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Crystal engineering solutions to improve pharmacokinetic properties of nutraceuticals

Anil Kumar Kruthiventi[1], Saikat Roy[2], Sathyanarayana Reddy[2], Bhargav Meshiya[2]
[1]*Nagarjuna Fertilizers And Chemicals Limited, Hyderabad, India,* [2]*Innovation Center, Tata Chemicals Ltd, Pune, India*
E-mail: anilk3@gmail.com

Gobal challenge of increasing needs with diminishing resources necessitates an innovative out-of-the-box thinking. Fortification of foods by nutraceuticals is a significant business opportunity, but one that still has significant technical challenges. Several factors are critical for the use and acceptance of nutraceuticals, such as, (a) stability at various pH, temperatures & relative humidity, (b) bioavailability, (c) organoleptic acceptance (taste masking) and (d) low cost formulation. Crystal engineering of synergistic combinations of nutraceuticals presented itself as a versatile platform for developing these formulations. Stable and taste masked epigallocatechin gallate, more bioavailable curcumin and biomimetic isoflavone cocrystals were developed at Tata Chemicals Innovation centre and their structures were analyzed by X-ray diffraction, properties by spectroscopic and thermal methods. Human clinical trials and in vitro anti-inflammatory studies of a synergistic formulation of curcumin – 'Sustentials curcumin–G', showed four times more bioavailability with pronounced reduction in IL-6 concentrations. A new brand for formulations based on crystal engineering platform, namely, 'Sustentials Curcumin' was launched in the market. A flavour of this research and the challenges in commercialisation journey will be presented with suitable examples.

[1} Saikat Roy, Bhargav Meshiya, Ravindra Barhalikar, Anil Kumar [2017] WO 2017/002134 A1
[2] Saikat Roy, Bhargav Meshiya, Ravindra Barhalikar, Anil Kumar [2017] WO 2017/002133 A1

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