Equipping the Nation's Drink Producers

TRANSLATED FROM THE FRENCH CPME INSTRUCTIONS PROVIDED BY SANICO

CIDER MUST DEFECATION

In addition to the Vigo Keeving Kit (94426) instructions,
these instructions must be read by the user in full before use.

I – DEFECATION

Defecation is a natural and spontaneous phenomenon which takes place in the must of cider apples under certain conditions. It occurs between the pressing and the start of fermentation.

Defecation occurs through the reaction of pectinesterase (an enzyme which exists naturally in the must) with calcium; the apple's pectins join together forming a dense structure which looks like a gel (calcium pectinate). Under the effect of gas produced by the start of fermentation, this structure rises and pulls away toward the surface of the liquid, creating the chapeau brun (brown hat). We recommend that you add the enzyme as soon as possible after the must arrives in the defecation vat.

II – THE CHAPEAU BRUN

The chapeau brun emerges as a brown viscous compote, of variable firmness, which can reach a thickness of five to eight centimetres. It contains all the components which contribute to the must's cloudiness: pectins, some tannins, bacteria, yeasts and mould, the suspended organic particles and most of the nitrogen which is linked to these components in varying extents. The liquid under the chapeau brun is not at all cloudy and must be syphoned out.

If the yeasts are not very active, it can take several hours or even several days for the chapeau brun to form. During this time the clumps will remain suspended in the liquid or will accumulate at the bottom of the vat. In order to accelerate the phenomenon, you can move it through a closed circuit for a few minutes or diffuse CO_2 through the bottom of the vat.

<u>Application</u>

Monitor the enzyme activity in order to determine the optimum moment to add the $CaCl_2$.

Once the defecation vat has been filled, remove a litre of must using a clear container and add 0.9ml of 520g/litre liquid $CaCl_2$ to it while mixing the must;

Shake for 2 minutes in order to see the flocculation of pectins releasing a clear juice; the flocculation can be recognised either as a cloud of fine suspended particles or by the appearance of coloured grains (semolina) or even translucent grains (tapioca).

If this is immediately observed (taking around one minute to appear), it is time to add the $CaCl_2$, if not, repeat the test 3, 6 or 12 hours later depending on the temperature of the must.

III – RACKING

Racking-off is the necessary complementary operation to defecation which is indispensable in order to get the benefit from defecation. This operation consists in decanting the clear juice, without breaking the chapeau brun or trapping any deposits, into a washed and disinfected container where it will slowly ferment protected from air. The opportune moment to carry out this drawing-off is determined by separation of the chapeau brun coming to an end: it allows some traces of white foam to appear provoked by the gas bubbles which move through it and which you can hear pop.

After this time, if the juice is not drawn-off, fermentation becomes vigorous, the juice begins to move, the cider "jumps" and this leads to the chapeau brun breaking and becoming mixed into the juice again which becomes cloudy once more.

If any pieces of the chapeau brun enter the fermentation vat, the benefits of the defecation will be partially invalidated: this must be avoided.

V – CONDITIONS REQUIRED FOR SPONTANEOUS DEFECATION

The pressing of well matured but not rotten cider apples. At this stage, all starch has been transformed into sugar, the pectin chains are soluble and in a gel-like state, the pectinesterase is more abundant and more active.

The pressing of clean and healthy apples, limiting the presence of microorganisms.

A must which is rich in calcium necessary for the linking of pectic chains between them.

A must which does not contain much nitrogen, which is the food for yeast. This limits their growth; if there is too much yeast in the must, the fermentation starts quickly and in an untimely manner.

Must temperature between 8 and 12°C: above 12°C, there is a chance that the defecation won't be complete, disrupted by a premature start to the fermentation. The temperature raises the enzyme's activity but stimulates that of the microorganisms even more; if there is no way to cool the must, raising the enzyme content is a good substitute. Below 8°C, the defecation will be slow, immobilising the equipment for several weeks.

Washed and disinfected equipment (vats, pumps, pipes etc.), otherwise, after defecation, the juice once again becomes full of microorganisms picked up from the equipment (especially with wooden vats) and fermentation is violent.

A suitable defecation vat, preferably translucent with straight vertical sides in order to better observe and simultaneously facilitate the formation of the chapeau brun and the draw-off operation. This form of vat allows the chapeau brun to form easily and to descend without breaking during draw-off; because of this it is possible to extract almost all of the juice from the vat. The defecation vat must be equipped with a sample tap half way up, a draw-off tap a few centimetres from the bottom and a discharge gate in order to extract the chapeau brun and the dregs.

Suitable filling. If the vat is not completely open, it must not be completely full: leave 15 to 20cm; if it is a horizontal cylinder, it will be filled to 2/3 maximum: must will be between 1m high as a minimum and a maximum of 2m high.

I Addition of the enzyme (Pectin Esterase), monitoring the temperature of the pulp and possible cooling

Pressoir	Press
Tamis	Sieve
Pompe	Pump
Pectine Esterase	Pectin Esterase
Cuve de défécation	Defecation vat

II Test for monitoring the enzyme activity

0,9ml de $CaCl_2$	0.9ml of $CaCl_2$
Remuer pendant 2 minutes	Stir for 2 minutes
Aspects obtenus suivant les moûts	Appearance depending on the must

III Addition of the $CaCl_2$

Agitation en circuit fermé pendant 10 à 20 minutes selon les quantités	Agitation in closed circuit for 10 to 20 minutes depending on the quantities involved

IV Formation of the brown head and syphoning

Cuve de fermentation	Fermentation vat