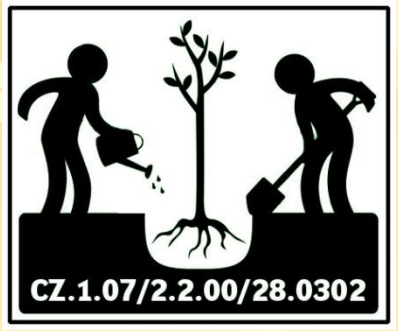


Inovace studijních programů AF a ZF MENDELU směřující k vytvoření mezioborové integrace CZ.1.07/2.2.00/28.0302

Tato prezentace je spolufinancovaná z Evropského sociálního fondu a státního rozpočtu České republiky

Evaluation of Grapes Qualitative Parameters

Evaluation of Grapes Qualitative Parameters

- Quality is affected by many factors (vineyard site, soil, climate, vineyard management, harvesting date)
- Harvest in past: Clusters were picked in in the stage of “industrial ripeness” - high sugar content and yields
- Changes to qualitative parameters also changed attitudes to ripeness – current practices prefer physiological and technological ripeness

- Physiological ripeness is associated with seeds ripeness which are able to germinate
- Seeds are brown
- Grape stalks gradually lignify
- Berry skin has a variety-specific colour
- Berry becomes transparent (seeds are visible inside the berry)
- Ripening of the seeds is related to ripening of all other vine parts – leaves, shoots, grapes and stalks
- Technological ripeness is determined by amount of sugars, acids, pH, aromas and phenological potential (aromatic and phenological ripeness)

- Technological ripeness is associated with a type of wine
  - Used for light, fresh aromatic red wine
  - Or for heavy, full-bodied red wine intended for aging in wood barrels
- First, requirements on grape quality during the time of harvest must be identified, these requirements further govern vineyard management and harvest date
- White wines: Proper genus of yeasts and proper grape maceration for higher aromas content

Tabulka 3 *Důležité kvalitativní parametry a možnosti jejich stanovení*

Kvalitativní parametr	Možnost stanovení
cukernatost	refraktometr, moštoměr
titrovatelné kyseliny	titrace s hydroxidem sodným
pH	pH-metrem
organické kyseliny – kyselina jablečná a vinná	kapalinový chromatograf, enzymatický test
dusíkaté látky, resp. asimilovatelný dusík	formaldehydová titrace
fenolické látky – barviva, taniny	kapalinový chromatograf
aromatické látky	G-G analýza, plynový chromatograf
fenolická zralost	senzorické hodnocení podle barvy a chuti slupky a barvy a chuti semene
aromatická zralost	zbarvení slupky a chuťové vlastnosti bobule

- Wine categories defined by Act No 321/2004 Sb. providing for viticulture and winemaking
- Following wine categories are marketed:
- Table wine, grapes reached 14 °NM sugar content (1 °NM indicates 1 kg of sugar in 100 litres of must)
- The so called “regional wine”, minimum sugar content of 14 °NM
- Quality wine made from grapes coming from a given location, sugar content of 15 °NM
  - Quality varietal wine, max. 3 varieties
  - Brand-name wine, blend of wine grapes

- Wines with additional quality attributes, production of:
- Kabinett wine, min. sugar content of 19 °NM
- Late harvest wine, min. sugar content of 21 °NM
- Auslese wine (the so called “vyber z hroznu”), min. sugar content of 24 °NM
- Selected overripe berries wine (the so called “vyber z bobuli”), min. sugar content of 27 °NM
- Selected botrytised berry wine (the so called “vyber z cibeb”), min. sugar content of 32 °NM
- Ice wine, clusters picked at -7 °C and lower temperatures; sugar content of the must: 27 °NM
- Straw wine; clusters stored on straw / reed or hung for min. 3 months; min. sugar content of 27 °NM

VOC certification (“wines of original certification")

- Wine from grapes grown at a specific wine-growing region
- Complies with requirements on quality wine
- VOC label is granted by the Ministry:
- VOC Znojmo
- V. O. C. Mikulov
- VOC Modré hory

Sampling methods for evaluation of qualitative parameters

- Grape sample must reflect variability in ripeness of all grapes in the vineyard
- Qualitative parameters of grapes must consider their significant variabilities:
  - Light perception
  - Direction of rows
  - Quality of canopy management

Sampling at the vineyard: Analytic and sensory evaluation

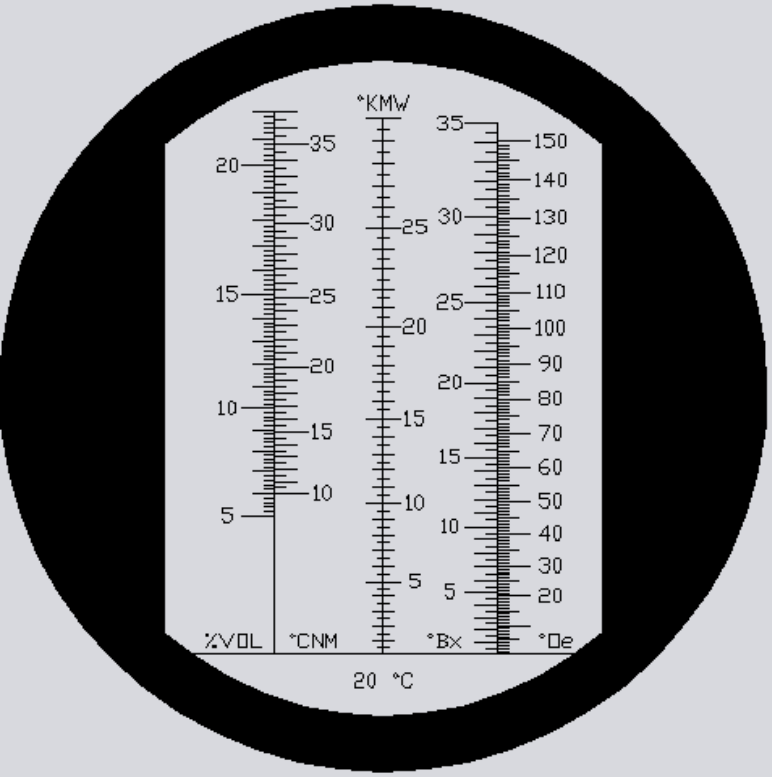
- Sample size: 100-200 berries in a good condition, without pests and disease infestation; samples taken from the whole vineyard area
- Samples must be taken from both sides of the canopy – berries exposed to the sun as well as the shaded berries
- Berries are placed in PVC bags, plastic containers, and analysed after sampling, as soon as possible (short-term storage in a fridge)

Berries sugar content

- Sugar content is the most easily measurable qualitative parameter (manual, table refractometer), and is identified after the pressing of must using a saccharimeter
- Sugar content is measured during a harvest, and is given in °NM (NM is a scale used for measuring the sweetness of wine must)
- Berry contains two basic sugars – glucose and fructose - which may be fermented; other sugars cannot be fermented and their amount in the berry is low

- Scale of the saccharimeter indicates amount of sugar in 100 litres of must
- 1.053 kg of sugar per 100 L increases sugar content in must by 1 °NM (rounded to 1.1 kg per 100 L of must)
- Measuring: Must is poured into a long graduated cylinder, and saccharimeter is inserted
- Lower meniscus gives the sugar content, correction for temperature is considered (-0.3 °NM correction at 10 °C; +0.3 °NM correction at 20 °C)

- Refractometer may be used at a vineyard, sugar content is given in °NM
- Adjustment of sugar content in table, regional and quality wines – addition of beet sugar/thickened must; wines with additional quality attributes cannot be sweetened
- In Czech Rep., sugar content in must for production of white wines is adjusted to 21 °NM, and 22 °NM for red wines
- Sweetening of grape mash for red wine must respect portion of the must in the grape mash (coefficient for large berry varieties: 0.85-0.9; coefficient for small berry varieties: 0.80)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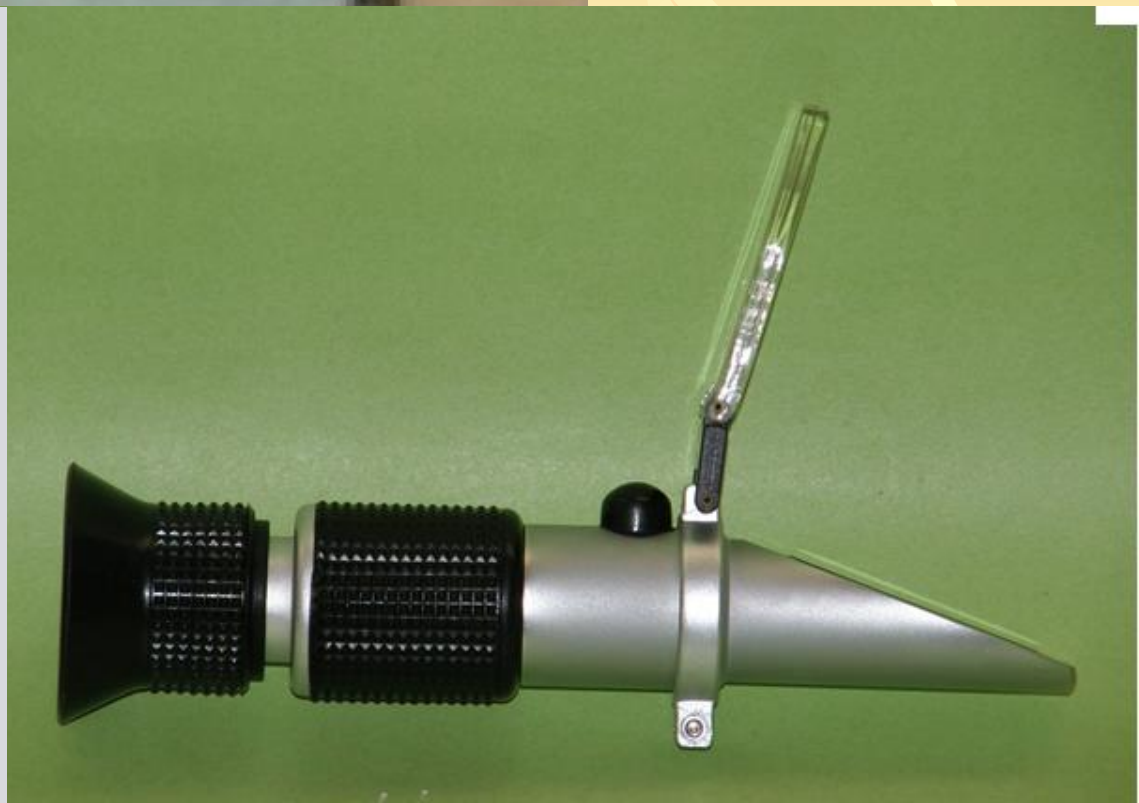

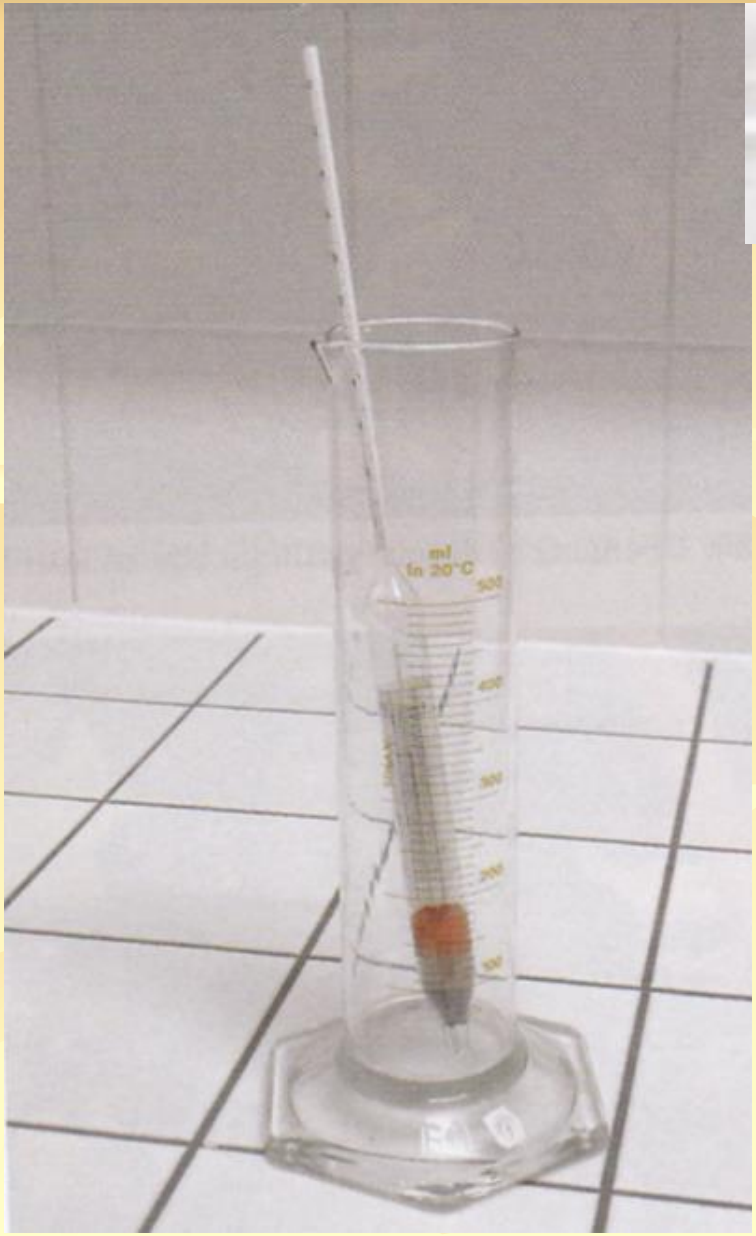
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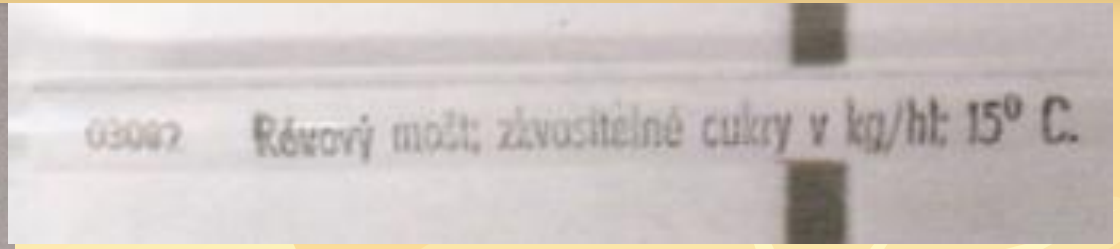

03087 Révový mošt: zkvasitelné cukry v kg/hl: 15° C.

Methods for identification of must pH and titratable acid concentrations

- Evaluation of acids means evaluation of total acidity / titratable acidity
- Titratable acids are identified by a process of neutralization using sodium hydroxide
- Titratable acids include all types of acids (inorganic - phosphoric acid, as well as organic)
- pH ranges throughout the aging from 2.80-3.50

High pH has negative impact on grape and wine quality

- Musts are more likely to oxidize
- pH higher than 3.5 results in a flat, “tired” wine and loss of its freshness
- Wines are often contaminated with microbes
- Low colour stability in red wines, insolubility of tannins
- High pH decreases efficiency of bentonite in elimination of heat-labile protein
- High pH requires more sulphur dioxide

Evaluation of aromas and phenological ripeness

- Evaluation of sensory ripeness of grapes helps determine optimum harvest date

Skin colour:

- Green skin shows unripe aromatic ripeness of berries; grass tones prevail
- Brownish, sun-burnt skin (Welschriesling) contains high amount of volatile phenols and their precursors which showcase burnt, plastic and stale taste

- Blue grapes: Identification of phenolic ripeness of grapes by evaluation of seeds (a scale of seed colour)
- Ripe tannins in seeds showcase as soft, smooth, velvety seeds; unripe seeds are hard, green, coarse and aggressive

Harvest and health condition of grapes

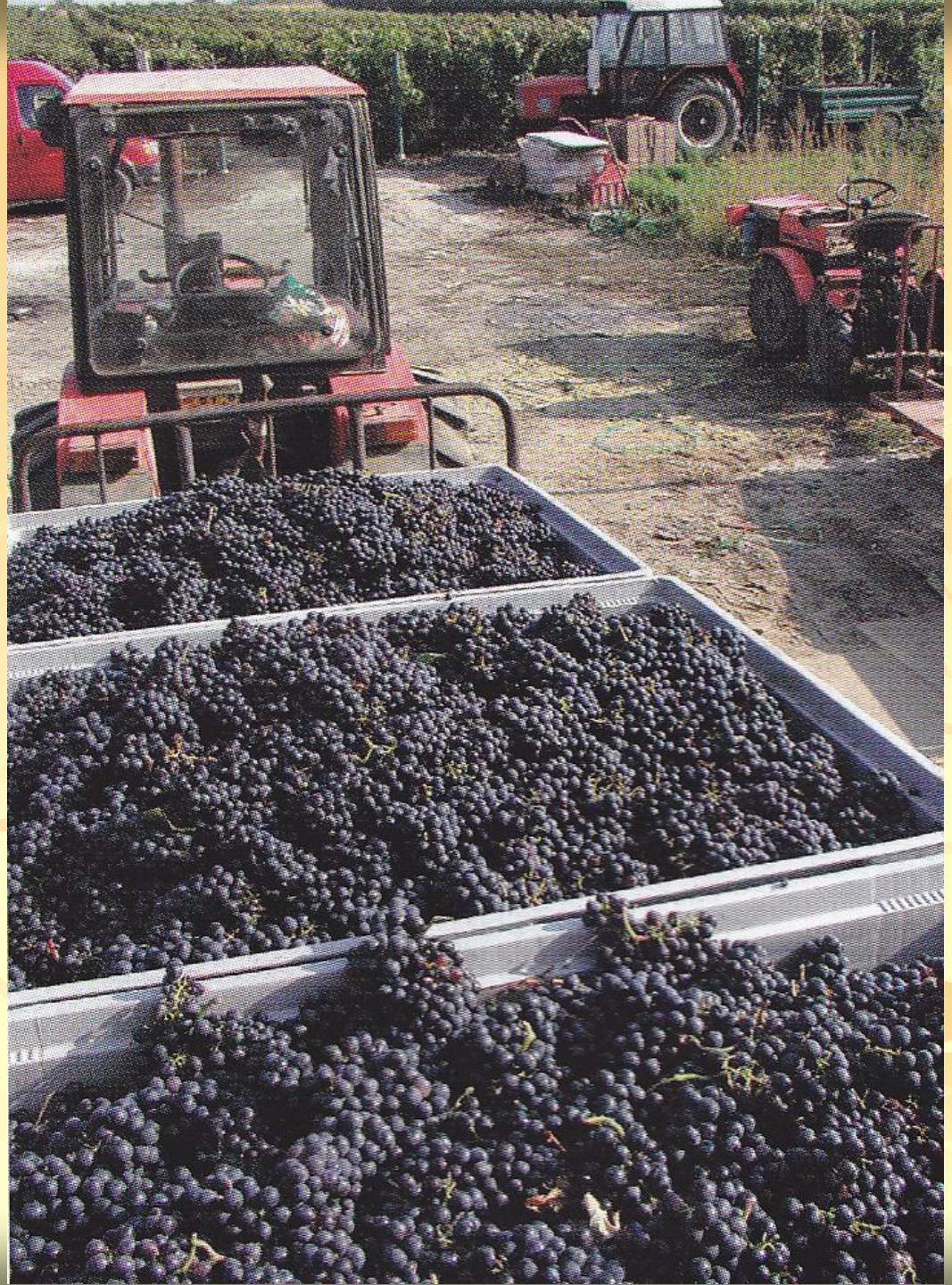
- Efficient and fast harvest is a prerequisite for good wine production
- Following aspects may have negative impact on grapes during their harvest and transport to processing facilities:
  - Fungi diseases, powdery mildew, grey mould
  - Wild yeasts (not saccharomyces)
  - Acetic acid and lactic acid bacteria

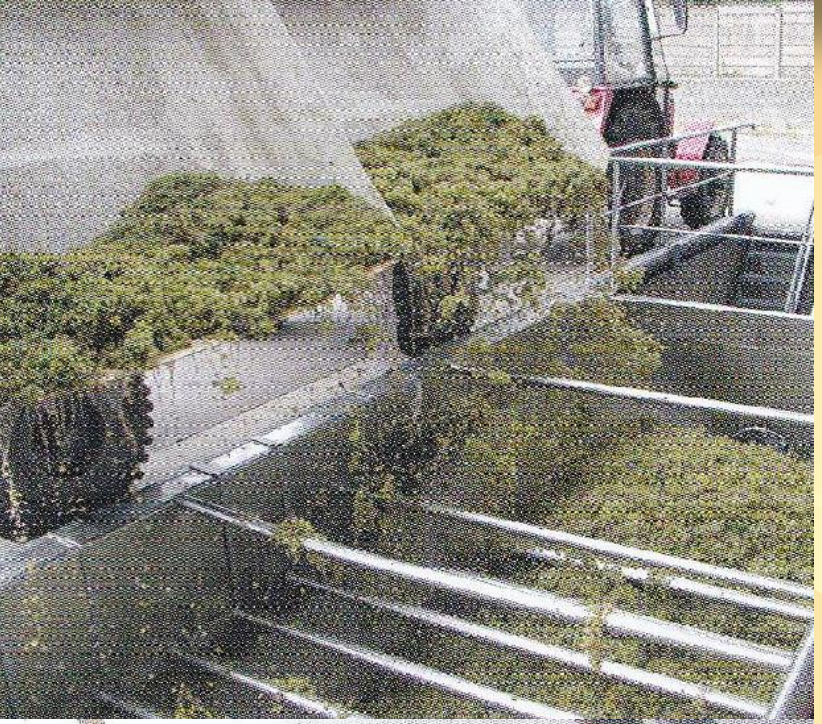
- These agents may produce undesired aromas and flavour; higher risk for red wine varieties during maceration
- Mechanically damaged grapes have more acetic acid bacteria and may be infested with fungi diseases
- Transport of grapes infested with fungi diseases must be quick, and grapes must be treated with sulphur dioxide

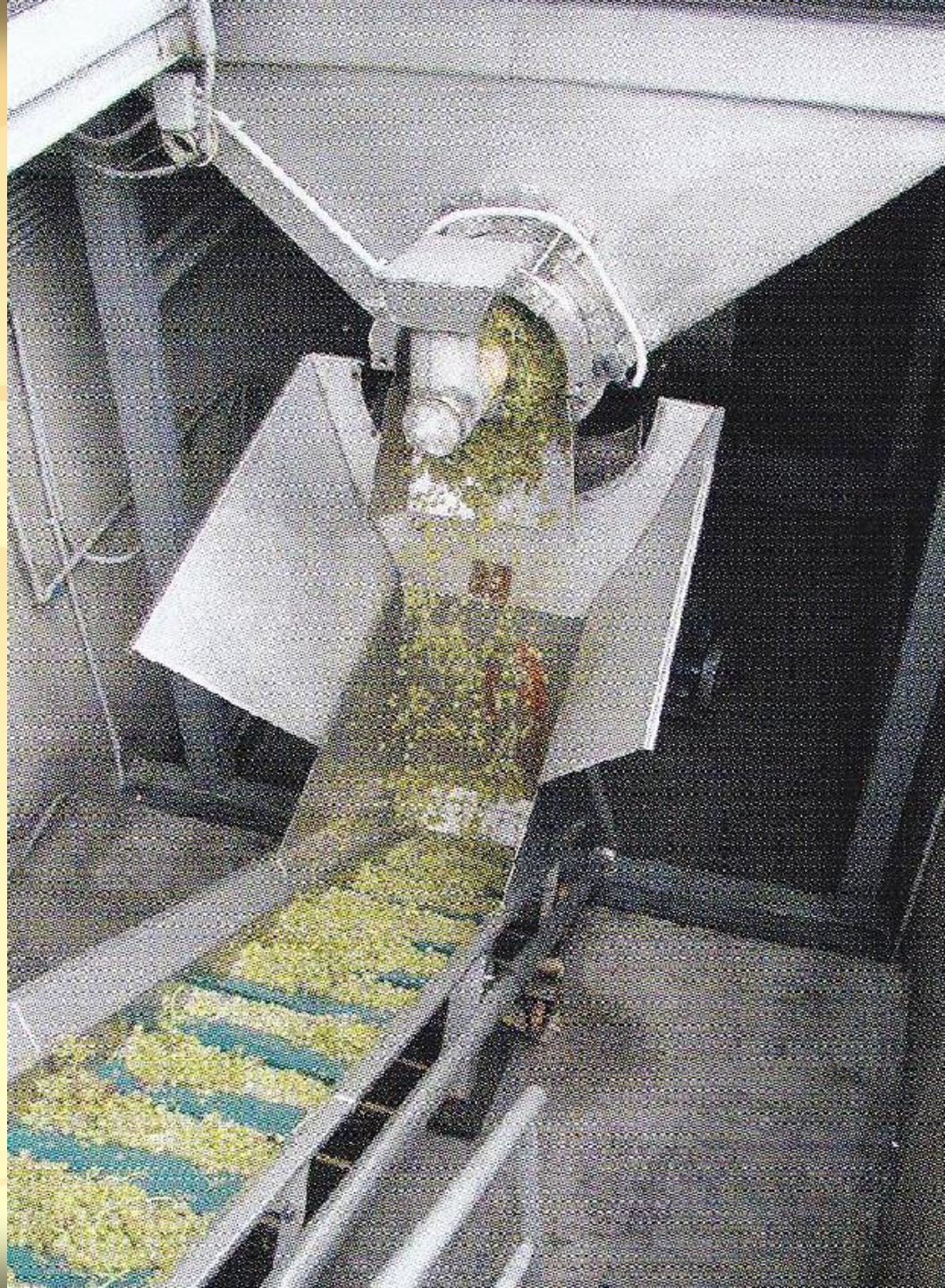
- Sugar is a good substrate for lactic acid bacteria, risks include:
  - Prolonged transport of grapes from vineyard into the cellar
  - Musts which do not ferment for a while
  - High residual sugar concentrations, irregularities in a fermentation process
  - Wines with high residual sugar content
- Manual picking of grapes is the most common and most used harvesting method
- Commercial producers - mechanized grape picking

Some of the principles for proper grape picking

- Ideal container volume: 10-15 L, grapes do not get damaged
- Larger containers (30 kg) – grapes must be treated before the harvest (most often with dry ice); damaged grapes – mild sulphuring
- Quick transport of grapes to processing facilities is important
- White grape varieties are harvested during cold day time; red grape varieties are harvested during warm day time







Grape picking

- One-off grape picking (days without rain)
- Grapes infested with mold are picked first (release of phenols)
- Low wine quality
- Manual picking (special scissors, plastic containers, transport boxes)
- 1 ha of vineyard = 250 hours; decrease in temperatures, dry ice
- Clusters infested with Aspergillus, Penicilllium expansum (ochratoxin) and acetic acid bacteria are removed

Gradual grape picking

- Picking is repeated several times per the harvest season
- Individual cluster or berries are picked

Mechanized grape picking

- Harvesting machinery
- Healthy berries are separated from the grape stalk, and fall into the harvesting containers; 3-4 ha per day
- Good for red wine varieties (high phenol concentrations)
- Transport containers have perforated bottoms (outlet for must)

Schéma výroby bílého vína

- odstopkování a drcení
- lisování
- kvašení
- dokvašení
- první stáčka
- školení vína
- stabilizace
- láhvování

Schéma výroby červeného vína

- odstopkování a drcení
- nakvášení
- lisování
- dokvášení a odbourávání kyselin
- první stáčka
- školení vína
- láhvování