

## Chapter 1

### Introduction

#### 1.1. Introduction

Nowadays consumers all around the world are more at the risk of non-communicable diseases (NCD) such as obesity, cardiovascular diseases, diabetes, and cancer. The leading causes of NCD were cardiovascular disease (45% of all NCD deaths), cancers (22% of all NCD deaths), and diabetes (4% of all NCD deaths) (WHO, 2017). It is found that diet that is low in essential nutrition such as dietary fiber and vitamin triggers the development of NCD. Furthermore, a high fiber diet helps to prevent colon cancer, lowers the risk of heart disease, and influences metabolic and inflammatory bowel disease, such as diabetes and diverticulitis. However, lack consumption of dietary fiber in major population still becomes a problem.

Noodle is a staple food that is popular in all over the world as staple food, especially in Asia. The main component of noodle is wheat flour. Wheat flour has several nutritional components such as vitamin minerals, and fiber. The main macronutrient of noodles is starch and gluten (Ritthiruangdej *et al*, 2011). However, traditional noodles lack of these nutritional components that are mostly lost during flour refinement. Thus, it is important to incorporate other ingredients in noodle to give extra health beneficial effect.

On the other hand, home-made meals are rarely seen and are being replaced by ready-to-cook and ready-to-eat foods. Wheat noodle products have become one of the food products that are consumed among people of all socioeconomic levels in both urban and rural areas of Thailand particularly in the form of instant noodles and fresh wheat noodles (Reungmaneejiton & Sikkhamondhol, 2014). However, instant noodles, especially the fried type, are sometimes classified by academics as “not nutritious” due to their high salt, fat and carbohydrate contents and inadequate fiber. Therefore, many attempts have been made to add dietary fiber to various noodle products with different fiber sources such as soy bean hulls, green and yellow peas, lentils, garbanzo

bean flour, etc. However, high levels of natural fiber in foods impart poor texture and mouth feel and unpleasant flavor and odor to the product.

One of the ingredients that can be incorporated in noodle is wheat bran. Wheat bran is a byproduct of dry milling of wheat into flour. It consists of the outer layers such as pericarp, seed coat, and cuticle. Usually wheat bran is used in animal feeding. However, wheat bran can also fortify foods for human consumption by proper processing. There are several nutritional components that are contained in the wheat bran such as vitamin B, minerals, thiamine, vitamin E, and etc.

**Table 1.** Average content of bioactive compounds in Wheat Bran (Stevenson & et.al, 2012)

Bioactive Compound	Wheat bran (g/100gfood)
$\alpha$ -Linoleic acid (18:3n –3)	0.16
Sulphur compounds	0.7
Total free glutathione	0.038
Fibre (as AOAC)	44.6
Lignins	5.6
Oligosaccharides	3.7
Phytic acid	4.2
Minerals and trace elements	3.39
B vitamins	0.0303
Vitamin E (tocopherols and tocotrienols)	0.0095
Carotenoids	0.00072
Polyphenols	1.1
Phenolic acids	1.07
Flavonoids	0.028
Lignans	0.005
Alkylresorcinol	0.27
Phytosterols	0.16

However, the main component of the wheat bran is insoluble dietary fiber. There are 46% of non-starch polysaccharide (NSP) that is contained in the bran of the wheat (Stevenson & et.al, 2012). The main NSP in the bran are arabinoxylan (70% of of wheat bran), cellulose (24% of wheat bran), and beta-glucan(6% of wheat bran) (Maes & Delcour, 2002). There are many health beneficial effect on the prevention of diseases, which are bowel cancer, cardiovascular disease, obesity, and gastrointestinal diseases, including diverticular disease, constipation, and irritable bowel syndrome (IBS).

At present, commercial resistant starch (RS) has captured the attention of food industries for both functional properties and potential benefits that are similar to dietary fiber. This study aims to formulate resistant starch-Fortified fresh wheat noodles by using commercial resistant starch (Hi-maize® ) in order to increase resistant starch content to provide health benefits as well as to add value to fresh wheat noodles. RS was applied by partially substituting it for wheat flour in the noodles formulation. High levels of RS incorporation in noodle products caused adverse effects to the rheological property of noodle dough as well as the quality of finished product. To improve the quality of RS-Fortified noodle products, it was necessary to add gluten and an additional amount of water. Results from product application testing and sensory evaluation indicated that RS could partially substitute for wheat flour up to 20%. RS-Fortified fresh wheat noodles and instant noodles in this study had total dietary fiber (TDF) values of 16.8 and 16.7 g/ 100g, respectively. This was markedly higher than the control noodles (about 9 times). The TDF content of RS Fortified fresh wheat noodles and instant noodles was about 8 g per reference amount which is equals to 33% RDI. The cost of Hi-maize® was relatively higher than the commercial wheat flour. However, due to the high TDF content of RS-Fortified noodles, they could be recommended as an alternative food choice for health conscious consumers.

## **1.2. Objectives**

The objective of this research is to develop Dietary fiber Fortified yellow alkaline noodles with acceptable physical properties and sensory Furthermore, this project aims to measure physical (Texture Analyzer, Color, and Cooking properties) and acceptability (Sensory evaluation)

## **1.3. Scope of work**

This research focuses on:

- The determination percentage of wheat bran for Fortified the flour
- The measurement of noodle quality in terms texture utilizing Texture analyzer
- The measurement of noodle quality in terms color utilizing colorimeter
- Conduct a sensory evaluation to know which formulation desired most

- Conduct proximate analysis and dietary fiber content of the noodle to know the chemical component

#### **1.4. Hypothesis**

The hypotheses of this research are:

- Noodle with the least proportion of wheat bran has higher consumers' acceptability than the noodle with highest wheat bran proportion
- Noodle with highest wheat bran proportion contributes to higher intake of dietary fiber in human body than the least wheat bran noodle formulation