1 INTRODUCTION

1.1 Background of study

Color plays an important role in food industries which make the food look more attractive, desirable and healthy in the eyes of consumers. Food coloring is a type of food additives which the most popular used in current industries to produce the fresh food’s appearance because the attractive food’s appearance can influence the perceptions of consumers towards the flavor of food (Lakshmi G., 2014). There are two types of food colorant which are synthetic food colorant and natural food colorant, which can be in the forms of liquids, powders, pastes and gels (Saleem et al., 2013; Khodjaeva et al., 2013).

Figure 1: Liquid food dyes

Synthetic food colorant were produced chemically and categorized as a complex organic chemical that contain toxic and can give bad effects to the health of the consumers and environmental (Magoulas, 2009). However, the uses of synthetic food colorant or also known as artificial food colorant was still preferable in many companies because it have brighter and greater stability of color compared to natural food colorant and has lower production cost (Kobylewski & Jacobson, 2010). Coca-cola and Pepsi-cola are the example of companies that used synthetic food colorant in their product. They were suspected using caramel coloring in their soft drink products which
contaminated with two cancer-causing chemicals such as 2-methylimidazole and 4-methylimidazole that tend to cause lung, liver and thyroid cancer and also leukaemia to the consumers (F. Jacobson, 2011).

Natural food colorant is coloring that can be obtained from natural sources such as plants, vegetables, animals and minerals. It can be classified into three types which are chlorophyll, carotenoids and anthocyanin. Chlorophyll can be easily obtained by extracted it from plants and vegetables. It also can be produced by photosynthesis in leaves and known as green pigments (Sabir, 2006). In addition, carotenoids also can be produced by the same way of chlorophyll production but the sources of carotenoids are fruits and it was known as yellow-orange-red pigments. Anthocyanin was classified as the red-purple pigments which can be distributed from many fruits and flowers. It can be easily affected by pH, light and also temperature which can fade the color and quality of color (Mortensen, 2006). Most of the companies chose to use synthetic colorant on their product to cut cost of production and also to produce products with attracted appearance.

1.2 Motivation

The motivation to carry out this research is to find a new alternative to the current usage of synthetic blue colorant which is to produce the natural blue food colorant.

In the current commercial market, Food, Drugs and Cosmetic (FD&C) Blue No.1 (Blue 1) and FD&C Blue No.2 (Blue 2) are the synthetic blue colorant used in the foods and cosmetics production in order to maintain the color and produce the attractive appearance of products. Both of them were derived from the petroleum which contains toxic and tend to give diseases to consumers. Many studies on the FD&C Blue No.1 and FD&C Blue No.2 were performed in order to determine the negative effects produced from this synthetic colorant. The most thorough studies of Blue 1 or also known as Brilliant Blue, proved that this color was a carcinogen colorant since the male mice used as the samples in the study shown that the male mice had kidney tumors (Rowland et. at., 2009). Besides that, it also has the potential in neurotoxicity, which tends to give bad effects to the fetus and babies under the age of six months (Lau et al., 2006). FD&C Blue No.2 or also known as Indigo Carmine in widely used in the production of foods was suggested not to use it in the foods because it considered not safe for human consumption (Kobylewski & Jacobson, 2010).
Therefore, this study is carried out to find a suitable alternative to replace the FD&C Blue No.1 and FD&C Blue No. 2 with the natural food colorant for blue color. This study focuses on the extraction of Clitoria Ternatea L. Fabaceae (CT) or also known as Butterfly Pea. It is a type of a perennial climb herb which can be classified in four colors which are dark blue, light blue, mauve and white (Hung et al., 2001). Ternatin was the anthocyanin found in the petals of Clitoria Ternatea and it was utilized as food colorant since it has the higher stability (Mukherjee et al., 2008).

1.3 Problem Statement

Nowadays, the food manufacturers give more interest in the production of natural food coloring because of pressure from the market demand. They need to find a new alternative to replace the synthetic food coloring with the natural food coloring. Among the sources of the natural food coloring, there is growing interest from the manufacturers toward the *Clitoria ternatea* L. flowers which also known as the Blue Pea flower to be studied as a natural blue colorant since the synthetic blue colorant used in the current industries have the bad effects towards the consumer’s health.

The demand of customers towards the natural food colorant is higher than the synthetic food colorant. It was expected to increase from 8000 MT by the year 2000 to 15000 MT by the year 2015 (Lakshmi G., 2014). The increasing of the report on the health hazards and toxicity of using synthetic colorant was the main cause for the increasing of demand toward the natural food colorant (Santos et al., 2011). The natural food coloring is safe to use in the food production because it gives no allergic reaction on skin plus it was also known as non-carcinogenic colorant in nature (Sinha et al., 2012).

Due to the increasing of demands, the manufacturers need to produce the food dyes in the shortest periods in order to fulfil the customer’s requests. There still a problem in producing the natural colorant since the phenolic compounds in the natural colorant were very sensitive towards pH, light and also temperature which when it exposed to light, the color tend to be fade. The study on color stability was carried out in this research work in order to solve the problem faced by the manufacturers.