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ORIGINAL ARTICLE

Yeast Species Affecting To Grape Wine Production

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ABSTRACT
Wine is a natural product resulting from a number of biochemical reactions, which begin during ripening of the grapes and continue during harvesting, throughout the alcoholic fermentation, clarification and after bottling. Apart from the principal wine yeast, Saccharomyces cerevisiae, spontaneous alcoholic fermentation of grape must is a complex process carried out by the sequential action of different yeast genera and species. Alcoholic fermentation (AF) is indispensable for the production of alcoholic beverages, including grape wines. In this research, we focus on investigation the function of yeast species and strains in wine fermentation. The use of starter cultures in winemaking has improved the reproducibility and predictability of wine quality.
Keywords: *Grape, wine, yeast, fermentation*

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INTRODUCTION

The diversity and the composition of the yeast micropopulation significantly contribute to the sensory characteristics of wine. *Saccharomyces cerevisiae* is the principal yeast used in modern fermentation processes, including winemaking, breadmaking, and brewing [2]. It converts the simple sugars of grapes to carbon dioxide and alcohol. Once the juices of the fruit have been exuded, an ideal breeding ground with the right mix of water and nutrients is created for S. cerevisiae to begin and sustain fermentation to produce an alcoholic beverage. The growth of each wine yeast species is characterized by a specific metabolic activity, which determines concentrations of flavour compounds in the final wine [7]. Microorganisms have a prominent role in determining the chemical composition of wine. They affect the quality of the grape prior to harvest and, during fermentation, they metabolise grape sugars and other components into ethanol, carbon dioxide and hundreds of secondary end-products that, collectively, contribute to the subtlety and individuality of wine character [5]. They demonstrated effect of simultaneous inoculation with yeast and bacteria on fermentation kinetics and key wine parameters of cool-climate chardonnay [2]. They identified for the first time the yeast population occurring during spontaneous fermentation of the Catalanesca white grape [3]. The results showed very high yeast diversity in this natural wine fermentation. They surveyed wild yeasts on the surface of various fruits including grapes to obtain yeast strains suitable for fermenting a novel wine with higher alcohol content and supplemented with rice starch [8]. They present the effect of yeast strain and supplementation with inactive yeast during alcoholic fermentation on wine polysaccharides [4]. They isolate and identify the yeasts prevalent in fresh grapes cultivated in the "São Francisco Valley" region (Brazil), as well as evaluating the cell growth of these indigenous yeasts during the fermentation of grape musts and their contribution to the improvement of wine aroma [6].
The main purpose of this our research is to investigate the function of yeast species and strains in wine fermentation.

MATERIAL & METHOD

Material

Grape fruits are originated from Binh Thuan province, Vietnam.

Research method

- Experiment #1: Yeast isolation. Cultivate yeast in culture tube and erlen to observe growth speed of *Saccharomyces cerevisiae* and *Saccharomyces* sp.

- Experiment #2: Yeast growth of *Saccharomyces cerevisiae* and *Saccharomyces* sp. on grape in different pH values. Experiment is conducted under two factors: A (pH values, 3.7, 4.1, 4.5) and B (*Saccharomyces cerevisiae* and *Saccharomyces* sp.)

Statistical analysis

All data are processed by Stat graphics.

RESULT AND DISCUSSION

Effect of pH to yeast growth, ^{o}Brix, and ethanol formation during fermentation

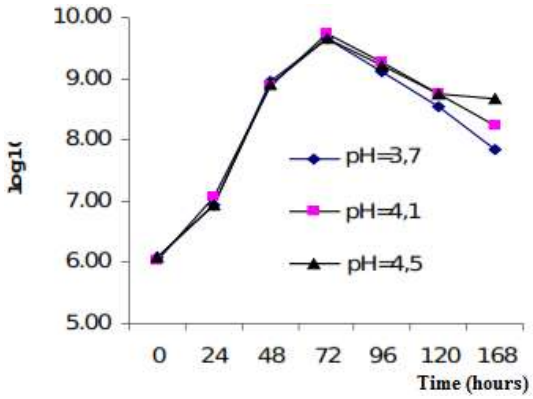

Figure 1. Effect of pH to yeast growth during fermentation

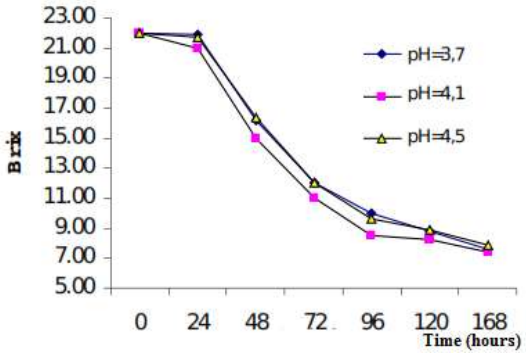

Figure 2. Effect of pH to oBrix reduction during fermentation

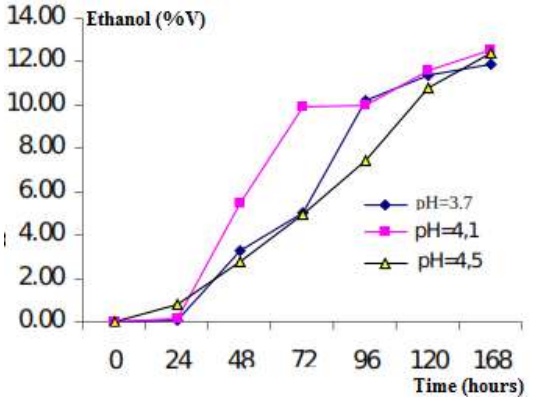

Figure 3. Effect of pH to ethanol formation during fermentation

From above result, we see that pH 3.7 is suitable for *Saccharomyces cerevisiae* during wine fermentation.

Comparison of yeast growth by *Saccharomyces cerevisiae and Saccharomyces* sp. in different pH values

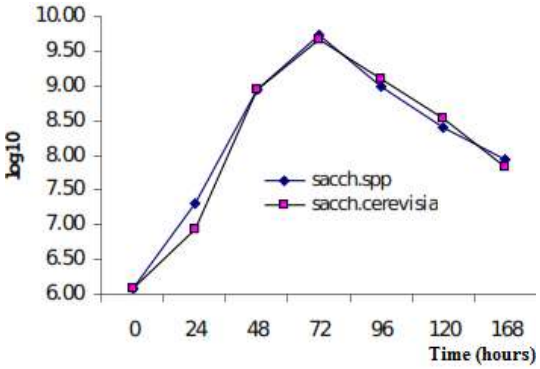

Figure 4. Growth of *Saccharomyces cerevisiae* and *Saccharomyces* sp. at pH 3.7

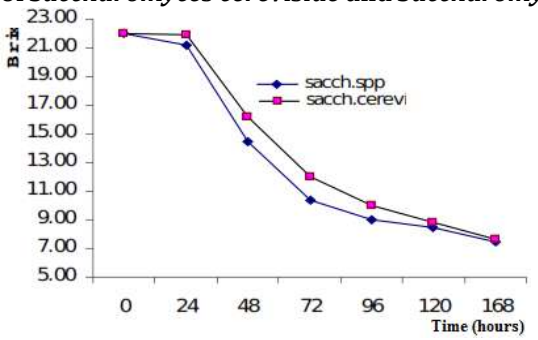

Figure 5. °Brix reduction by *Saccharomyces cerevisiae* and *Saccharomyces* sp. at pH 3.7

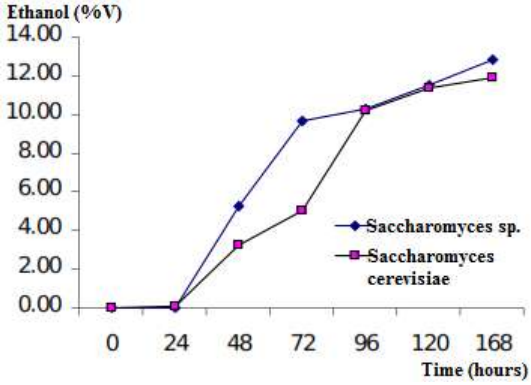

Figure 6. Ethanol formation by *Saccharomyces cerevisiae* and *Saccharomyces* sp. at pH 3.7

Table 1. Ethanol formation by *Saccharomyces cerevisiae* and *Saccharomyces* sp. at different pH value

Criteria	*Saccharomyces* sp.			*Saccharomyces cerevisiae*		
	pH 3.7	pH 4.1	pH 4.5	pH 3.7	pH 4.1	pH 4.5
Ethanol	12.82	11.73	12.31	11.91	12.51	12.38

From table above, we don't see any statistically significant difference between *Saccharomyces* sp. and *Saccharomyces cerevisiae.*

CONCLUSION

Wine is the product of complex interactions between fungi, yeasts and bacteria that commence in the vineyard and continue throughout the fermentation process until packaging. The beneficial contribution from the yeast increases when starter cultures for winemaking are selected on the basis of scientifically verified characteristics and are able to complement and optimise grape quality and individual characteristics.

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