Chapter 1: Introduction and Literature Review
1.1 General Introduction

Throughout the pharmaceutical industry and more recently, with the introduction of ‘functional foods’ in the food industry there is a need to deliver active components to consumers especially people with ailments. This is possible by encapsulation technology. This is an advanced technology which is growing in the pharmaceutical, cosmetic, food and printing industry (Heinzen, 2002). Encapsulation can be defined as a technique to coat an active ingredient or a mixture of active materials in a system (Madene et al., 2006). The system or coating material is called shell, wall, material, carrier or encapsulant while the active ingredient that is coated is known as the active material or core material. In food industry, the materials that are normally used as the core material are flavours, colourants, aroma compounds, fats and oils, vitamins and minerals (Shahidi and Han 1993). Enhancement of the quality of food through encapsulation technology has gained increasing importance in the manufacture of health food or functional food. The use of encapsulation technology to achieve a target of flavour release and some other functions encourages researchers to study the mechanisms of flavour release and make enhancement on the existing encapsulation technology. Similar emphasis is given in the pharmaceutical industry where encapsulation of drugs has been explored extensively in order to improve the therapeutic performance of drugs. The reasons for applying encapsulation technology in the industries mentioned are summarised in Table 1.1.
Table 1.1: Reason of the encapsulation technology. (Adapted from Finch and Bodmeier, 2005).

<table>
<thead>
<tr>
<th>Reason</th>
<th>Description</th>
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<tr>
<td>Controlled release</td>
<td>Controlling the release of the active material in a carrier material to have various release profiles. This reason is mainly applied to the food and pharmaceutical industry.</td>
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<tr>
<td>Protection of core material</td>
<td>Some of active ingredients are sensitive to the atmospheric condition such as moisture, atmospheric oxygen and temperature. Encapsulation can prevent any active materials from direct contact to the atmospheric condition and thus increase its functionality.</td>
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<td>against the atmospheric</td>
<td></td>
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<tr>
<td>condition</td>
<td></td>
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<tr>
<td>Protection of hygroscopic core</td>
<td>Flowability and direct compressible nature of hygroscopic core materials such as hygroscopic B group vitamins can be improved with iron phosphate by microencapsulating this core material before compressing it into tablets.</td>
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<td>contents</td>
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<tr>
<td>Masking of taste and odour</td>
<td>Compounds with unpleasant taste and odour can be masked by microencapsulation in hard gelatine capsules or by incorporating the unpleasant compound in sugar or film-coated tablets.</td>
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<td>Flavour and aroma release</td>
<td>Encapsulation can control the release profile of</td>
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