



**TITLE:** Chapter Thirteen - Applications of NADES in stabilizing food and protecting food compounds against oxidation

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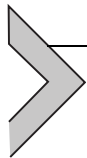
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# Applications of NADES in stabilizing food and protecting food compounds against oxidation

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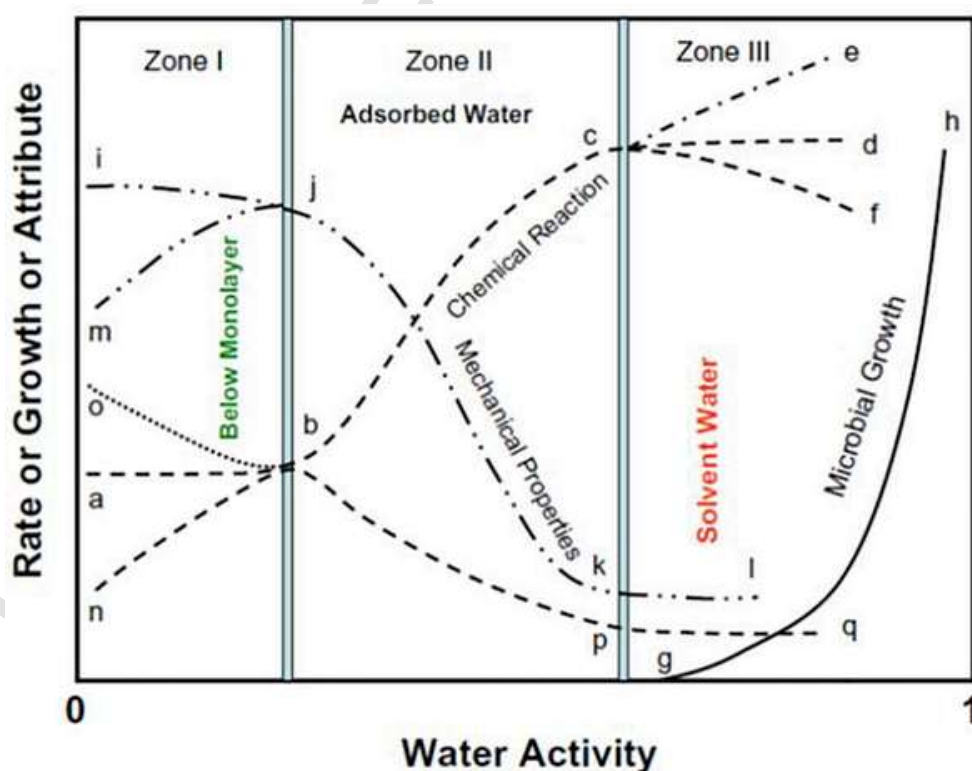
## Abstract

In new food product development, one of the major challenges is to enable the preservation of the designed food properties throughout its shelf life. During the shelf life, food ingredients undergo different deteriorative changes thus affecting their chemical, sensory and nutritional properties (e.g. texture, appearance, flavor, nutritional value, beneficial health effects). Different strategies have been applied to food

products to stabilize food ingredients and improve the oxidative stability, such as: the use of chemical additives, antioxidants, and utilization of encapsulation/microencapsulation techniques. However, in recent years the change of consumer needs and expectations from food industry have dramatically changed, requiring more natural, less processed and “free from” ingredients food. Therefore, the importance of natural deep eutectic solvents (NADES) made of natural primary metabolites is rising especially in the food sector. However, studies presenting the stabilization ability of NADES are still scarce. This chapter overviews the unique physicochemical properties of NADES accountable for stabilization of solutes and their application related to stabilization of food and its components.

## 1. INTRODUCTION: THE MAJOR DETERIORATING CHANGES IN FOODS

Foods are often classified based on their stability as: non-perishable, semi-perishable and perishable. Most foods (e.g. most fresh fruits and vegetables, meat and fish, milk and eggs) are classified as perishable, due to their high-water content. Low moisture content foods (e.g. cereal grains, dried fruit and vegetables) and frozen foods are classified as semi-perishable, while canned foods can sometimes be stored for



**Fig. 1.** The food stability map based on the water activity concepts. Taken from Rahman, M. S. (2019). *Water activity and glass transition of foods. Reference module in food science, Elsevier.*