

Stability of amoxicillin and clarithromycin after intercalation into smectite

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Clay minerals have various usages in pharmaceutical ground both as excipients and active agents. As excipient aspects, the cation intercalation characteristic of layer silicate minerals makes them have been studied for the purpose of drug carrier. Drugs have cationic feature whichever could be intercalated into the interlayer site of smectite. Drugs can be also released from the drug-intercalated smectite complex in the gastrointestinal fluid by cation exchange phenomenon. Amoxicillin (Amox) is synthetic penicillin which often adopted for eradication of bacteria. However it is easily decomposed in aqueous solution at any pH condition. Clarithromycin (Cla) is improved erythromycin in stability which is also widely administrated for eradication of bacteria. However, it was reported that Cla was decomposed at condition lower than pH 4. In this study, focusing on safe carrier usage, the stability of Amox and Cla after intercalation into smectite interlayer. By aging, the empirical half-life of both antibiotics was calculated at solid, aqueous, and intercalated complex condition. Detection of decomposition was performed with liquid chromatography-mass spectrometer (LC-MS). The antibiotics-smectite complex were tested with X-ray diffraction (XRD) and energy dispersive spectroscopy (EDS) before and after release experiments. In conclusion, the stability of intercalated Amox and Cla were similar to that of aqueous condition.

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