

ADVANCES IN DRYING SCIENCE AND TECHNOLOGY

THERMAL AND NONTHERMAL ENCAPSULATION METHODS

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1 Principles and Applications of Encapsulation Technologies to Food Materials

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1.1 INTRODUCTION

Encapsulation in the food science area is defined as the process of entrapment of food materials in solid, liquid, or gaseous forms (termed as internal phase, core, fill, payload phase, incipient, (bio)active agent, etc.), within small capsules made from secondary materials, often referred to as carrier or wall, shell, excipient, or encapsulant, with the aim to protect the entrapped constituents from harsh environments and release them at controlled rates over prolonged periods of time or at specific target sites (e.g., in the gastrointestinal track). The capsule wall structure is often made up of food grade polymers, such as proteins (gelatin, milk whey proteins, etc.) and polysaccharides (gum arabic, alginates, pectins, chitosan, cellulose and starch derivatives, etc.) as well as lipids (fats and waxes), used either alone or in mixtures and layers, to enhance the performance of the capsules for controlled release of the active constituents (Augustin & Hemar, 2009); the latter can be nutrients,