

USANA Technical Bulletin

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Turmeric Extract

Technical Background

- Turmeric (*Curcuma longa* L.) is a member of the ginger family and native to India and Southeast Asia. The powdered root has a long history of use as a spice, especially in India and in the Middle East, where it is also used as a natural food colorant and medicinal agent.^{1,2}
- Turmeric contains three major phytochemical compounds (called curcuminoids), which give turmeric its bright yellow-orange color. These curcuminoids have been the focus of numerous clinical studies investigating their long-term safety,³ antioxidant properties,^{4,5} and anti-microbial⁶ and anti-inflammatory activity.^{7,8} Turmeric's most active curcuminoid is curcumin.
- Curcuminoids have been shown to block inflammatory processes by inhibiting the production of intercellular messengers called prostaglandins, which are found in high concentrations at sites of chronic inflammation.⁹
- Preliminary studies have examined the possible role of turmeric (and specifically curcumin) in potentially reducing the risk and/or severity of several types of cancer.^{10,11,12,13,14}
- Recent research has examined curcumin's ability to block the effects of homocysteine on the vascular system. This could potentially benefit those with HIV¹⁵ as well as protect the cardiovascular system.¹⁶

Sources and Precautions

- No Recommended Dietary Allowance (RDA) has been established for turmeric extract.
- Turmeric is listed as Generally Recognized as Safe (GRAS) by the U.S. Food and Drug Administration for use as a spice and seasoning agent.
- Based on long-term safety data, extracted curcuminoids have been approved as a food additive by the Food and Agriculture Organization /World Health Organization.

Abstracts

Radhakrishna Pillai G, Srivastava AS, Hassanein TI, Chauhan DP, Carrier E. Induction of apoptosis in human lung cancer cells by curcumin. *Cancer Lett.* 2004 May 28;208(2):163-70. Curcumin, a phenolic compound from the rhizome of the plant *Curcuma longa* has anti-inflammatory, antioxidant and anti-cancer activities. Although the precise mode of action of this compound is not yet elucidated, studies have shown that chemo-preventive action of curcumin might be due to its ability to induce apoptosis and to arrest cell cycle. This study investigated the cellular and molecular changes induced by curcumin leading to the induction of apoptosis in human lung cancer cell lines-A549 and H1299. A549 is p53 proficient and H1299 is p53 null mutant. The lung cancer cells were treated with curcumin (0-160 microM) for 12-72 h. Curcumin inhibited the growth of both the cell lines in a concentration dependent manner. Growth inhibition of H1299 cell lines was both time and concentration dependent. Curcumin induced apoptosis in both the lung cancer cell lines. A decrease in expression of p53, bcl-2, and bcl-X(L) was

observed after 12 h exposure of 40 microM curcumin. Bak and Caspase genes remained unchanged up to 60 microM curcumin but showed decrease in expression levels at 80-160 microM. The data also suggest a p53 independent induction of apoptosis in lung cancer cells.

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