

Research Paper :

Chemical composition of finger rhizomes of *Curcuma aromatic* L. and *Curcuma longa* L.

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ABSTRACT

Biochemical constituents in the finger rhizomes of two genotype *Curcuma aromatic* L. and four genotype of *Curcuma longa* L. were evaluated for proximate composition on a dry weight basis. The contents of Moisture, ash, crude protein, crude fat, crude fiber and total carbohydrates were in the range of 7.01-7.91, 4.34-5.07, 4.05-7.09, 2.66-4.46, 2.09-3.67 and 73.47-78.31 per cent respectively. Among the rhizomes of six genotypes examined, genotype CA 62/1 had the highest content of acid value (4.72%). Genotype Salem contained the highest amount of curcumin (3.43%). The curcumin content in turmeric dry rhizomes varied from 3.11-3.43 per cent.

Key words : Curcumin, Crude fat, Crude protein, Crude fiber, Total carbohydrates acid value

Turmeric is one of the well known spices commonly used in a variety of Indian dietary preparations to impart colour, flavor and taste to the food. It has been in use traditionally as a natural medicine due to its anti-inflammatory, anti-bacterial, anti-fungal and anti-tumor activities (Shrimal, 1993). Curcumin as an active ingredient present in turmeric (3 to 5 per cent) is responsible for biological activity and acts as a colouring agents to food, fiber, wood and several preparations. Some of the polysaccharides in turmeric were known to have anticancer, antioxidant and anti-microbial activity (Dhawan, 1993). The joint FAO/WHO expert committee on food additives has included turmeric in the provisional list and has temporarily recommended the acceptable daily intake for turmeric and curcumin as 2.5 and 0.1 mg/Kg of body weight, respectively (Bhavanishankar *et al.*, 1986). Several researchers have studied the biochemical composition of mother and finger rhizomes of turmeric (Anonymous, 1950; Pruthi, 1979; Natrajan and Lewis, 1980; Farrell, 1985; Viasan *et al.*, 1989 and Rakhunde, *et al.*, 1998). The biochemical composition of rhizomes and fingers as indicated by these researchers were in the range of 4.03 to 8.9% crude fat, 4.05 to 8.6% protein, 2.6 to 1.6% crude fibers and 59.15 to 71.95% carbohydrates. Looking to the scanty information available on chemical composition of some of the promising and the popular cultivars of Maharashtra, the present investigation was undertaken to evaluate proximate composition, curcumin content and acid value of crude

fat extracted from two different species of the turmeric *viz.*, *Curcuma aromatic* L. and *Curcuma longa* L. grown on black cotton soil at Turmeric Research Centre, Digraj, Dist. Sangali.

MATERIALS AND METHODS

The freshly harvested finger rhizomes of two promising cultivars from *Curcuma aromatic* L. and four popular cultivars of *Curcuma longa* L. were selected for the present study. After the harvest of the produce, the rhizomes were processed into dry rhizomes by following usual practice of curing by cooking in iron pan and drying under sunlight. The cured rhizomes were brought to the laboratory and dried in hot air oven for constant weight. The dried product was ground to a fine powder, sieved through 40 mesh sieve and stored in plastic containers for analysis. The proximate composition of powdered samples *viz.* ash, protein (N \times 6.25 = crude protein), crude fiber and crude fat (by Soxhlet extraction method) was determined by the standard A.O.A.C. (1990) methods on a dry weight basis. The total carbohydrate content was determined by difference *i.e.* by summing up and subtracting other parameters from hundred. The curcumin (g/100g) was determined by using the methods described by Sadasivam and Manickam (1991). The acid value of extracted oil was determined by A.O.A.C. (1990) method.

Table 1 :

Sr. No.	Cultrivars	Moisture (%)	Ash(%)	Crude protein (%)	Crude fat (%)	Crude fiber (%)	Total carbohydrate (%)	Curcumin (%)	Acid value of extracted oil
<i>Curcumin aromatica</i>									
1.	CA 62/1	7.52	4.84	4.05	2.66	2.16	78.31	3.14	4.73
2.	CA 62/2	7.01	4.72	7.09	2.87	2.69	76.35	3.27	4.66
<i>Curcuma longa</i>									
3.	Salem	7.25	4.34	6.08	3.40	2.28	76.35	3.43	2.88
4.	DM-222	7.19	4.82	7.09	3.21	2.47	75.67	3.11	2.88
5.	Tekurpeta	7.78	4.73	5.74	3.28	2.66	77.02	3.36	2.81
6.	Rajapuri	7.91	5.07	6.42	4.46	3.67	73.47	3.20	2.02
	S.E. \pm	0.050	0.074	0.141	0.082	0.041	0.340	0.035	0.047
	C.D.. (P=0.05)	0.152	0.223	0.425	0.247	0.123	1.025	0.106	0.143

RESULTS AND DISCUSSION

The approximate composition, curcumin content and acid value in the dry rhizomes of *C. aromatica* and *C. longa* cultivars are presented in Table 1. The approximate composition of the six turmeric cultivars of both the species reveal that moisture, ash, crude protein, crude fat, crude fibre and total carbohydrates were in the range of 7.01 to 7.91, 4.34 to 5.07, 4.05 to 7.09, 2.66 to 4.46, 1.69 to 3.67 and 73.47 to 78.31 per cent, respectively. These values are in agreement with the values reported from this laboratory by Rakhunde *et al.* (1998). A wide variation in crude protein content was observed within the two cultivars of *C. aromatica*. The variation in ash and crude fiber appeared to be minimum in all the cultivars. The maximum total carbohydrates content of 78.31 per cent was observed in the rhizomes of cultivars CA 62/1 of the *C. aromatica*. The crude fat content was found to be low in both the cultivars of *C. aromatica* than the cultivars of *C. longa*. However, it is interesting to note that, the acid value of the extracted crude fat was very high in both the cultivars of *C. aromatica* than the cultivars of *C. longa*. The increased acid value in cultivars of *C. aromatica* might be due to the more susceptibility of these fatty acids to non-enzymatic oxidation than the enzymic oxidation as the cooking of the rhizomes before the drying might have destroyed the enzyme lipase and lipoxygenase as reported by St. Angelo *et al.* (1979) in oil seeds. The curcumin content in all the cultivars was in the range of 3.11 to 3.43%. The maximum curcumin content of 3.43% was observed by Rakhunde *et al.* (1998).

Conclusion :

Thus the results of the present investigation on biochemical constituents curcumin and acid value of extracted oil in the finger rhizomes of two *Curcuma*

aromatic L. and four *Curcuma longa* L. genotypes indicated not much variability in the curcumin content within the two species, however, crude fat content and acid value of the extracted oil differed. This information on biochemical parameters can be utilized by Horticulture breeders in further varietal improvement programmers.

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