Chapter 3B
Biologically Aged Wines

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The biological aging of wines has aroused increasing interest in recent years, as reflected in the large number of papers on this topic over the last decade. Biological aging in wine is carried out by flor yeasts. Once alcoholic fermentation has finished, some Saccharomyces cerevisiae yeast races present in wine switch from a fermentative metabolism to an oxidative (respiratory metabolism) and spontaneously form a biofilm called “flor” on the wine surface. Wine under “flor” is subject to special conditions by effect of oxidative metabolism by yeasts and of the reductive medium established as they consume oxygen present in the wine. These conditions facilitate

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various transformations in wine components that lead to the acquisition of special sensory features.

Flor yeasts efficiently transform young wine obtained from sensory neutral grapes into genuine, internationally appreciated wine with a high aroma potential. In fact, wine aroma is dictated by the particular flor yeasts rather than by the grape variety used.

_Fino_ wine, which is the best known type of biologically aged wine, is obtained by using the _criaderas and solera_ system, which essentially involves the periodic homogenization of wines of different age. This process is complex and expensive, but produces wines of uniform quality over time. Also, it makes the “vintage” notion meaningless.

The need to store _fino_ wine over long periods of time, the analysis and maintenance operations involved, and the need to obtain an effective yeast biofilm substantially increase its price. Hence the interest in shorting the aging time, whether by physical (e.g. periodic aeration) or biological means (e.g. by using specially efficient yeasts or genetically altering existing races).

### 3B.1 The Winemaking of Biologically Aged Wines

Although biological aging of wines under flor films is done in Italy (Sardinia and Sicily), France (Jura), Hungary (Tokay), USA (California) and various South African and Australian regions, the best-known biologically aged wines are produced in southern Spain (particularly in Jerez and Montilla-Moriles), using a traditional procedure aimed at ensuring uniform quality over time.

The complex homogenization system used for this purpose is depicted in Fig. 3B.1. A few months after alcoholic fermentation has completed, the wine is transferred and any lees removed. In Jerez, wines to be biologically aged are fortified

![Fig. 3B.1 Scheme of biological aging system](image)