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- Instructions for the preparation of Banana mash -

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Technical information and instructions for use

General information:
The clean and, above all, aroma-preserving fermentation of the banana mash is the basis for the production of pure, aromatic distillates. Careful mashing, the addition of pectinase and above all amylase preparations, a combination of acids, a fermenting dry yeast and possibly also some yeast nutrient lead to a mash that is rich in alcohol and aroma and easy to distil. Bananas should be wrapped when fully ripe, as the enzymatic attackability of the starch they contain, that means its saccharification at fermentation temperature, is facilitated with increasing ripeness. Under certain circumstances, the starch in unripe fruit (similar to the processing of grain) can only be processed by hot processing with the aid of the heat-stable α-amylase **Schliessmann-VF** and then simultaneously saccharify and ferment only after cooling.
Particularly in larger fermenters, it is advisable to reduce the fermentation temperature using cooling plates, -coils or external sprinkling. Temperatures above 20°C in the mash cause a stormy fermentation process and thus losses of alcohol and, above all, aroma.
Although a cool fermentation temperature prolongs the fermentation time, the aroma yield improves considerably as long as it is ensured that the mash does not spoil bacterially.

Additives for mashing:

- **Säure-Kombination MS** or **PM-Säure** By acidifying fruit mashes right at the start of fermentation, undesirable harmful bacteria and the formation of their metabolic products (lactic acid, acetic acid, butyric acid, acrolein) are suppressed. This fermentation under acid protection supports the development of the fruit's own odors and flavors as well as a pure fermentation.
The formation of volatile sulphur compounds (bocks) in the fermenting mash, which is regularly observed when acidifying with **sulphuric acid,** does not occur when using **Säure-Kombination MS** or **PM-Säure.**
Banana mashes should not be acidified below pH 4 if possible in view of the optimum pH of the amylases.

- **Special distillery enzymes**
ULTRA-"Fruit" is a pectinolytic enzyme preparation for liquefying the mash. When processing overripe, already very mushy bananas, it may be possible to reduce the dosage or omit it completely. The banana starch can only be fermented after enzymatic saccharification with a combination preparation of fungal α- and glucoamylase, **Amylase GA 500**. Saccharification and fermentation of ripe bananas take place in parallel.

- **Schliessmann dry yeasts**
LT 8 plus is a cold fermentation yeast that reliably ferments even high sugar contents at the start of fermentation at 10-14°C to up to 16.5% vol. Although **OPTI-Fruit** plus likes it a few degrees warmer, it has the advantage of an unusually strong expression of aroma and bouquet substances with similar sugar and alcohol tolerance.

- **Fuel maize nutrient**
...reliably prevents any nutrient deficiency and facilitates the complete fermentation of very starchy or sugar-rich fruit.

Recommendations for the preparation of banana distilling mashes

- Sort out diseased, spoiled fruit, allow unripe fruit to ripen, peel bananas;
- Mash bananas by squeezing or conveying through a progressive cavity pump;
- continuously add the following enzyme preparations during mashing or stir them homogeneously into the mash:

  ULTRA-"Fruit", dosage approx. 5 ml/hl mash,

  AMYLASE GA 500, dosage approx. 20 ml/hl mash,
- Allow for a rising space of 20-25 % in the fermentation tank;
- Add dry pure yeast **LT 8 plus**, or **OPTI-Fruit plus**, dosage see note below; mix yeast in 35°C warm water and stir thoroughly into the mash after 20 minutes at the latest;
- If necessary, add **distilling mash nutrient**, dosage approx. 30-40 g/hl, dissolve in a little water and stir in;
- Acidify the mash to approx. **pH 4** with **Säure-Kombination MS** (dosage approx. 1l/hl mash) or **PM-Säure** (dosage approx. 200ml/hl mash. Stir in the acid thoroughly and check the **pH value** with **pH sticks** or the burner **pH meter**;
- Add **Siliconentschäumer Antischaum US** (approx. 5g/hl) to the mash surface;
- Seal the fermentation container airtight with **DUPLEX** beverage protector, sealing liquid from double salt I+II;
- After the apparent end of fermentation, check the mash liquid for residual sugar (**MEDI test "Glucose"** or **Restzucker-Test)** and the mash solids for starch (**iodine starch test** for distillers);
- If fermentable sugars are still present, the cause of the fermentation interruption must be sought, for example very starchy and sugary fruit (with more than 25%mas extract) may require the addition of some water at the start of fermentation;
- If starch is still present, difficulties are to be expected during distillation (strong foam formation, sticking of the mash). In this case, some more **Amylase GA 500** must be added to the distillation. In the next batch, it should be dosed higher or even thermal gelatinization and enzymatic liquefaction of the starch with the enzyme preparation **Schliessmann-VF** at pH 6-6.5 should be considered prior to fermentation;
- the fermented mash should be distilled as soon as possible due to its poor shelf life at room temperature.

Notes on fermentation temperature and dosage of dry yeast:
The fermentation temperature should not exceed 18-20°C so that volatile aroma components are not discharged with the fermentation carbon dioxide. The quantity of yeast to be used should therefore be calculated depending on the temperature of the fruit and the fermentation room and the size of the fermentation container. It should be noted that higher yeast quantities are required at lower temperatures than at higher temperatures:

Fermentation temperature 10 - 15°C	20 - 10 g yeast per hl mash
Fermentation temperature 15 - 20°C	10 - 5 g yeast per hl mash