

Investigating the Quality and Phytochemical Composition of Turmeric Products in Karachi

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ABSTRACT

Introduction: Turmeric (*Curcuma longa*), known as haldi, is a widely used spice and herbal remedy, particularly in South Asia, due to its potential medicinal properties stemming from its bioactive compounds, most widely acknowledged as curcumin (Enemor *et al.*, 2020) (Jikah & Edo, 2024). Although turmeric is used today in a wide range of food products, its chemical composition varies significantly depending on its geographic origin, processing, and storage conditions (John *et al.*, 2024) (Oluwafemi *et al.*, 2022). These variations can affect the health benefits of turmeric, as its curcumin content is one of the major components of its therapeutic effect.

The local market in Karachi, Pakistan, offers a wide range of turmeric products, including powders and rhizomes from various suppliers, but little is known about the consistency of their phytochemical composition. This study investigates the variability in the phytochemical composition of turmeric samples available in Karachi's local markets.

Aim and Objective: The main aim of this study is to evaluate the phytochemical profile of turmeric samples from Karachi's local markets. Following are the objectives;

- To measure the potential phytoconstituents including curcumin in different turmeric samples.
- To analyze the presence and concentration of flavonoids, and polyphenols.
- To compare the chemical composition of turmeric samples from different suppliers to find out quality differences.

Methodology: A total of 4 turmeric samples were collected from different local markets in Karachi, including branded and unbranded turmeric powders and rhizomes. For further analysis the following procedures are used;

Phytochemical Contents: Phytochemical presence were found by previously standardized validated methods (Salem *et al.*, 2022).

Curcumin Content: Curcumin concentration was measured spectrophotometrically at 420 nm after ethanol extraction (Salem *et al.*, 2022).

Flavonoid Content: The flavonoid content was determined using the aluminum chloride method, with absorbance measured at 510 nm (Taoheed *et al.*, 2017).

Polyphenol Content: Polyphenols were quantified using the Folin-Ciocalteu method, with absorbance readings at 765 nm (Taoheed *et al.*, 2017).

Result: Qualitative analysis showed the presence of flavonoids, polyphenol, steroids, glycosides and tannins. The curcumin content ranged from 2.5% to 8.5%, with higher concentrations observed in branded samples compared to unbranded ones. Flavonoid content ranged from 0.4% to 1.9%, while polyphenols were found between 2.35% and 6.5%.

Discussion: The study highlighted significant variability in the phytochemical composition across 4 turmeric samples in Karachi's markets, with branded products generally showing higher curcumin content.

The presence of phenolic compounds and flavonoid made it better candidate for therapeutic uses (Taoheed *et al.*, 2017).

Conclusion: This research underscores the need for improved quality control in the turmeric market in Karachi. Variability in curcumin content highlight the importance of standardizing turmeric products to ensure consumer safety and the medicinal efficacy of turmeric.

Keywords: Phytochemicals, Chemical Composition, Variability, Polyphenol, Folin-Ciocalteu Method.

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