CHAPTER I
INTRODUCTION

1.1 Background of the Study

Food waste is a major worldwide concern. Food waste is estimated to be considerably over US$1 trillion annually (World Bank 2020). Using more than a quarter (28 percent) of the world's agricultural land, this accounts for more than one-third of all food produced worldwide (Food and Agriculture Organization of the United Nations [FAO] 2013).

Agri-food for example vegetables by-products or waste could play important roles in the economy but are often overlooked and as a result, used as stock feed or even thrown away. Thus, adding more value to those by-products could be a business potential by making them more desirable and presentable. Studies over the past ten years have demonstrated that the by-products still have bioactive compounds such as phenolic compounds, dietary fiber, antioxidants, natural pigment, carotenoids, and even protein like their products. For this reason, agri-food by-products should be utilized more efficiently to create nutritional and desirable food products. The example of the products may include beverages, morning cereals, dairy products, meat products, bakery goods, and sweets. For example, the usage of banana peel turned into powder which is added when making bread for additional starch, protein, and dietary fiber as well as tomato peel in making patties for increasing antioxidant content. (Rațu et al., 2023).

Thus, many research focus their studies on the utilization of the by-products that may have the potential to be applied to become a food product. Broccoli stems and carrot skins are common vegetable waste that people often overlooked and are underutilized. These materials are rich in nutrition and other health-beneficial components, including dietary fiber, protein, vitamins, minerals, and significant bio-active compounds.

The broccoli stems and carrot skins is processed into a delightful snack that is a cheese croquette. A croquette is a little, fried, breaded patty or roll

that usually has a béchamel or mashed potato foundation and a variety of toppings tied together. Croquettes are a global favorite, albeit the ingredients and cooking techniques used vary by culture. Looking at its history, croquettes were originally served as a royal snack by nobles, especially in France and the Netherlands. Croquettes appeal to people because of their delightful blend of flavors and textures. They are a satisfying and delectable delicacy, with a crispy, golden-brown outside giving way to a creamy, aromatic interior. Additionally, croquettes can be made with a variety of flavors and ingredients, ranging from the traditional mashed potato to more complex pairings with meat, seafood, or vegetables. They can also be a great way to use up leftovers, adding an element of resourcefulness to their appeal.

This broccoli stem and carrot skin croquettes is different in terms of main ingredients from the generic potato croquettes. Broccoli by-products are rich in antioxidants and carrot skins contain high value nutrients such as vitamin C, vitamin B3(niacin), and phytonutrients that is useful and fuctional for the human body. Soy chunks will also be added for protein content and texture. Although almost absent in starch, the fillings will be bound with methylcellulose that gives a thick texture. To add more flavor and calories, the croquette is filled with cheese that melts in the consumers mouth. The compactness and the bite-size croquettes is also a highlighted aspect of this product. Consumers can eat while on the road and even share with others with little mess as well. Additionally, by utilizing vegetable by-products, food waste will be reduced and the vegetables' potential is used to the maximum efficiency. The utilization of those vegetable trimmings hopefully will help people realize the benefits and nutrition that are found in those trimmings.

1.2 Objectives of the Study

The objectives of this study are following below:

1. To formulate a healthy croquette product utilizing broccoli stem and carrot skin as primary ingredients to enhance its nutritional profile and as an act of reducing food waste.
2. To analyze the properties and sensory acceptability of the developed croquette formulations.
3. To reduce food waste and trimmings and utilizing materials to its full capabilities and potentials that people not realize yet.