Herbal Immunity Booster-Associated Liver Injury During COVID-19 Pandemic and Aflatoxins

Dear Editor,

The recent case series on herbal immunity booster-induced liver injury during COVID-19 pandemic by Nagral et al in the J Clin Exp Hepatol was very interesting, and it has pharmacological importance from the point of herbal and complementary medicine, as well as public awareness.[1] The global outbreak of the COVID-19 pandemic in December 2019, as well as the second wave in 2021, claimed millions of deaths across the world. Fear of COVID-19 created panic in the general public across India, as well as in other countries. Even healthy subjects started looking for rapid immunity boosters or miracle drugs as a shield for protecting themselves from scary SARS-CoV-2 infection. The major reason for this was unavailability of specific drugs to target SARS-CoV-2, as well as early lack of a vaccine. Many people opted for traditional Complementary and Alternative Medicines (CAM) without any prescription from the expert doctors as well as without any advanced scientific research evidence. One such very popular CAM was *Tinospora cordifolia*, which is very popularly known Indian medicinal plant was promoted due to previously known immunity-boosting effects.[2] Although these CAMs including *T. cordifolia* are of natural origin, they have their own limitations compared to modern drugs.[1]

Even though there were reports on Drug-Induced Liver Injury (DILI) from these CAM drugs as stated in this study, few animal studies also reported the hepatoprotective function of *T. cordifolia*.[3,1,4] The toxicity is not only arising from the direct and indirect molecular mechanisms of action of these important pharmacological metabolites and also other contaminants from the same herb or plant of CAM drugs, but, there may also be chances of involvement of other external hepatotoxic contaminants such as Aflatoxin B1 and associated mycotoxins.[5,6] The Aflatoxin B1, which was extensively studied for its genotoxic hepatocarcinogenic effects on liver, may possibly play a major role in CAM-induced liver injury.[7] There was an experimental evidence that even herbal drug raw materials of *T. cordifolia* show a high amount of Aflatoxin B1 molecules.[5] Different types of mycotoxins, including Aflatoxins, are known to adversely activate the host immune responses.[8] Aflatoxin-mediated epigenetic modification may induce autoimmune disorders.[9] Aflatoxin-induced liver injury resembles autoimmune liver disease features, and it can also trigger the apoptosis of circulating leukocytes which may lead to autoimmune diseases of the liver.[10] Therefore, *T. cordifolia* herbal immunity booster-induced liver injury may be due to the Aflatoxins contamination.

There is an urgent need of the hour to create complete awareness in the general public about the harmful effects of improperly maintained and ingested *T. cordifolia* and other herbal immunity boosters not only during the COVID-19 pandemic but also in the coming days.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Ravishankar M. Vamadevaiah: Conceptualisation, writing, idea. **Prasanna K. Santhekadur**: Conceptualisation, Writing – original draft, Investigation, idea.

CONFLICTS OF INTEREST

The authors have none to declare.

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Abbreviations: CAM: Complementary and Alternative Medicines; DILI: drug-induced liver injury

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