



Research Highlight

CURCUMIN: A RELIABLE TOOL FOR CONTROLLING TOXIC ROS LEVEL

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Cancer is a devastating disease that is treated by employing chemotherapy. But, chemotherapeutic drugs induce toxicity to normal tissues which are the primary constraint in the way of successful cancer chemotherapy. A solution to reduce the toxicity of these medicines was sorely needed.

Therefore, numerous chemotherapy regimens as well as chemopreventive medicine combined with herbal drugs to improve the treatment effect and to minimize the toxicity of these medicines.

In this regard, curcumin is a chemopreventive agent which can be combined with traditional chemotherapeutic drugs in order to lessen the drug toxicity.

Curcumin is the major curcuminoid of turmeric which has anticancer properties that is why it is considered as a significant tool for chemoprevention of cancer¹. Curcumin is known for its medicinal properties for thousands of years and it is harvested from the rhizomes of the roots of a perennial plant known as *Curcuma longa*². It possesses various pharmacological characteristics that are well

investigated for its efficacy regarding cancer chemoprevention³.

At low concentrations, curcumin exerts its anticancer activity in HL-60 cells, whereas at elevated concentrations, it promotes Reactive Oxygen Species (ROS) generation⁴. Even though according to toxicological studies, curcumin is non-toxic even at high dosages⁵.

These facts urged the researchers to design a study in order to investigate the possibility of combining curcumin with chemotherapeutic drugs and to study the impact of different concentrations of curcumin alone as well as in combination with the chemotherapeutic drug 5-fluorouracil (5-FU) on normal yeast cells (*Schizosaccharomyces pombe*)⁶.

During this experiment, scientists evaluated the reactive oxygen species generation, cell growth, antioxidant enzyme activity, DNA integrity as well as cell cycle arrest⁶.

At the end of this experiment, researchers found that curcumin shows a concentration based effect on the growth of *S. pombe* cells. At 2.5 μM , it does not influence growth rate but at 5 μM and above this concentration it severely

lessens the growth rate of *S. pombe* cells.

Moreover, treatment of curcumin was also found to decrease the GSH levels and catalase activity which could be responsible to prevent DNA damage despite the generation of high levels of reactive oxygen species. However, the treatment of a very high concentration of curcumin (20 μ M) leads to DNA damage. The crux of the matter is curcumin plays a key role in controlling the cell growth and toxic reactive oxygen species level when combined with 5-fluorouracil (5-FU).

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