

Short Communication

Estimation of Tannins in different Food Products

TABASUM, S., S. AHMAD, N. AKHLAQ AND K. RAHMAN
Department of Chemistry, University of Agriculture, Faisalabad–38040, Pakistan

ABSTRACT

Different food products were analyzed and compared for their tannin content. The products having least tannin contents were: Supreme Brooke Bond tea (0.18%), green tea (0.18%), Maxwell coffee (0.35%), Golden apple (0.19%), Ammri apple (0.19%), Naakh pear (0.02%), Surmai peach (0.09%) and Chalari pomegranate (0.39%). Among various tea brands, Lipton Yellow Label and tea leaves had maximum quantity (0.48%) of tannin. Badana variety of pomegranate was containing highest quantity (1.17%) of tannin among all the studied products.

Key Words: Tannin; Tea; Coffee; Fruit juices

INTRODUCTION

The term “tannin” covers a wide range of naturally occurring compounds of varying structure scattered widely through out the vegetable kingdom. The antioxidant and antimicrobial activities of tannin are well documented. They are also used as antiseptics and astringents. However, they are considered undesirable because they precipitate protein, inhibit digestive enzymes and affect the utilization of vitamins and minerals. The dosage of tannin is critical to these effects (Chung *et al.*, 1998).

Keeping in view these effects, this study was conducted to estimate tannin content in commonly used food products in Pakistan.

MATERIALS AND METHODS

Tannin contents were estimated from different brands of tea, coffee and varieties of fruit juices. Estimation of tannin was performed by titrating the material with standard potassium permanganate solution (AOAC, 1980).

Tea and coffee samples were prepared by boiling 5 g of material with 400 mL of water and diluted to 500 mL; while fruit juices used for tannin analysis were extracted from the fresh fruits. In 5 mL of each sample, indigo carmine solution (12.5 mL) and water (375 mL) were added. This mixture was titrated against KMnO_4 solution (“b” mL) until colour changed to faint pink. This volume of KMnO_4 was used for total tannin and all other related compounds.

To determine the volume of KMnO_4 (“a” mL) used for non tannin compound, another sample of 50 mL quantity was mixed with 25 mL of the gelatin solution, 50 mL of the acidic NaCl solution and 5 g powdered kaolin. After shaking the mixture for 15 minutes, it was decanted through Whatman filter paper. Filtrate (12.5 mL) was mixed with same volume of the indigo carmine solution and 375 mL H_2O . This mixture was again titrated against KMnO_4 solution until colour changed to faint pink. The volume of KMnO_4 used against true tannin was calculated by

subtracting “b” from “a”. The concentration of tannin was estimated by using the following relationship:

- 1 mL of std. KMnO_4 solution = 0.595 mL 0.1N Oxalic acid
- 1 mL of 0.1 N Oxalic acid = 0.0042 g tannin

RESULTS AND DISCUSSION

Results of the tannin contents in different brands of tea and coffee have been presented in Table I. It was found that tea leaves and choora tea (unprocessed) had higher tannin contents than processed tea brands. These findings are in line with the idea of Harller (1964) who reported that tea leaves have higher tannin contents as compared to processed tea brands. Lipton Yellow Label tea is an exceptional case which contained same tannin contents as tea leaves, while remaining all other tea brands have lower tannin contents. It may be due to the difference in the process of manufacture or the aging of tea leaves. Tea leaves lose their tannin contents with increase in age (Harller, 1964). Libert *et al.* (1999) determined that in black tea (brewed without stirring or chopping) the total tannin contents increased from 0.03% after 0.5 min and upto 0.06% after 10 min brewing time. These values were less than the values shown in Table I because tea extracts were prepared after 1 hr. brewing during the research work. Supreme Brooke Bond tea and green tea have minimum (0.18%) quantity of tannin among the studied brands. So these brands are better as compared

Table I. Percentage of tannin in tea and coffee

Tea	Percentage of Tannin
Green Tea	0.18
Tea leaves	0.48
Chooraa Tea	0.45
Supreme Brooke Bond	0.18
Tapal Danedar	0.38
Lipton Yellow Label	0.48
Coffee	
Crude Coffee	0.5
Nescaffee	0.4
Maxwell coffee	0.35

with other brands regarding the tannin contents.

According to the research results, the crude coffee contains higher contents of tannin (0.5%) than roasted coffee brands. Michael (1963) analyzed that tannin occurs at 4.5% in roast coffee and is reduced to about 8% in green coffee. It is evident from Table I that tannin contents are less than Michael (1963) value. This difference may be due to difference of variety selected for analysis, difference in the process of manufacture of coffee. Maxwell with lower tannin contents (0.35%) is better than the all other coffee brands.

The tannin contents had been estimated from different varieties of fruits i.e. apple, pear, peach and pomegranate Andrew and Barber (1935) analyzed Apple, pear, peach and pomegranate for their tannin contents. Tannin contents were 0.01-0.43%, 0.16-0.25%, 0.12% and 0.65% for apple, pear, peach and pomegranate, respectively. It is evident from Table II that apple (0.19-0.39% tannin) and pear (0.02-0.19% tannin) varieties are in agreement with the above statement. Among peach varieties Surmai (0.09% tannin) and Desi (0.1% tannin) agreed with above statement but remaining two were found to have greater tannin contents than 0.12%. Badana (1.17% tannin) and Safaid (1% tannin) are pomegranate varieties, which were not in line with the idea of Andrew and Barber (1935). Reasons for the difference in tannin contents may be due to the difference in climate and soil texture. Varieties of fruit with lower tannin

contents are better than remaining varieties as shown in Table II.

Tannin decrease feed intake, growth rate, feed efficiency and protein digestibility. Therefore, food which have high tannin contents are harmful for health (Chung *et al.*, 1998). Among analyzed food products those are better which had least tannin contents i.e. Green tea (0.18%), Supreme Brooke Bond tea (0.18%) and Maxwell coffee (0.35%). The least tannin contents were 0.19, 0.19, 0.02, 0.09 and 0.39% for Golden (apple), Ammri (apple), Naakh (pear), Surmai (peach) and Chalari (pomegranate) varieties, respectively are better as compared to the other varieties.

CONCLUSION

Supreme Brooke Bond and green tea contained minimum quantity (0.18%) of tannin, while Maxwell coffee comparing other types had low tannin contents (0.35%). Among fruits, the varieties bearing lesser tannin contents were Golden apple (0.19%), Ammri apple (0.19%), Naakh pear (0.19%), Surmai peach (0.9%) and Chalari pomegranate (0.39%).

REFERENCES

- A.O.A.C., 1980. *Official Methods of Analysis. Association of Analytical Chemists*. Arlington, USA.
- Andrew, L.W. and K. Barber, 1935. *The Structure and Composition of the Food*, 3rd Ed., pp: 589-673. John Wiley & Sons Inc., New York.
- Chung, K.T., T.Y. Wong, C.I. Wei, Y.W. Hung and Y. Lin, 1998. "Tannin" and Human Health". *Critical Reviews in Food Sci. Nutr.*, 38: 421-64.
- Harller, C.R., 1964. *The Culture and Marketing of Tea*, pp: 70-75, 87-89. Oxford University Press, London.
- Libert, M., U. Licht, V. Bohm and R. Bistch, 1999. Antioxidant properties and phenolic contents of green and black tea under different brewing conditions. *Food Res. Technol.*, 208: 217-20.
- Michael, S., 1963. *Coffee Processing Technology*, 2nd Ed., pp: 173-79. The AVI Publishing Co, Inc., Westport, Connecticut, USA.
- Steel, R.G.D and J.H. Torrie, 1992. *Principles and Procedures of Statistics*. McGraw Hill Book Co. Inc., New York, USA.

(Received 20 February 2001; Accepted 11 July 2001)

Table II. Percentage of tannin in different varieties of fruit juices

Apple	Percentage of Tannin
Golden	0.19
Kashmiri	0.39
Ammri	0.19
Masudi	0.37
Pear	
Pear	0.19
Bagugosha	0.18
Naakh	0.02
Khurma	0.19
Peach	
Kharoo	0.19
Surmai	0.09
Desi	0.1
Taki	0.48
Pomegranate	
Kandhari	0.56
Badana	1.17
Chalari	0.39
Safaid	1.0