Méthode Cap Classique, Part 2:
Processing and primary fermentation

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This part two of the Méthode Cap Classique series briefly covers the effect of skin contact, pressing and settling on the base wine composition as well as general guidelines for these production stages.

Skin contact, pressing and settling

Skin contact should be kept to a **minimum to prevent extraction** of phenolics, potassium (which could increase pH), solids and oxidation enzymes. This also applies to **pressing** and a **gentler pressing** (minimal rotation and minimal mechanical pressure) is recommended to limit extraction of especially phenolic compounds. By **limiting phenolic content**, you are protecting the juice from oxidation which also has a beneficial effect on the **foamability** of the resulting MCC. The **extraction of aroma precursors** could also lead to the development of typical varietal character, which might be unwanted depending on the style of MCC produced.
The rule of thumb in Champagne for pressing

- The 1st **fraction** usually contains dust and high potential for oxidation and depending on the health of the fruit, the 1st fraction, up to 50 L/ton may be discarded or added to the taille. In the case of *Botrytis* infected grapes (>15% infection) even more than 50 L/ton may be discarded due to extraction of unwanted proteins that can influence foaming.
- **Cuvée (mosty used for MCC)** 510 L/ton ; < 1 bar
- **1st taille** (tail) 100 L/ton ; < 1.2 bar
- **2nd taille** 50 L/ton ; < 1.4 bar

The **type of press** used could also influence the extraction of compounds – a press that allows **reduced skin contact** (minimal berry damage) and **sufficient juice recovery** at **low pressing pressures** is important. **Whole bunch pressing** is also recommended to reduce maceration and extraction and other than that, the **presence of the stalks** within the press aids in efficient and improved draining and pressing. Traditionally, Champagne is produced with very lightly-weighted hydraulic vertical presses. New technology includes vibrating hoppers that deliver grapes directly to the press while using inert gas (nitrogen) to protect the grapes from oxidation. When **crushing and destemming** is applied, it is recommended to keep the **skin contact time** as **brief** as possible as polyphenol content can increase by up to 100 mg/L.

Recommended polyphenol content in juice for MCC production:

- Cuvée 200 mg/L (for first 80% of total pressings)
- 1st taille 250 mg/L (for 15% of total pressings)
- 2nd taille 320 mg/L (for final 5% of pressings)

The Champagne regulations stipulate that 2550 litres of clean must can be extracted from the 4000 kilograms of grapes, which equates to 64% of maximum yield of which only 2050 litres (51% of maximum yield) may be classified as **cuvée**. The **taille** (press fractions following the cuvée) is generally considered to be **inferior to the cuvée**, but some producers choose to use a small quantity of taille for its **fruitiness** and its **lower acidity** (acidity decrease during pressing). The taille can also be **fined** with protein agents (occasionally in combination with bentonite and kieselsol) to remove some of the undesirable polyphenols and other characteristics, however very often the last press juice is not used due to higher level of polyphenols.

Turbidity levels decrease during pressing, but increase again during the return/retoussé (redistribution of the grapes within the press after a cycle). **Foamability decreased during pressing**, probably due to protein reduction or protein binding to phenolic compounds while an **extract** (sugar free) of 25 g/L is considered to represent a good balance.
Of course, the **yield reduction by pressing softly** or by **omitting crushing** should be carefully reviewed considering the economics, target market and the style desired. **Continuous tasting** and **monitoring of acidity levels** (which can differ with 1.5 g/L TA between stages) as well as **visual evaluation of the colour** is also important to control the desired separation of the fractions.

In the production of **rosé** it is essential that colour extraction occur **without extraction of excess astringent phenols**. The use of **cold soak** with or without pectolyctic enzymes helps to attain this goal and subsequent colour modifications may occur in the dosage stage. For the production of **Blanc de noir**, **minimal extraction** is important for optimal colour and to limit the amount of fining agent needed for colour removal.

Sulphur dioxide should as far as possible only be added to the juice **after pressing** due to the enhanced extractability of compounds from the grape skins in the presence of SO_2. A concentration of 30 mg/L SO_2 to the cuveé juice is recommended to prevent browning and preserve aroma. These additions should also be kept to a minimum as it is known to negatively affect foaming. **SO_2 additions to the press fractions can be increased** to 70 mg/L together with additional clarification products such as pectinase, casein and/or bentonite. *Botrytis* affected grapes also require higher SO_2 additions (perhaps even during pressing). **Settled juice turbidity** can decrease from **300 to 20 NTU (recommended 120 NTU)**, whereas the return/retroussé fractions were only marginally reduced.

Acidification

Acidification is carried out by the **addition of tartaric acid** which has been found to have a **positive effect on foaming and stability**. This is done very seldom due to high natural acid concentration in the harvested grapes. However, in cooler growing seasons the malic acid concentration might be higher than usual and would thus result a significant decrease in the total acid during malolactic fermentation. To prevent the unwanted drop in total acid, acid adjustments can be made prior to MLF.

Primary Fermentation

Primary fermentation is generally conducted in **stainless steel**, while some European houses use small wooden casks and barrels to ferment all or part of the cuvée. Unsurprisingly, total **phenolics** are higher in base wines fermented in oak which may have detrimental effects on the finished wine **foam qualities**.

Yeast assimilable nitrogen (YAN) is measured and adjusted to ensure accurate nutrient additions and to avoid stuck fermentation. This is also important as the secondary fermentation might be problematic if nutrients are depleted. A standard addition of 5-10 g/hL of DAP is widely used in Champagne.

Yeast strain have a significant effect on the base wine aroma and is mainly chosen on its ability to produce **esters**. The most important ethyl esters found in Chardonnay base wines were found to be ethyl butanoate, ethyl hexanoate, ethyl octanoate, ethyl decanoate, ethyl lactate and diethyl succinate. **Alcohols** that also contribute significantly include propanol, hexanol, dodecanol, 2,3-butanediol and 2-phenylethanol.

Fermentation temperature may vary between 13-20°C depending on the style of wine required and the yeast strain used. **Lower fermentation temperatures are desired to retain fruity and floral aromas**. However, some producers prefer to **ferment at higher temperatures to reduce some of the varietal characters** to ensure a final wine bouquet dominated by aroma originating from malolactic fermentation. When cultivars such as Sauvignon blanc is used, it should be kept in mind that a higher fermentation temperature might, in contrast to previously stated, produce **more volatile thiols** leading to a fruit driven aroma.

Bentonite or **tannins** may be added to **reduce the levels of unstable proteins** and some producers in Champagne add 10-25 g/hL of bentonite during the primary fermentation of the cuvée. **Higher concentrations** of bentonite or bentonite/casein mixture may be added to press juices (taille), especially when the grapes are of **poor health (rot)**. **Fermentability of botrytized base wine is reduced** because of compositional effects including grape metabolites and protein composition of the *Botrytis* affected berries. These compounds **destabilize the foam** of MCC and contribute unwanted organoleptic properties that could **negatively affect the final wine flavour and quality**.

Glutathione addition to must and wine resulted in greater oxidation protection, while a **lower phenolic concentration was observed in the corresponding wines**. These preliminary results indicate that glutathione has a promising role in future MCC production, particularly due to the possible reduction of SO_2 use.

The primary fermentation should complete to **dryness <2 g/L RS or glucose+fructose < 1 g/L**, while also considering the **negative impact of ethanol on the foam**.
Regarding the **colour** of the base wine, it has been suggested that the wine (made from both white and red grapes) should be between **140 and 160 absorbance units**.

Part three of the MCC series will cover bottling, riddling, secondary fermentation and aging. Watch this space!

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