Coinoculation and good practices for managing MLF, fruit, longevity and prevention of microbial spoilage (such as *Brettanomyces*) in red wines.

赤ワインにおけるコ・イノキュレーションとMLF管理手順、果実香、長期品質維持、変敗予防（ブレタノマイセス）
Testimonial of my R&D and consulting experience with coinoculation yeast-bacteria
私の研究開発とコンサルティング業務の経験からコ・イノキュレーションをお勧めします
1. What is yeast bacteria coinoculation?
酵母乳酸菌のコ・イノキュレーションとは何か
The winemaker vision

ワインメーカーの視点
Brix and malic curves during a co-inoculated yeast - bacteria fermentation

As soon as the pomace cap is formed, **coinoculation** with selected lactic acid bacteria

Documento Dominique Delteil Consultant.

Impiego vietato per uso professionale (formazione, riproduzione, articoli, documentazione commerciale, ecc.) senza l'accordo scritto di Dominique Delteil
Two key winemaking actions

1. **Yeast inoculation**
   - 酵母接種
   - As soon as the pomace cap is formed, coinoculation with selected LAB
     - 果帽形成直後に選抜乳酸菌をコ・イノキュレーション

2. **Racking**
   - 滲引き
   - 1 week

3. **SO2 addition**
   - 亜硫酸添加

4. **Brix**
   - ural

5. **Malic acid**
   - 驚き
Sensory goals of coinoculation during fermentation

As soon as the pomace cap is formed, coinoculation with selected LAB is performed.

Yeast inoculation

1 week

Brix

SO2 addition

Malic acid

Cleaner, More fruit

Racking
Sensory goals of coinoculation during aging
コ・イノキュレーション後、熟成中に目指す香味質

Yeast inoculation 酵母接種

As soon as the pomace cap is formed, coinoculation with selected LAB
果帽形成直後に培養乳酸菌をコ・イノキュレーション

Malic acid

1 month

Aging 熟成
The microbiologist vision
微生物学者の視点
Population curves during a co-inoculated yeast - bacteria fermentation

Yeast inoculation 酵母接種
Lactic acid bacteria (LAB) coinoculation 乳酸菌コ・イノキュレーション

Yeast living population 酵母生菌数
LAB living population 乳酸菌生菌数

1 week

Brix

Malic acid

SO2 addition

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Population curves during a co-inoculated yeast - bacteria fermentation

Yeast inoculation

LAB coinoculation

Yeast living population

LAB living population

Indigenous Lactic Acid Bacteria living population

1 week

SO2 addition
Post alcoholic fermentation LAB inoculation: indigenous LAB

アルコール発酵後の乳酸菌接種: 野性乳酸菌

Selected LAB living population

LAB inoculation, post AF

Yeast inoculation

Yeast living population

Indigenous Lactic Acid Bacteria living population

Reminder: Indigenous Lactic Acid Bacteria living population with yeast - bacteria coinoculation
Post alcoholic fermentation LAB inoculation: indigenous LAB

アルコール発酵後の乳酸菌接種: 野性乳酸菌

LAB inoculation, post AF

Selected LAB living population

Selected LAB living population

LAB inoculation,

Yeast inoculation

酵母接種

Yeast living population

酵母生菌数

Yeast living population

1 week

Indigenous Lactic Acid Bacteria living population

野性乳酸菌数

Indigenous Lactic Acid Bacteria living population

Reminder: Indigenous Lactic Acid Bacteria living population with yeast - bacteria coinoculation

Reminder: Indigenous Lactic Acid Bacteria living population with yeast - bacteria coinoculation

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Brettanomyces sp. population curves during a co-inoculated yeast - bacteria fermentation

Indigenous Brettanomyces sp. living population

LAB coinoculation

LAB living population

Yeast inoculation

Yeast living population

1 week

SO2 addition
Post alcoholic fermentation LAB inoculation: Brett!
アルコール発酵後の乳酸菌接種；ブレット！

Selected LAB living population
選抜乳酸菌数

LAB inoculation, post AF
アルコール発酵後の乳酸菌添加

Brettanomyces sp. Living population
プレタノマイセス属生菌数

Reminder: Brettanomyces living population with yeast - bacteria coinoculation
コ・イノキュレーション中のプレタノマイセス属生菌数

Yeast inoculation
酵母接種

Yeast living population
酵母生菌数

1 week
1週間
Post alcoholic fermentation LAB inoculation: Brett!

アルコール発酵後の乳酸菌接種; ブレット！

Selected LAB living population
選抜乳酸菌数

LAB inoculation, post AF
アルコール発酵後の乳酸菌添加

1 week

Yeast inoculation
酵母接種

Yeast living population
酵母生菌数

Brettanomyces sp.
ブレタノマイセス属

Reminder: Brettanomyces living population with yeast - bacteria coinoculation

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As a sensory consequence, with coinoculation

1 week

LAB living population

SO2 addition

Yeast inoculation

LAB coinoculation

Yeast living population

Cleaner, More fruit

Cleaner, More fruit

Cleaner, More fruit

Cleaner, More fruit

1 week
As a sensory consequence, with post-AF inoculation

アルコール発酵後に乳酸菌接種の場合、香味は？

Selected LAB living population

Yeast inoculation

Yeast living population

1 week

Clean

Clean?

Clean?

Clean?

Clean?