

STUDIES ON THE REACTION BETWEEN IBUPROFEN AND CHITOSAN

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Chitosan (CTS) is a biopolymer obtained through partial deacetylation of chitin, whose physical-chemical properties depend on its deacetylation degree (DD). CTS can be used in several applications, such as water treatment, cosmetic formulations, among others. One of such applications which has received special attention is its use as a drug carrier.[1]

The use of CTS as a drug delivery system for controlled drug release of ibuprofen (IBU) is a good alternative to minimize side effects as gastric sensitivity.

IBU is a non-steroidal anti-inflammatory drug with analgesic and antipyretic activities widely used in pain and fever relief.[2]

In this work, the product of a reaction between CTS and IBU was prepared and characterized.

The DD of pre-purified CTS was determined potentiometrically, as 78.1 %.

Thus, this pre-purified CTS was stirred with IBU in aqueous solution for 24h, at 40 °C. The reaction product was filtered and dried at 40 °C under reduced pressure.

FTIR was used to characterize the isolated CTS and IBU as well as the reaction product.

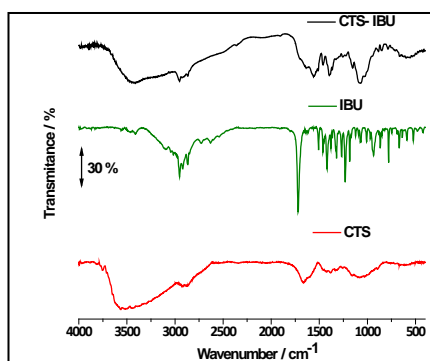


Fig 1: FTIR spectra of (—) CTS-IBU, (—) IBU and (—) CTS.

CTS FTIR spectrum presented a band in 1665 cm^{-1} related to C=O vibration. This carbonyl band is shifted to 1637 cm^{-1} when the CTS-IBU is formed. According to Quandil [3] this shift is expected when an electrostatic interaction occurs between the starting reactants, indicating the success of the reaction, meanwhile the IBU carbonyl band at 1720 cm^{-1} disappears.

Thermal analysis was used to study the thermal behavior of the isolated components, the salt and the physical mixture (PM) of chitosan and ibuprofen. TG, DTA and DSC curves are shown in Figures 2 and 3, respectively.

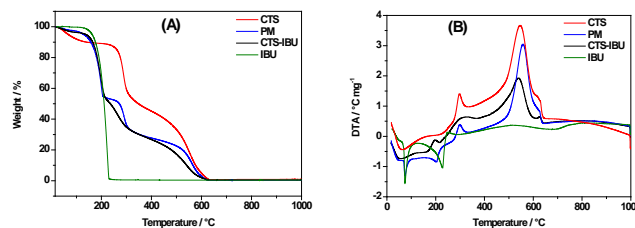


Fig 2: (A) TG, (B) DTA curves of (—) CTS, (—) PM, (—) CTS-IBU and (—) IBU.

Fig. 2 A presents the mass losses of CTS, the reaction product (CTS-IBU), the physical mixture (PM 1:1 w/w) and IBU. It is easy to see that the physical mixture does not present evidence of interaction between the components while the reaction product curve presents changes in the TGA profile. Similar comments can be drawn in relation to the DTA profiles in Fig. 2 B which show changes in the exothermic decomposition peaks of CTS and IBU due to electrostatic interactions.

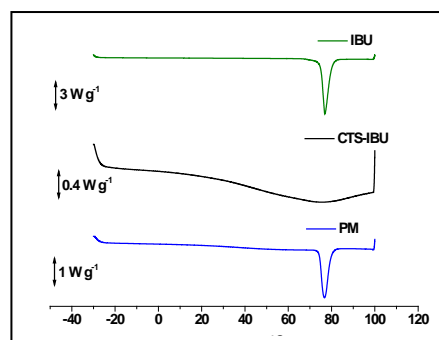


Fig 3: DSC curves of (—) IBU, (—) CTS-IBU, and (—) physical mixture of components.

DSC curves (Fig. 3) also present evidences of these interactions, once the IBU melting signal is not observed in the DSC curve of the product but it is present in the curve corresponding to the physical mixture. In the DSC curve of the product only a broad peak due to dehydration is observed.

ACKNOWLEDGEMENTS

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