CHAPTER 1

Introduction

1.1 Principles and rationale

Salt (sodium chloride) is used as salty condiment in human foods. Besides, it, a flavor enhancer, affects the flavor of food products. Salt is a cheap and versatile product. Salt decreases water activity of foods. By preserving these foods, it particularly acts as a deterrent to growth of microorganism. Salt can interact with other ingredients of some foods that affect foods texture such as bread and meat products (Gibson et al., 2000; Hutton, 2002). Within human body, the principal role of sodium in the body is the maintenance of bodily fluid within closed and regulated limits. Together with potassium (K), chloride (Cl) and other ions, sodium ions maintain the volume of the extracellular fluid, osmotic pressure, acid base balance and electrophysiological activity in muscles and nerves (Gibson et al., 2000). However, excessive sodium intake is also known to be one cause of high blood pressure (hypertension). Untreated hypertension is associated with increasing incidences of heart disease, stroke, and kidney disease (Bureau of Nutrition Department of Health, 2011). Approximately 150 million of peoples in the world have high blood pressure and every year 7 million of peoples in the world have died from high blood pressure (World Hypertension League, 2012). In 2009, approximately 21.4% or 10 million of Thai peoples had high blood pressure (Bureau of information, Office of the permanent secretary, 2010). In addition, salt intake of human in the world has been estimated to range between 9-12 g/day. In Thailand, averaged salt consumption among Thai people is 10.8 g/day/person in 2008-2009. In case of salt consumption, homemade diet contributes 10 g (8 g in condiments where: fish sauce, salt, condiment powder and soy sauce and 2 g in natural food), whenever another 0.8 g salt consumption comes from ready to eat snack, street food (Bureau of Nutrition, Department of Health, 2010). This rate is more than the recommended daily intake of salt consumption. The World Health

Organization (WHO) recommends that the limit of salt consumption is 5 g/day or 1 teaspoon/day or approximately 2,300 mg sodium/day (Bureau of Nutrition, Department of Health, 2011; World Hypertension League, 2009; World Hypertension League, 2012).

Therefore, the decreasing of sodium intake has become an important challenge in the world. Including Thailand, Bureau of Nutrition, Department of Health established campaign of sweet, fat, salt, overweight/obesity and diseases reduction for Thai people, which raised awareness of the consequence of high sodium diet and recommended changes of consumption habit (Bureau of Nutrition, Department of Health, 2011). However, individual behavioral consumption was different and complicated. Individual behavioral changes are difficult to achieve. It may depend on salt reduction processes and techniques in food manufacturer such as changing food product formulations or process, using salt particles with various size and structure and other salt substitutes, etc. (Desmond, 2006).

Odor-induced saltiness enhancement (OISE) is one of the reduced salt techniques in food products. It uses salt associated odorants to reduce sodium in salt solution and food products since the perception of taste quality can be enhanced by odor such as sweetness enhancement induced by strawberry odor (Djordjevic et al., 2004) or saltiness enhancement in salt solution by sardine odor (Lawrence et al., 2009). Generally, odor-induced saltiness enhancement has been studied in low salt solution model and some food products such as cheeses and soups. Lawrence et al. (2009) and Nasri et al. (2011) showed that odor-induced saltiness enhancement was more effective to salt reduction strategy. Odor-induced saltiness enhancement may be used in conjunction with different compensation strategies, such as the use of salt substitutes or flavor enhancers (Nasri et al., 2011). Another reduced sodium approach is increasing saltiness perception by changing salt particles. Various sizes and shapes of salt particles could affect different solubility property and sensory perception (Desmond, 2006). The suitable size and shape of salt particles allow faster saltiness perception which allows uses of a regular salt without salt substitutes.

Odor-induced saltiness enhancement is a rather new technique hence its application in food products is few. Therefore, the ideal was to use odor-induced saltiness enhancement in conjunction with modified salt particle in food products that

allows more options to reduce high sodium intake among Thai people and the rest of the world.

1.2 Objectives of the study

1.2.1 To identify different types of odor potentially enhancing saltiness perception;

1.2.2 To establish recognition and difference threshold of a selected odor that enhances saltiness perception;

1.2.3 To enhance saltiness of salt by process modification and odor induction.

1.3 Education and application advantages

1.3.1 Knowledge of the suitable odor for saltiness enhancement in food product will be obtained. Result from this research can same as a prototype of other sodium reduced foods in the future.

1.3.2 It supports a policy that encourages Thai people and the rest of the world to consume less sodium. It is an effective alternative to consumers to reduce the risk of sickness from high sodium intake.