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Preparation and physical properties of itraconazole-loaded nanoemulsions using pineapple starch as co-emulsifier

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ARTICLE INFO

Article history:

Available online 24 November 2015

Keywords:

Pineapple starch
Pectin
Co-emulsifier
Polysorbate 80
Itraconazole
Nanoemulsions

Pineapple plant (*Ananas comosus* L. Merr.) is a leading edible member of the Bromeliaceae family [1]. Nanoemulsions containing itraconazole, a poorly water-soluble drug using pectin as a polymeric emulsifier, are currently under investigation [2]. The physicochemical and rheological properties as well as structural characterizations of cassava and mungbean starches have been reported [3]. However, the application of pineapple starch as co-emulsifier of pharmaceutical excipients for pharmaceutical industry has not been investigated.

Nanoemulsions were prepared by simple homogenization method using homogenizer with speed of 20,000 rpm for 30 minutes to avoid high pressure conditions. In this study, polysorbate 80 was used as emulsifier, whereas high methoxy pectin

or Pattawia pineapple starch were employed as co-emulsifiers. Castor oil was used as internal phase. Itraconazole, a poorly water-soluble drug was used as a model drug. The selected formulations were evaluated for particle size, zeta potential, viscosity and % creaming. The composition of optimized formulations was 20% w/w polysorbate 80, 2.6–3.0% w/w high methoxy pectin and 0.1–0.4% w/w pineapple starch as shown in Fig. 1. The particle size of the formulations was within the range of 100 to 500 nm. The zeta potential and viscosity were in the range of –15.71 to –21.46 mV and 5003 to 5101 mPa.s, respectively. The formulations provided the most stable nanoemulsions when they were kept at 2–8 °C for 14 days. When the prepared nanoemulsions were subjected to temperature cycling test (4 °C for 24 hours and 40 °C for 24 hours), they were

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Peer review under responsibility of Shenyang Pharmaceutical University.
<http://dx.doi.org/10.1016/j.ajps.2015.11.102>

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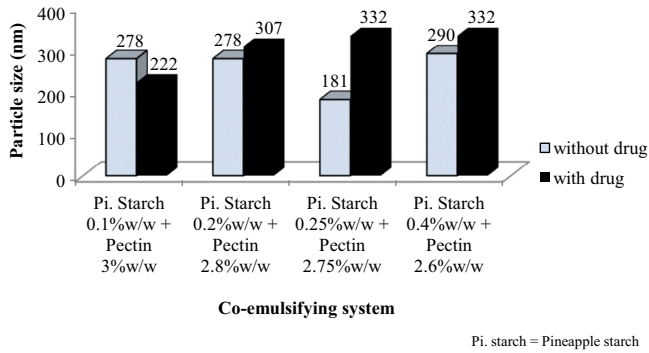


Fig. 1 – Effect of co-emulsifying system on particle size of nanoemulsions.

stable for 3 cycles. The results suggested that pineapple starch, naturally occurring polysaccharide, biodegradable, edible and harmless biopolymer, could be applied as co-emulsifier in nanoemulsions for pharmaceutical application.

Acknowledgments

The authors gratefully acknowledged Silpakorn University Research and Development Institute through research program on “The study of starch from stalks and stems of pineapples and development as pharmaceutical excipients” for financial support.

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