

CHAPTER II

LITERATURE REVIEW

2.1 Ingredients

These are the ingredients that used in this study.

2.1.1 Kersen



Figure 2.1 Kersen Fruit

Elaeocarpaceae is the botanical family that includes the Jamaican cherry (*Muntingia calabura* Linn.). This plant is native to Trinidad, St. Vincent, Central America, Southern Mexico, Northern South America, and the Greater Antilles. Other tropical nations including Indonesia, Malaysia, the Philippines, and India are also affected and frequently home to it. In Southeast Asia, the flower, roots, and bark are used as folk medicines for a variety of illnesses, including fever, liver sickness, an impending cold, and antiseptic agents. Jamaican cherry fruit is also edible; people may consume it either raw or juiced. The fruit is spherical, smooth-shape, and relatively modest from a morphological perspective. Its colour changes from green to crimson as it ripens. Due to its low acidity and high amount of fructose, it has a sweet flavour. The fruit is also well-known for its high nutritional value and for having a significant amount of phenolic and flavonoid components. The Jamaican

cherry fruit has a significant deal of promise for usage as a functional food in the food industry due to its flavour, nutritional value, and high amount of antioxidant chemicals (Frediansyah *et al.*,2021). Kersen Fruit can be seen at *Figure 2.1*.

2.1.2 Sugar

Sugar is an indispensable product for human consumption in daily life. Sugar products are not only sustenance but also ingredients for other products (Sirait, 2020). Sucrose is a disaccharide that hydrolyzes readily in acidic conditions (e.g., once introduced to wine) into its component monosaccharides glucose and fructose. Therefore, measurements of "sucrose" after addition are indirect because they are based on the individual quantification of glucose and fructose. This quantity can be referred to as the wine's sweetness or, more precisely, the total reducing sugar. The exact proportion of each dosage component varies by winemaker and wine style. However, since the addition of sucrose alters the viscosity of the liquid and is known to have an effect on carbon kinetics, it is possible that this process also has a significant impact on foam formation due to a reduction in CO₂ production (Crumpton *et al.*, 2018). In the production of wineries, the use of sugar-containing products with a non-grape base is prohibited. The total amount of carbohydrates (glucose, fructose, and disaccharides) in grapes characterizes their technical maturity and determines their processing: table or liqueur wines. The ratio of glucose and fructose (the glucose-fructose index) is one of the criteria for identifying the grape origin of sweeteners, as well as determining the choice of yeast and fermentation conditions for obtaining wine products with the desired characteristics (Gnilomedova & Anikina, 2018)

2.1.3 Yeast

Yeasts are eukaryotic microorganisms that inhabit a variety of ecological niches, primarily in water, soil, air, and on the surfaces of plants and fruits. Yeast ferments sucrose into alcohol to produce energy by converting sugar to alcohol (Maicas, 2020). For the development and completion of alcoholic fermentation, yeasts are the key microorganisms. Throughout the fermentation process, various species and strains cohabit and engage in interactions with one another and their surroundings. The structure and dynamics of the yeast community are influenced by interactions between individual yeasts even in the early stages of fermentation (Zilelidou & Nisiotou, 2021). Wine yeasts (most notably *Saccharomyces cerevisiae*) play a crucial role in the final aroma profiles of wines, despite their primary function being to convert the carbohydrates in grape must to alcohol. Strain selection, the incorporation of non-*Saccharomyces* yeast in so-called "mixed-culture fermentations," and genetic modifications of *S. cerevisiae* have all been demonstrated to significantly improve the chemical composition and sensorial profile of wines. (Wyk *et al.*, 2019)

2.2 Wine

Wine is a product of microbial activities and microbe–microbe interactions (Zilelidou & Nisiotou, 2021). As the requirements of consumers continue to diversify, the number of fruit wines available on the market continues to expand (Yang *et al.*, 2020). The grape is the primary produce used in the production of wine. Non-grapefruit wines are gaining popularity with wine drinkers due to their distinctive aroma and bouquet, low alcohol content, organoleptic qualities, and additional health benefits (Patil *et al.*, 2021). Wine is an alcoholic beverage produced by the fermentation of grapes; different varieties of wine include natural still wine, sparkling wine, fortified wine, and aromatic wine. Typically, wine contains between 10 and 15 percent alcohol. The term "wine" refers exclusively to alcoholic beverages produced from the

fermentation of grapes; when other fruits (such as apples) are used in this process, the term "wine" is prefixed with the name of the fruit. It is a fermented strawberry and apple wine. Wine is a fermented (fresh grape juice) alcoholic beverage that can be made from strawberries, currants, or rice (Wiratnaya et al., 2019)

2.3 Fermentation

Fermentation is a well-known natural process that has been utilized by humans for thousands of years to produce alcoholic beverages, bread, and byproducts. Biochemically speaking, fermentation is a fundamental metabolic process in which an organism converts a carbohydrate, such as starch or sugar, into an alcohol or an acid (Maicas, 2020). Wine fermentation is one of the earliest known bioprocesses, and our knowledge of wine science has evolved alongside our knowledge of the natural world (Miller & Block, 2020). During natural fermentation, unpredictable interactions between microorganisms and environmental factors result in the formation of a complex and stable microbiota that defines the kinetics of the process and the ultimate product. Controlled multistarter fermentation is a microbial technique for achieving the dual goals of a less hazardous process and a unique end product. Indeed, the interactions between members of the microbial consortium significantly modulate the final sensory qualities of wine (Comitini et al., 2021)