NUTRIENTS

MARTIN VIALATTE

ACTIFERM 1-2

ACTIFERM 1 promotes yeast growth and rapid onset of fermentation.

Complete fermentation activator – Dual action

ACTIFERM 2 increases resistance of yeasts to ethanol and speeds up the end of fermentation.

ACTIFERM 1

ACTIFERM 1 contains:

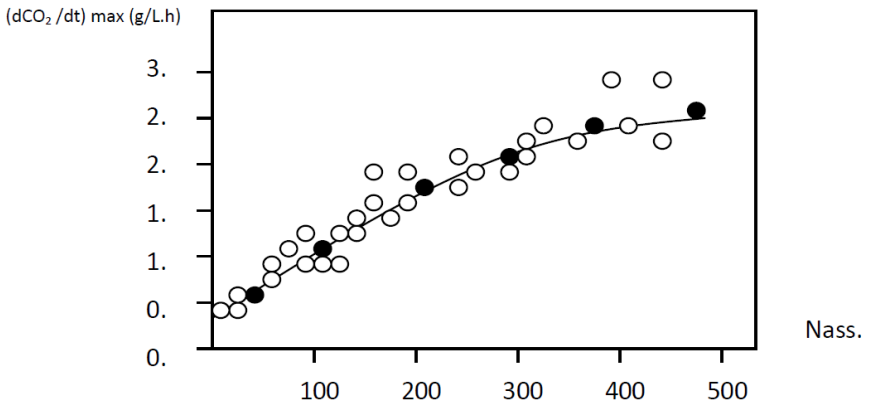
- **Thiamine (vitamin B1)**

Studies carried out at INRA Montpellier (IPV) have shown that, when yeast inoculation takes place, musts are very often deficient in thiamine, due to consumption by native yeasts that develop during prefermentation treatments.
In order to ensure correct yeast growth, thiamine requirements are in the region of 0.2 to 0.3 mg/L in practice (Sablayrolles, (1).

- **Available nitrogen (ammoniacal and amino)**

Uptake of nitrogen at the onset of fermentation activates protein synthesis and leads to a greater abundance of yeasts. The maximum fermentation rate is directly related to available nitrogen content in the musts (Figure 1).
A high rate reflects rapid onset of fermentation.

Figure n°1 : Effect of available nitrogen content in musts on maximum fermentation rate.



Nitrogen content in musts is highly variable and frequently too low.
Addition of nitrogen therefore often enables more rapid onset of fermentation (2).

- **Cellulose, which plays a role as a support and detoxifying agent.**

It increases the cloudiness of musts, acting as a support for yeasts, and promotes degassing. Recent studies have shown that cloudiness levels affect fermentability of musts (3). This is probably due to the support effect and to the fat fraction of must deposits, which limit the production of inhibiting fatty acids.
Overly vigorous racking is always advised against in order to avoid problems of stuck fermentation.

- **Inactivated yeasts.**

These inactivated yeasts (inactivated by heat and then spray dried) contain vitamins, trace elements, amino acids, proteins and sterols.
They promote yeast growth, while the sterols provide a supplementary supply of oxygen that is essential for the resistance of yeasts to ethanol. Measurements on musts during yeast inoculation show variable and frequently limiting oxygen content (1).
Table 1 shows the effectiveness of a combined addition of nitrogen and oxygen on fermentation time and elimination of sugars.
The use of ACTIFERM 1-2 is optimal in combination with OXYFERM or OXYFRITTE (to provide controlled supply of oxygen at 5 to 10 mg/L) (4).

Oxygen (mg/L)	0	0	0.9	1.8	4.5	9	4.5
Nitrogen (mg/L)	0	60	0	0	0	0	60
Residuel suger (g/L)	50	22.7	19.2	15.6	11.9	7.8	3.5

Table 1: Effect of addition of nitrogen and oxygen on residual sugar content measured at the end of fermentation.

ACTIFERM 1 MUST BE ADDED DURING YEAST INOCULATION.

ACTIFERM 2

ACTIFERM 2 contains:

- **Ammoniacal nitrogen (phosphate and sulfate).**

The nitrogen enhances the resistance of yeasts to ethanol.
Added half-way through fermentation, nitrogen does not lead to an increase in the abundance of yeasts but to higher nitrogen content in yeasts. Protein synthesis starts up again and a reactivation of the sugar transport system is observed (5). Adding nitrogen half-way through fermentation is very often more effective than adding it at the start of fermentation (Table 2).

Table 2: Effect of time of addition of nitrogen (dose of 63 mgN/L) on fermentation time.

NITROGEN CONTENT OF INITIAL MUST (mgN/L)	FERMENTATION TIME (h)		
	CONTROL WITHOUT ADDITION OF NITROGEN	ADDITION OF NITROGEN IN THE FIRST TWO DAYS	ADDITION OF NITROGEN MID-FERMENTATION
76	271	205	187
86	278	234	193
146	128	107	103
207	94	79	79
374	93	88	88

- **Inactivated yeasts.**

Provide nitrogen, vitamins and sterols, which improve resistance to ethanol. Sterols play a role in the strength of yeast membranes.
Similarly, the inactivated yeasts provide yeast cell walls that adsorb C6, C8 and C10 fatty acids, and thus limit their inhibiting action with regard to yeasts.
(as demonstrated at the Bordeaux Faculty of Oenology, (6).)

ACTIFERM 2 MUST BE ADDED AT MID-FERMENTATION, THAT IS, WHEN SPECIFIC GRAVITY HAS FALLEN BY 30 TO 40.

INSTRUCTIONS FOR USE

ACTIFERM 1 must be dissolved in 10 times its weight of must and then added at yeast inoculation to rehydrated yeasts or directly to the must. Then carry out a pump-over to ensure thorough mixing.
Aeration: After specific gravity has fallen by 20, the addition of oxygen leads to additional yeast growth and increases their resistance to ethanol.
A supply of about 10 mg/L can be carried out by bubbling in air by direct injection through a sintered disk (Oxyferm or Oxyfritté). The injector is calibrated to determine the addition time.

ACTIFERM 2 must be dissolved in 10 times its weight of fermenting must and then added to the vat half-way through fermentation (or after specific gravity has fallen by about 30 to 40), fairly slowly to prevent overflowing. Whenever possible, thorough mixing of the vat is beneficial. The natural mixing created by gas release is normally sufficient.

Precautions for use:
Product for oenological and specifically professional use.
Use in accordance with current regulations.

DOSAGE

20 g/hL of ACTIFERM 1 + 20 g/hL of ACTIFERM 2

Maximum legal dose according to current European legislation:
ACTIFERM 1: 20 g/hL
ACTIFERM 2: 130 g/hL (assuming prior supply of 20 g/hL of **ACTIFERM 1**)

PACKAGING

1 KG*
5 KG**
40 KG***

**1 kg in 2 bags, boxes of 20 x 1 kg: - 500 g of ACTIFERM 1 – 500 g of ACTIFERM 2*
***5 kg in 2 bags, boxes of 4 x 5 kg: - 2.5 kg of ACTIFERM 1 – 2.5 kg of ACTIFERM 2*
****40 kg in 2 bags of 20 kg: - 20 kg of ACTIFERM 1- 20 kg of ACTIFERM 2*

STORAGE

Store unopened, sealed packaging away from light in a dry, odour-free environment.
Once opened use rapidly.

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