



Original Article

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Comparison of systemic availability of curcumin with that of curcumin formulated with phosphatidylcholine

- Timothy H. Marczylo
- , Richard D. Verschoyle
- , Darren N. Cooke
- , Paolo Morazzoni
- , William P. Steward
- , Andreas J. Gescher

Abstract

Purpose

Curcumin, a major constituent of the spice turmeric, suppresses expression of the enzyme cyclooxygenase 2 (Cox-2) and has cancer chemopreventive properties in rodents. It possesses poor systemic availability. We explored whether formulation with phosphatidylcholine increases the oral bioavailability or affects the metabolite profile of curcumin.

Methods

Male Wistar rats received 340 mg/kg of either unformulated curcumin or curcumin formulated with phosphatidylcholine (Meriva) by oral gavage. Rats were killed at 15, 30, 60 and 120 min post administration. Plasma, intestinal mucosa and liver were analysed for the presence of curcumin and metabolites using HPLC with UV detection. Identity of curcumin and metabolites was verified by negative ion electrospray liquid chromatography/tandem mass spectrometry.

Results

Curcumin, the accompanying curcuminoids desmethoxycurcumin and bisdesmethoxycurcumin, and the metabolites tetrahydrocurcumin, hexahydrocurcumin, curcumin glucuronide and curcumin sulfate were identified in plasma, intestinal mucosa and liver of rats which had received Meriva. **Peak plasma levels and area under the plasma concentration time curve (AUC) values for parent curcumin after administration of Meriva were fivefold higher than the equivalent values seen after unformulated curcumin.** Similarly, **liver levels of curcumin were higher** after administration of Meriva as compared to unformulated curcumin. In contrast, **curcumin concentrations in the gastrointestinal mucosa after ingestion of Meriva were somewhat lower** than those observed after administration of unformulated curcumin. Similar observations were made for curcumin metabolites as for parent compound.

Conclusion

The results suggest that curcumin formulated with phosphatidylcholine furnishes higher systemic levels of parent agent than unformulated curcumin.

Keywords

Curcumin Phosphatidylcholine Bioavailability Rat Cancer Chemoprevention Metabolism

Concepts found in this article

Phospholipid Complex

Curcumin Glucuronide

Curcumin Metabolite

Curcumin Concentration

Curcumin Administration

Parent Curcumin

European Patent Application

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Authors

- Timothy H. Marczylo ⁽¹⁾
- Richard D. Verschoyle ⁽¹⁾
- Darren N. Cooke ⁽¹⁾
- Paolo Morazzoni ⁽²⁾
- William P. Steward ⁽¹⁾
- Andreas J. Gescher ⁽¹⁾

Author Affiliations

1. Cancer Biomarkers and Prevention Group, Department of Cancer Studies and Molecular Medicine, University of Leicester, Robert Kilpatrick Clinical Sciences Building, Leicester Royal Infirmary, Leicester, LE2 7LX, UK
2. Indena SpA, Viale Ortles 12, 20139, Milan, Italy