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CHEMICAL ANALYSIS AND PRODUCT DEVELOPMENT (CHUTNEY) USING FRESH TURMERIC

Dr. Ekta Singh Chauhan[1], Shivani Srivastava[2]*, Shivangi Yadav[3] and Ritu Singh[4]

Department Food Science and Nutrition, Banasthali University, Banasthali, Dist-Tonk. Rajasthan, India.

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Corresponding author: Shivani Srivastava

Department Food Science and Nutrition, Banasthali University, Banasthali, Dist-Tonk. Rajasthan, India.

ABSTRACT

India is known as "the home of spices." Turmeric is a mild digestive, aromatic and a carminative. It is one of the most powerful heeler. The medicinal properties of turmeric have been slowly revealing themselves over the centuries. Huge known properties like anti-inflammatory, antidiabetic had revealed that turmeric is a natural wonder, beneficial in many health conditions from cancer to alhzimers disease. The purpose of present study is to evaluate the neutraceutical properties of fresh turmeric. Fresh turmeric was used for testing moisture, ash protein, fat, fiber, carbohydrate, calcium, phosphorus, iron and riboflavin. Fresh turmeric aqueous extract was used in various assays such as alkaloids, glycosides, flavonoids, steroids, tannins, saponins and phenols. The entire phytochemical are present in fresh turmeric accept glycoside. The fresh turmeric prepared is nutritious, convenient and easy to store. Thus an attempt was made to prepare the fresh turmeric chutney. The chemical analysis of turmeric shows the high presence of the protein, fat, and fiber. Fresh turmeric was incorporated at 5%, 10% and 15% in the chutney. The results of overall acceptability show that the variant A 5% fresh turmeric chutney was most acceptable as compared to other variants. In the comparison of chemical analysis of standard chutney and variant A (5% fresh turmeric powder) moisture, ash, protein, fat, iron and vitamin C increased respectively. Thus, the study concluded that fresh turmeric is beneficial in all aspects.

KEYWORDS: Turmeric, Chemical analysis, Phytochemical, Neutraceuticals, Chutney.

INTRODUCTION

Spices have been used in almost all countries in the world for many years either cuisines or for their medicinal values. At least in the East and Asia, spices were extensively used for their medicinal values. Now of course western medicine has replaced all these, although spices are still used in some countries, in their indigenous medical practices.[1] A spice is a dried fruit, root or bark used as a food additive to enhance the flavors, sometimes as a preservative preventing growth of harmful organism.[2] India is known as "The home of spices". There is no other country in the world that produces as many kinds of spices as India. In medicine, spices are also used. Ginger, turmeric, garlic, cardamom, chili, cloves and saffron are among the spices recommended by Ayurveda.[3]

Turmeric is a medicinal plant belongs to the *Zingiberaceae* family and widely used in *Ayurveda, Unani* and *Siddha* medicine as home medicine for different diseases. It is an ancient spice, a native of South East Asia, used for antiquity dye and condiments. It is cultivated in Bengal, China, Taiwan, Sri Lanka, Java, Peru, Australia and the West Indies.[4] Components of turmeric are named curcuminoids which include mainly curcumin, dementhoxycurcumin and bisdemethoxycurcumin. The yellow color of turmeric is due to the presence of its active principles curcumin and curcuminoids.[5] Turmeric is known as a golden spice as well as spices of life. It has strong association with the socio cultural life of the people of the India subcondinent. Turmeric has high nutrient and phytochemicals status that can be subjugated. Turmeric is known as a good source of vitamins and minerals. Introduce of turmeric as a part of diet has been successfully despite because it is traditionally used by the humans.[6]

Rhizome of curcuma is an aromatic chemical compound present in turmeric also used in medicines as a stomachache, carminative, and emmenogogue for skin diseases[7] and recently as health food[8] Turmeric contains antioxidant,[9] anti-inflammatory,[10]

hypocholestremic,[11] antimicrobial,[12] insect repellent,[13] antimutogenic,[14,15] antifibrotic,[16] antivenom,[17] antidiabetic,[18] antiviral,[19] antihepatotoxic[20] as well as anticancerous properties.[21,22,23] Turmeric has been used as a food additive in curries to improve palatability and storage stability.[24]

In the present study the turmeric use as functional ingredient for the development of chutney. The main objectives of this study were to conduct proximate analysis and phytochemicals screening of fresh turmeric. Then, development of food product (chutney) incorporating fresh turmeric and proximate analysis of most acceptable variant will be conducted.

MATERIALS AND METHODS

Collection of raw materials

The fresh turmeric was collected from the medicinal garden of Banasthali University. Tomatoes, cloves, cinnamon, cardamom, acetic acid, salt and sugar were purchased from Banasthali University.

Chemical Composition

The fresh turmeric was analyzed for chemical composition like as moisture, ash content, protein estimation was done by Micro Kjeldhal method.[25] Estimation of Carbohydrate by difference method. Preparation of aliquot from ash for the estimation of iron by Wong's method.[25] Calcium analysis was done by titrametric method. Fat and crude fibre, phosphorous and riboflavin estimation.[26]

Phytochemicals

The aqueous extract of fresh turmeric was extracted for the phytochemical screening like alkaloid was done by Mayer's test, glycosides done by Brontrager's test. Tannins and steroids were done by Libermann-buchard's test. Flavonoid was done by Shonoda test.[27,28] Phenol was done by Ferric chloride test and saponin by Foam test.[29]

Product development and sensory evaluation

Chutney was prepared using fresh turmeric with different ratio. Four samples of chutney were prepared one was standard or control and other one prepared with 5%, 10% and 15% of fresh turmeric. The nutritional analyses of developed food product were also conduct. The samples were evaluated for overall acceptability by semi-trained panel of 7 to 8 judges by using 9 point hedonic scale 9-like extremely to 1- dislike extremely. A score of 5.5 and above was considered acceptable.[30]

RESULTS AND DISCUSSION

Chemical analysis of fresh turmeric

Spices are used for their medicinal properties by the centuries. Neutraceutical and phytochemical potential of turmeric is very beneficial for human being. It also used in curing of many diseases like as cancer, diabetes, hypocholestremia, antimicrobial. Turmeric is an aromatic plant with multiple uses.[31] Table 1 showed that chemical content in the fresh turmeric, in which micro nutrients are Moisture (8.73%), ash (33.84%), Protein (9.87%), Fat (6.43%), Fibre (5.97%), carbohydrate (66.43%), calcium (0.37%), phosphorus (0.69%), iron (0.056%) and riboflavin (0.622%) respectively. Ikpeama (2014), rveled the different results of chemical analysis fresh turmeric in the comparison of our study, it contain high moisture (8.92%), carbohydrate (67.38%) in the comparison of our study.[32] Other nutrients were high in our study.

Phytochemical screening of fresh turmeric aqueous extract

Phytochemicals are group of chemical compounds, responsible for color, flavor and odor. These phytochemicals have many protective health benefits. In phytochemical screening the same results finds in another study.[33] Table 2 showed that fresh turmeric extract was found rich in alkaloids, flavonoids, steroids, tannins and phenol. Whereas lack in glycoside. Arutselvi et al, (2012), reported the absence of flavonoids, alkaloids, tannins, saponin but presence of phenol and glycoside.[34]

Sensory evaluation of chutney prepared by incorporation of fresh turmeric

Table 3 showed that mean sensory score of chutney prepared by incorporation of fresh turmeric. Standard chutney was scored highest than other chutneys of fresh turmeric. Variant A (5%) was most acceptable than any other variant, it scores 7.4 in color and texture, 6.6 in taste, 7.5 in appearance and 7.4 in overall acceptability. Variant B (10%) was scored 6.8 in color, 7.2 in texture, 6.2 in taste, 6.9 in appearance and 6.6 in overall acceptability. Variant C (15%) was scored 6.6 in color, 7.0 in texture, 5.7 in taste, 6.7 in appearance and 6.4 in overall acceptability.

Chemical analysis of Standard and Variant A (5%) fresh turmeric mix chutney

After the sensory analysis the standard chutney and variant A that is 5% fresh turmeric incorporated chutney is most acceptable that's why the chemical analysis of standard and variant A chutney was done.

Table 4 showed that nutrient content of the standard and variant A(5%) chutney. 5% fresh turmeric incorporated chutney was highly acceptable and the nutrient analysis of acceptable product moisture content was 75.00% and increased 79.00% in test sample. Fat content was 0.50% which was increased 1.10% in test sample. Protein content was 3.40% and in test sample it was 4.20%. Iron content was 3.80% and which were increased 4.50%. Calcium, phosphorus and riboflavin were also increased in test sample.

Sensory evaluation of chutney, an another study done by Gaikwad et al, (2013), reported on the curry leaves chutney for the hypertensive subjects[35] and in our study

chutney is prepared by fresh turmeric that is also beneficial for many health conditions like antidiabetic, antiviral, anticancerous and fresh turmeric also increases the palatability and storage stability. A study on BAU-Kul chutney reported the moisture content that is 33.56% and ash content 04.0% but in turmeric chutney moisture content was low in the comparison of BAU-Kul chutney and ash content was high in comparison.[36]

Mohammad et al, 2014 conduct a study on inhibitory effect of ginger and turmeric on Rhizopus, Stolonifer growth on bread, moisture content of the bread was decreased and ash content was gradually increased. The results of overall acceptability shows that the bread was aceeptable at 1.5% turmeric powder and in our study the chutney was accepted at 5% of turmeric powder.[37]

Table 1: Chemical analysis of fresh turmeric.

Nutrients (%)	Fresh turmeric
Moisture	8.73
Ash	3.84
Protein	9.87
Fat	6.43
Fibre	5.97
Carbohydrate	66.43
Calcium	0.37
Phosphorus	0.69
Iron	0.056
Riboflavin	0.622

Table 2: Phytochemical screening of fresh turmeric aqueous extract.

Phytochemical	Fresh turmeric extract
Alkaloids	+ve
Glycosides	-ve
Flavonoids	+ve
Steroids	+ve
Tannins	+ve
Saponins	+ve
Phenols	+ve

(+) = Present
(-) = Absent

Table 3: Mean sensory score of chutney prepared by incorporation of fresh turmeric.

Sample	Color	Texture	Taste	Appearance	Overall acceptability
S	8.7	7.9	8.3	8.9	8.8
A	7.4	7.4	6.6	7.5	7.4
B	6.8	7.2	6.2	6.9	6.6
C	6.6	7.0	5.7	6.7	6.4

S- Standard A-5% Fresh turmeric
B-10% Fresh turmeric C-15% Fresh turmeric

Table 4: Chemical analysis of Standard and Variant A (5%) fresh turmeric mix chutney.

Nutrient (%)	Standard	Variant (A)
Moisture	75.00	79.00
Ash	2.60	3.90
Protein	3.40	4.20
Fat	0.50	1.10
Fiber	1.00	1.06
Carbohydrate	60.00	63.00
Calcium	2.00	2.87
Phosphorus	0.00	0.01
Iron	3.80	4.50
Riboflavin	0.00	0.001

CONCLUSION

The study showed that turmeric contains high amount of nutrients, phytochemicals that may be a great usage for the development of food products. Turmeric was potential against many diseases and health conditions. It is also a natural medicine because of its low cost, proven the potential against many therapeutic conditions. Turmeric is fastly moving from kitchen towards the clinic.

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REFERENCES

1. Akram M, Uddain S, Ahmed A, Khan U, Hannam A, Mohuddin E, Asif M. (Curcuma longa and curcumin:a review article). Romanian Journal of Biology Plant Biology, 2010; 55(2): 65-70.
2. Amerine MA, Pangborn RM, Rossler EB. (Principles of sensory evaluation of foods). Academic Press New York, 1965; 350-376.

3. Arutselvi R, Balasarvanan T, Ponmurugan P, Saranji MN, Suresh P. (Phytochemical screening and comparative study of antimicrobial activity of leaves and Rhizomes of turmeric varities). Asian Journal of Plant Science and Research, 2012; 2(2): 212-219.
4. Bhowmik D, Chiranjib, Kumar KPS, Chandira M, Jaykar B. (Turmeric: a herbal and traditional medicine). Archives of Applied Science and Research, 2009; 1(2): 86-108.
5. Biswas MMH, Ahmed B, Taneya MLJ, Uddin MB. (Development of preservation by processing technologies of BAU kul). Journal of Bangladesh Agricultural University, 2014; 12(1): 143–152.
6. Chattopadhyay I, Biswas K, Bandyopadhayay, Banerjee RK. (Turmeric and crcumin: biological actions and medical applications). Current science, 2004; 87: 44-53.
7. Christine M, Kaefer, John A, Milner. (The role of herb and spices in cancer prevention). Journal of Nutritional Biochemistry, 2008; 19(6): 347-361.
8. Danalas CA. (Potential uses of turmeric (Curcuma longa) products as alternative means of pest management in crop production). Plant Omics Journal, 2011; 4(3): 136-141.
9. Deogade SC, Ghate S. (Curcumin: therapeutic applications in systematic and oral health). International Journal of Biological and Pharmaceutical Research, 2015; 6(4): 281-290.
10. Gaikwad P, Khan TN, Nalwade V. Impact of curry leaves (*MURRAYA KOENIGII*) on hypertensive subjects). International Journal of Food and Nutritional Sciences, 2013; 2(2): 68-72.
11. Ikpeama, Ahamefula, Onwuka GI, Nwankawo, Chibuzo. (Nutritional composition of turmeric (Curcuma longa) and its antimicrobial property). International Journal of Scientific and Engineering Research, 2014; 5(10): 1085-1089.
12. Irulappam R, Naturajan, PV. (Antimutogenic potential of curcumin on chromosomal aberatiavsim allium cepa). Journal of Zhejiang University Science, 2007; 8(7): 470-475.
13. Jayapraasha GK, Rao LJ, Saariah KK. (Antioxidant activities of curcumin, demethoxycurcumin and disdemethoxycurcumin). Food Chemistry, 2006; 98: 720-724.
14. Jurenka JS. (Anti-inflammatory properties of curcumin, a major constituent of Curcuma longa: a review of preclinical research). Research Alternative Medicine Review, 2009; 14(2): 141-153.
15. Kanugo, S. (Trend analysis of turmeric exported from India and associated foreign earnings). International Journal of Research in Economics and Social Sciences, 2016; 6(11): 99-105.
16. Krup V, Prakash H, Harini A. (Pharmacological activities of turmeric (Curcuma longa linn): a review). Homeopathy and Ayurvedic Medicine, 2013; 2(4): 131-133.
17. Kumar A, Dora J, Singh A. (A review on spice of life Curcuma longa: turmeric). International Journal of Applied Biology and Pharmaceutical Technology, 2011; 2(4): 371-379.
18. Labban L. (Medicinal and Pharmacological Properties of turmeric (Curcuma longa): a review). International Journal of Pharmaceutical and Biomedical Sciences, 2014; 5(1): 17-23.
19. Lakshmi V, Lakshmi T. (Antivenom activity of traditional herbal drugs: an update). International Research Journal of Pharmacy, 2013; 4(9): 1-3.
20. Lal J. (Turmeric, curcumin and our life: a review). Bulletin of Enviroment, Pharmacology and Life Sciences, 2012; 1(7): 11-17.
21. Li S, Yun W, Deng G, Wang P, Yang P, Agarwal BB. (Chemical composition and product quality control of turmeric *Curcuma longa* L.). Pharmaceutical Crops, 2011; 2: 28-54.
22. Meng BO, Jun LI, Hong C. (Antioxidant and anti-inflammatory activities of Curcumin on diabetes mellitus and its complication).Current Pharmaceutical Design, 2013; 19(11): 2101-2113.
23. Moghadamtousi SZ, Kadir AH, Hassandarvish P, Tajik H, Abubakar S, Zandi K. (A review on antibacterial, antiviral and antifungal activity of curcuma). BioMed Research Internatinal, 2014; 1-12.
24. Muhammad A, Rahman ZMAYA, Tabassum A, Shakoor A, Khan A. (Inhibitory effect of ginger and turmeric on Rhizopus, Stolonifer growth on bread). Food Processing and Technology, 2014; 5(5): 1-6.
25. Nasri H, Sahinfard N, Rafieian N, Rafieian S, Shirzad MS, Shirzad M. (Turmeric: a spice with multifunctional medicinal properties). Journal of Herbmed Pharmacology, 2014; 3(1): 5-8.
26. NIN. (2003). A manual of laboratory techniques. Hyderabad, National Institute of Nutrition, Indian Council of Medical Research, 2003; 56-58.
27. Pawar H, Karde M, Mundle N, Jadhav P, Mehra K. (Phytochemical evaluation and curcumin content determination of turmeric rhizomes collected from Bhandra dsittrict of Maharastra: India). Medical Chemistry, 2014; 4(8): 588-591.
28. Rathaur P, Raja W, Ramtcke PW, Joh SA. (Turmeric: the golden spice of life). International Journal of Pharmaceutical Sciences and Research, 2012; 4(9): 1-3.
29. Ryan JL, Heckler CE, Ling M, Kalz A, Williams JP, Pentland AP, Morrow GR. (Curcumin for radiation dermatitis a randomized, double blind, placebo-controlled clinical trial of thirty breast cancer patients). Radiation Research Society, 2013; 180(1): 34-43.
30. Sharma S. (2007). Experiments and techniques in biochemistry. New Delhi: Galgotia Publication Pvt Ltd., 2007.
31. Shrishail D, Handrsl HK, Handral R, Tulsianand G, Shruthi SD. (Turmeric: a nature's precious medicine). Asian Journal of Pharmaceutical and Clinical Research, 2013; 6(3): 10-16.
32. Shukla DP, Shah KP, Rawal RM, Jain NK. (Anticancer and cytoxic potential of turmeric

(Curcuma longa), neem (Azardizachta indica), tulsi (Ocinum sanctum), ginger (Zingiber offininale) extracts on HeLa cell line). International Journal of Life Science Scientific Research, 2016; 2(4): 309-315.
33. Sonchit MN, Zuraini A, Bustman AA, Sonchit N, Sulaiman MR, Noratunlinna. (Protective activity of turmeric (Curcuma longa) in paracetamol induced in hepatotoxixcity in rats). International Journal of Pharmacology, 2005; 1(3): 252-256.
34. Surojanametakul V, Satmale P, Saengprakai J, Siliwan D, Wattanasiritham L. (Preparation of cucuminoid powder from turmeric root (Curcuma longa linn.) for food ingredirnt use). Kasetsart Journal (Natural Science), 2010; 44(1): 123-130.
35. Tiwari P, Kumar B, Kaur G, Kaur H. (Phytochemical Screening and extraction: A Review). Internationale Pharmaceutica Sciencia, 2011; 1(1): 98-106.
36. Wadood A, Ghufram, Syed BJ, Muhammad N, Khan A, Ghaffar R, Asnad. (Phytochemical analysis of medicinal plants occurring in local area of Mardan). Biochemistry and Analytical, 2013; 2(4): 2-4.
37. Yadav RNS, Agrawala M. (Phytochemical analysis of some medicinal plants). Journal of Phytology, 2011; 3(12): 10-14.