTC paper contained as much as 0.3 mg. As a result, many school boards in the United States banned its use at that time. The authors described this activity as inaccurate, dangerous and bad science.

In 2008, “Tasting Phenylthiocarbamide (PTC): A New Integrative Genetics Lab with an Old Flavor” was published in *The American Biology Teacher*, a well-respected science journal. The authors were:

- Robert Merritt Professor Department of Biological Sciences, Smith College
- Lou Ann Bierwert, Research Assistant (Engineering), Smith College
- Barton Slatko Director Products and Applications, New England Biolabs
- Jessica Ingram, Research Associate, New England Biolabs

PTC paper was obtained from two science suppliers, and when measured ranged from 0.005 to 0.007 mg per paper. They stated that the salt in a small bag of potato chips was 100 x more toxic than the strip of PTC paper. The authors concluded that there was no reason for teachers to be concerned about the toxicity of PTC taste papers. The very low PTC concentrations on commercially sold PTC paper found by these authors was supported by an independent laboratory for Carolina Biological Supply Company, and Precision Laboratories.

STAO Safety Committee position: PTC paper has been used by science teachers throughout the world for over 80 years. There has been no accident history associated with this genetics activity. Students would normally be exposed to this

activity once or twice in their educational career. The concentration on the paper is very low, and the quantity transferred by touching the paper on the tongue would be even smaller.

STAO has recently revised two resources (*Safe ON Science (2018)*) and *Safer Use of Chemicals (2018)* to reflect this new information. STAO now suggests that using PTC paper is a safe activity, where the ability to taste this substance indicates that the person is either homozygous dominant or heterozygous. The inability to taste PTC indicates the recessive condition.

The ability to taste actually occupies the divide between single gene inheritance and multigene interactions. It is interesting to see the relationship between food preferences and phenotype.

References:

Tasting Phenylthiocarbamide (PTC): A New Integrative Genetics Lab with an Old Flavor. (2008). Retrieved from <https://docplayer.net/52544257-Tasting-phenylthiocarbamide-ptc-a-new-integrative-genetics-lab-with-an-old-flavor.html>

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