CHAPTER II

LITERATURE REVIEW

2.1 Ingredient review

2.1.1 Limau

Orange is a fruit that commonly found in most Indonesian region because it is liked by most of the people in the Indonesia in the traditional market or even in the modern market. The general public know jeruk limau (Citrus ambylcarpa) as an addition for seasonings in the cooking process like for making chilli. This citrus is usually smaller than the other citrus on the market. The diameter for this citrus is usually 2-3 cm. like the other in the citrus family this fruit contain a high dose of vitamin C and as an antioxidant that is good for your body. Jeruk limau that is mixed with salt or sweet soy sauce believed by the general public to be able to cure sore throat and cough. This is because jeruk limau contain atsiri oil that is controlling the respiration so it can reduce cough. And this fruit also contain limonene, filadrin , citric acid, and mineral. (Mega *et al* 2021)

2.1.2 Jeruk Keprok

As a locally source fruit that is not only liked by local people it is also liked by the international market. Jeruk keprok (Citrus reticulata blanco) have to had a quality so it can compete with the other citrus fruit in the market and so it can be accepted by the international market. The 92% of the total 1.926.544 ton of citrus fruit harvest is jeruk keprok. The fruit have a really good nutrient for the body. It is really rich in vitamin C that is needed for the human body (Restu Widodo *et al .,* 2018)

2.1.3 Jeruk Manis

Sweet orange in general is consumed fresh or usually juiced as an orange juice. Sweet orange in general taste sweet and have a high nutritional value. Orange fruit usually packed with many essential

nutrient that is really good for your health and body such as carbohydrates, calcium, potassium, folate, thiamine, vitamin B6, magnesium, phosphorus, niacin, copper, and pantothenic acid and contain a high dose of vitamin C . Making them a beneficial addition to a healthy diet. However as a horticultural commodity, fresh citrus fruits in general including sweet orange has the property of being prone to be easily damaged because it have a lot of water content and after harvested this commodity is still experiencing life processes, such as respiration, transpiration and maturation. Proper storage is really needed and crucial to prevent the rate of the spoilage of the fruit and to maximize the shelf life of these fruits. (Sitti ramlah *et al* ., 2021)

2.1.4 Sugar

The production of wine requires ingredients with a sufficient sugar content, typically ranging from 15%-18%. These sugars serve as the main ingredients for the fermentation process, where the yeast convert the sugar into alcohol by eating the sugar. However, certain ingredients may lack the necessary sugar content and natural sugar producing properties. In such cases, the addition of sucrose becomes essential to meet the sugar requirements for wine production and ensure the desired wine quality. Considering the impact of sugar on ethanol content and overall wine quality. Too much sugar will destroy the balance between providing enough sugar for yeast fermentation and avoiding excessive sugar levels that could inhibit fermentation or may result in a poor wine quality. To produce optimum alcohol content in wine, it is very crucial to determine the optimum sugar concentration and starter addition during fermentation. A sugar concentration of 20% has been found to be the optimal percentage for achieving the desired alcohol levels. The addition of an appropriate yeast starter is also essential for efficient sugar-to-alcohol conversion during fermentation. (Emma Rahmasari *et al* ., 2023)

2.1.5 Yeast

Fermentation is a popular natural process that is used by the people since thousand of years ago with the purpose of making alcoholic beverages, as well as many more things like bread and many more by-product. Fermentation is a process of which an organism converts a carbohydrate, such as sugar, into alcohol or an acid. Like the example of yeast converting sugar into an alcohol. The process of fermentation when making alcohol is from fermentable carbon sources by yeast is maybe the oldest and economically important of many other biotechnologies because yeast plays a vital role in the production of many kinds of alcoholic beverages like , beer, wine, cider. (Sergi maicas., 2020). Saccharomyces cerevisiae is a yeast species widely known for its role in the alcoholic fermentation of grape is a must, which is a crucial ingredient for wine production. However, it is really an important note that Saccharomyces cerevisiae. Constitutes only a small portion of the microbial community found on ripe grapes. Other yeast species, collectively referred to as non-saccharomyces yeast, are more abundant and are believed to play a significant role in the early stages of grape must fermentation. Non-Saccharomyces yeasts, such as Hanseniaspora, Pichia, Metschnukowia, or Torulaspora, can reach relatively high cell counts during the initial phase of fermentation when alcohol levels are still low before Saccharomyces cerevisiae becomes dominant (Jordi Tronchoni *et al* ., 2018)

2.2 Product Review

Wine, an important fermented beverage, is primarily produced from grapes but can also be made from other organic raw materials such as peaches, plums, apricot, bananas, and elderberries. It is an alcoholic beverage consisting of approximately 80-85% water and 9-15% alcohol, fruit wines contain organic acids, sugars, phenols, nitrogenous compounds, enzymes, and other constituents that contribute to their flavour and nutritional profile. Various fruits, including apples, bananas, cherries, pears, and many more can be used

to produce fruit wine. These wines contain ethyl alcohol, sugar, acids, top alcohol, tannins, aldehyde, esters, amino acid, and many more compound. Trademark wines include dry wine, sweet table wine, fortified wine, champagne, muscat, and burgundy, while sweet wines, natural fruit wines, vermouth, and dessert wines are also popular varieties. Non-grape wines, particularly those made from tropical and subtropical fruits like banana, apple, kiwi, strawberry, cherry, pineapple, and many more offer high nutritional value and have lower alcohol content compared to commercially available wines. The choice of fruit for wine production extends beyond grapes, as tropical and subtropical fruits yields abundant juice suitable for fermentation. However, the techniques used for winemaking with other fruits have been closely modelled after grape wine production. Extracting sugar and other soluble elements from fruit mash can be more challenging, as most fruit juices contain less sugar and higher acidity compared to grape juice. Nevertheless many fruits can be used for commercial wine production, providing a diverse range of flavours and characteristics. (Shubham Kumar *et al*., 2021)

2.3 Process Review

Wine fermentation, one of the oldest bioprocesses, has been studied and advanced alongside our understanding of the natural world. Over the past century, scientific advancements in various fields, such as chemical kinetics, heat transfer, and computational fluid dynamics, have greatly contributed to our knowledge of the winemaking process. These developments have led to improved understanding and optimization of fermentation processes (Konrad V. Miller *et al* .,2020). The yeast A crucial organism in food biotechnology, namely in the production of wine and beer, is Saccharomyces cerevisiae. Yeasts convert sugars in the grape juice into ethanol and carbon dioxide during the fermentation process of wine. Most of the time, the process is anaerobic and carried out in batches. Anaerobic process is a process which can occur when there is no oxygen inside the fermentation container usually used in a wine process and also the other alcohol making process (David Henriques *et al ,.2021)*.