

## Synthesis and Characterisation of Piperine-loaded Starch Nanoparticles

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**ABSTRACT:** *This study aimed to explore the potential application of starch nanoparticles as the nanocarriers for the controlled release of piperine. Starch nanoparticles with mean particle sizes ranging from 50 nm to 200 nm have been synthesised as nanocarriers for encapsulation of piperine. Piperine has been successfully loaded onto starch nanoparticles via the in-situ nanoprecipitation method. The loading capacity of piperine was affected by the synthesis conditions such as types and concentrations of surfactants as well as initial piperine concentrations. Under optimum conditions, starch nanoparticles exhibited a maximum piperine loading capacity of 4.74 mg mg<sup>-1</sup>. Piperine was observed to release out from starch nanoparticles in a slow and steady manner over a period of 168 h under physiological pH.*

**Keywords:** Piperine, starch nanoparticles, nanocarriers, release studies, synthesis and characterisation

### 1. INTRODUCTION

Piperine is the major alkaloid of the black pepper, and it is responsible for the spicy flavour of the black pepper. Piperine is a yellow crystalline compound and it is a weak base compound particle with low water solubility (40 mg l<sup>-1</sup> at 18°C). It is not reactive in solid form but becomes reactive after dissolved in solution.<sup>1</sup> Traditionally, piperine had been used mainly for culinary purposes but it has been proven to have excellent pharmacological properties. In addition, piperine has demonstrated to have biotransformative effects and could enhance the bioavailability of therapeutic drugs.<sup>2</sup>