

Analysis of the Curcumin Content of various Turmeric Genotypes (*Curcuma longa* L.)

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ABSTRACT: One of the most essential ingredients in Indian and Chinese cooking is turmeric. Turmeric contains a significant amount of curcumin. Curcumin is highly sought after and has a high market potential or high price, because to its numerous medical, biological and pharmacological uses. The goal of the current experiment was to assess the curcumin content of several turmeric genotypes. According to the study's findings, JWRH-7 and GNT-1 have a larger percentage of curcumin than the other turmeric genotypes. The quantity of curcumin in turmeric determines its quality and, consequently, its potency. The results show that the content of curcumin varies geographically and is influenced by factors including soil, environment, and climatic conditions.

Keywords: Turmeric, Curcumin, Spectrophotometer, Geographical variation.

INTRODUCTION

One of the most significant spices and herbs for Indian desserts is turmeric (*Curcuma longa* L.) (Aggarwal *et al.*, 2003). The Zingiberaceae family is the home of turmeric. Its rhizome is frequently employed in processes that provide flavour and colour. In Southeast Asia, it was also used to add spices to the cooking process. It is a conventional drug used in the treatment of several illnesses in Ayurveda, Unani, and Siddha medicine (Selvi *et al.*, 2015). Due to the several well-known biological properties of turmeric and curcumin, which is its main active element, the two have attracted a lot of interest. The primary bioactive ingredient in turmeric, curcumin, has been demonstrated to have a wide range of biological effects, including anti-inflammatory, antioxidant, anticarcinogenic, antidiabetic, and antibacterial ones (Jain *et al.*, 2006; Chuengsamarn *et al.*, 2012; Bradford, 2013; Soetikno *et al.*, 2013; Son *et al.*, 2013). A crystalline orange-yellow powder known as curcumin is virtually insoluble in water. Lampe and Milobedeska described the curcumin structure (C₂₁H₂₀O₆) for the first time in 1910, demonstrating that it is diferuloylmethane (Anamika Bagchi, 2012). Its use as natural treatments in India has increased the use of curcumin. The anti-diabetic, antiseptic, antibacterial, anti-asthmatic, anti-ulcer, insect-repelling, and wound-healing effects of turmeric are well documented (Ammon and Wahl 1991). Indian turmeric is preferred because of its high content of Curcumin compared to other countries. However, non-standard materials and uniforms may result in less

functional integration than is required for the specified function.

MATERIAL AND METHODS

Plant material considered in 25 genotypes / species collected in different regions of India and stored in the Division of Vegetable Science, Agricultural and Forestry College, Jhalarapatan City, Jhalawar, Rajasthan, India. The curcumin content extracted from these genotypes.

Using the technique described by Geethanjali *et al.* (2016) the curcumin content was determined. The dried rhizomes were crushed into a fine powder, and one gram of it was filtered for an hour in 75 ml of acetone before being filtered again into 200 ml of cosmetics. In this instance, a standard flask is used to dilute 1 ml to 100 ml. Curcumin is kept in dark environments and flasks that have been covered in black paper since it is light-sensitive. Less than 420 nm was the wavelength at which this solution's UV spectra were measured. Standard curcumin was used to record the UV spectrum. Using the following formula, the absorption obtained from of the samples was compared to the standard value and the amount of curcumin in the estimated samples:

$$\text{Curcumin (\%)} = \left[\frac{Ds \times As}{100 \times Ws} \times 1650 \right] \times 100$$

wherever,

Ds - dilution volume of the sample (i.e., 200 × 100 = 20000ml)

Ws - weight of the sample taken in grams

As - absorbance of the sample

1650 - standard value calculated by experts

RESULT AND DISCUSSION

Three replications number of samples was collected, and the curcumin concentration was determined using a UV-visible spectrophotometer. All of the samples' UV-visible spectra were compared to the curcumin standard UV spectrum. Curcumin has an absorption band of 420 nanometers. Analyses the percentage of curcumin in various genotypes in Table 1. It varies between 1.60 to 4.15%. The character's overall mean was 2.36%. The JWRH-7 genotype had the highest curcumin concentration (4.15%), followed by GNT-1 (3.44%), while JWRH-2 (1.60%) had the lowest. Similar results

were found by Ratnambal (1986); Sinkar *et al.* (2005). The findings show that turmeric genotypes collected in Jhalawar, Rajasthan, and Navsari, Gujarat, had significant curcumin concentration. The phytochemical makeup of turmeric and hence its function are related to its concentration. The curcumin concentration of turmeric may be related to glucosidase inhibition, antiglycation effects, antioxidant activity, radical release capacity, ability to reduce oxidative stress, prevention of human LDL oxidation, etc (Jha and Deka 2012).

Table 1: Percentage of curcumin extracted from different genotype of turmeric.

Genotypes name	Curcumin content (%)
Krishna	2.02
JWRH-1	2.12
Laka Dong	2.05
JWRH-2	1.60
JWRH-10	2.14
JWRH -11	1.69
GNT-1	3.44
JWRH-3	2.24
JWRH-4	2.16
JWRH-7	4.15
JWRH-9	1.78
JWRH-6	1.66
Patangadi	2.80
Erode local	2.65
Salem	2.64
Belogaum local	2.83
JWRH-13	2.05
JWRH-12	2.41
Keshar	2.60
JWRH-17	2.67
JWRH-5	2.39
JWRH-8	1.93
JWRH-14	3.15
JWRH-15	2.12
JWRH-16	1.74

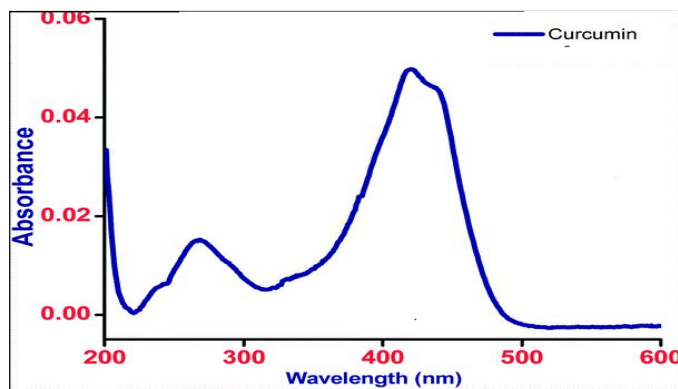


Fig. 1. Ultraviolet (UV) spectrum of ordinary curcumin.

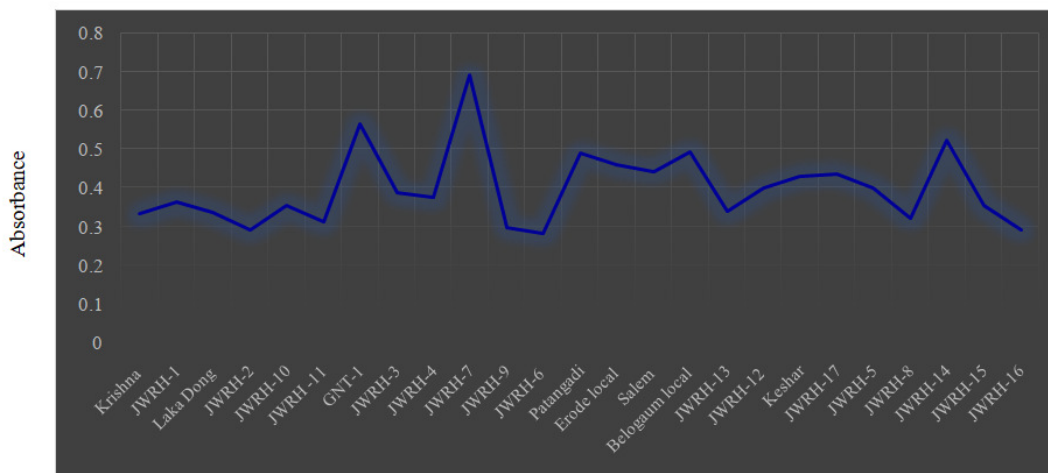


Fig. 2. Comparison of the curcumin UV-visible spectra obtained from several turmeic genotypes.

CONCLUSIONS

Due to variations in local environmental conditions, curcumin quantity and quality fluctuates. Thus, it is crucial that these plants be cultivated and carefully planted on a wide scale in order to improve the quality of turmeric. More investigation can be done to establish the requirement to grow high quality curcumin, which has numerous therapeutic characteristics, based on the proportion of curcumin present in turmeric and its capacity to prevent many diseases.

Conflict of Interest. None.

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