

CHAPTER II

LITERATURE REVIEW

2.1 Nutmeg

The nutmeg plant is a native plant of Indonesia originating from the island of Banda. This plant is a perennial that can live long to more than 100 years. Nutmeg plants grow well in the tropics, besides in Indonesia there are also in America, Asia and Africa. Nutmeg has a family consisting of 15 genera (genera) and 250 species (species). Of the 15 genera, 5 of them are in tropical America, 6 genera in tropical Africa and 4 genera in tropical Asia (Rismunandar 1990).

Nutmeg trees bear fruit all year round. The growth of nutmeg starting to flower into ripe fruit takes 6-7 months. Fruit harvesting at the onset of the rainy season gives the best results with the thickest nutmeg flowers. The main purpose of nutmeg plant exploitation is to obtain nutmeg seeds and mace. The most important part of nutmeg seeds is the content of etheric oil weighing 2-15% and fat 30-40%, while for mace 7-8% etheric oil and fat 20-30% (Hadad, 2001).

Nutmeg has various benefits that are good for the health of the human body, such as reducing flatulence, increasing digestibility, improving appetite, treating diarrhea, vomiting and nausea (Lince, 2003). In addition, oil derived from nutmeg seeds and mace is widely used for the pharmaceutical, perfume and cosmetic industries. Until now, Indonesia is the largest supplier of nutmeg seeds and mace to the world market (around 60%) (Nurdjannah, 2007). Nutmeg flesh makes up the largest portion of fresh nutmeg, which is almost 80%, but only a small part has been used, most of which is only disposed of as agricultural waste. Nutmeg flesh has the potential to be processed into various

food products. Nutmeg consists of fruit flesh (77.8%), mace (4%), shell (5.1%) and seeds (13.1%) (Rismunandar, 1990).

Although nutmeg has many benefits, but if consuming too much can cause side effects, nutmeg has essential oils that have hypnotic or hallucinogenic effects. In addition, the study also mentioned that nutmeg can trigger toxic effects because it contains myristicin oil. Actually this oil is found in various fruits and spices. But only myristicin oil in nutmeg can make a person drunk. Other side effects when excessive nutmeg consumption can cause allergies, nervous disorders, motion sickness, hallucinations, to organ damage. Therefore, you should consume this spice in sufficient quantities.

2.1.1 Barley

Barley is a grain crop that belongs to the gramineae and gramineae families. It is common to grow in cool climates. Barley has become the main ingredient in production beer for hundreds of years (IBD, 2016). According to Briggs et al. (2004), there are 2 varieties Barley that is often used in beer production is 2 rows barley and 6 rows Barley. These two varieties of barley are grown in different seasons. 2 rows barley It is planted in the spring so it is often called spring barley. Whereas, 6 Rows barley is planted in winter so it is often called winter barley. Barley is also one type of cereal plant in the form of grains which are mainly used as food for humans and also feed for animal. Several types of barley cultivars are developed by several countries in the world such as Tunisia, Morocco, Algeria, Afghanistan, Lebanon, Cyprus, China, Libya and Iraq. (Lahouar et al., 2011). Growing research is generally concerned with the composition and functional value of barley on health. According to Kalraet al. (2000), barley has a fairly high dietary fiber content. From several studies it has been known that the dietary fiber component in barley has functional value for the body.

Barley is the main feed and malt as well as the main food in several countries of the world but it is also the richest grain source of functional ingredients and the most abundant species for functional food crops. Barley seeds are very rich in nutritional functional ingredients. Barley whole grains and its outer bran layer are rich in functional ingredients, especially fiber, phenolic acids, flavonoids, phytosterols, alkylresorcinols, benzoxazinoids, lignans, tocol, and folate, which have antidiabetes, anticancer, antiobesity, preventive cardiovascular disease, antioxidant, antiproliferative, and cholesterol lowering abilities (Oxid Med Cell Longev 2020).

Beer is an alcoholic beverage made by brewing and fermentation from cereals, usually malted barley, as well as maize and flavored with hops and the like for a slightly bitter taste. Barley beer is said to have many health benefits if it is consumed in moderate amounts. Some of these interesting health benefits include anti-cancer properties, reduced risk of cardiovascular diseases, increased bone density, diabetes, prevention of anemia, hypertension, anti-aging properties, gallstones, prevention of dementia and coronary disease, aids digestive system, kidney stones and osteoporosis, stress buster and diuretic (Ore, Mironov and Shootov, 2018).

2.2 Beer

Beer is an alcoholic beverage fermented starch without going through a distillation process so as to produce low-alcohol products with an alcohol content of 4-6%. The main raw materials in brewing include water, malt, hops, and yeast (Barth, 2013). The functional value of beer is determined by the amount of phenolic compounds and flavonoids because both compounds are closely related to antioxidant activity. (Dordevic, 2016) . According to IBD (2016), beer is an alcoholic beverage produced by fermentation of sugar by yeast and flavored from hops extract.

Barley and malt are the main ingredients that are very important in beer production because these 2 ingredients are a source of sugar in the form of starch that can be used by yeast to carry out the fermentation process. According to Briggs et al. (2004), there are two types of beer spread throughout the world, namely lager and ales. Lager beer is bright yellow / golden and fermented using bottom yeast at a temperature of 10-15 oC. Ales type beer is dark yellow and fermented with top yeast at a temperature of 15-20 oC.

Beer consists mainly of water, but it is also rich in carbohydrate nutrients, amino acids, minerals, vitamins, and polyphenols resulting from the brewing process. There is a lot of scientific literature on excessive alcohol consumption. Indeed, chronically high alcohol intake acts as a poison to the heart and vascular system and can also exacerbate pre-existing heart disorders. However, intake of low to moderate amounts of alcohol may have beneficial effects on the cardiovascular system (CV), as it increases high-density lipoprotein (HDL) cholesterol and reduces arterial stiffness (both effects are shown specifically with beer) and also decreases fibrinogen, platelet activation and aggregation, as well as blood oxidative stress and inflammatory parameters. The alcohol content of beer may also have an effect on glucose homeostasis. Alcohol contributes to total calorie intake and can promote weight gain when consumed in excess. Non-alcoholic components also contribute to the energy content of beer.

2.3 Fermentation

Fermentation is the main process and takes most of the time in production from beginning to end, where the beer fermentation process begins with the malting and mashing process, which is the process of breaking down polysaccharides into oligosaccharides, in the malting and mashing process, barley protein (H) is degraded into amino acids and small peptides by proteolytic enzymes. The malting process consists of 4 stages, namely steeping, germination, baking and roasting. (Baxter et al., 1981).

Fermentation is also where microbes can use nutrients to produce a product under controlled circumstances. In general, fermentation is a form of anaerobic respiration, however, there is a clearer definition that defines fermentation as respiration in an anaerobic environment with no external electron acceptors. It can also be said that fermentation is a change in the chemical structure of organic materials by utilizing biological agents, especially enzymes as biocatalysts.