

STAR ECOTRONICS s.r.l.

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AMSA SYSTEM: AN INNOVATIVE TECNOLOGY TO ANALYZE THE ACIDIFICATION PROCESS IN MILK

The equipment allows to check in real time the acidification process caused by lactic bacteria in milk.

Amsa system manages pH and temperature values by a software that stores and analyzes them.

Amsa system employes temperature compensated pH probes. The probes send to AMSA pH and temperature data. The system shows in real time the pH values and the related pH and temperature curve of each of the 15 curves, one at a time.

They are also analysed by the software, that gives the following information:

- Lag-phase: this is the difference of pH between the first measured value and the value at which the acidification has begun. It is defined by the operator.
- Initial pH: pH value corresponding to the beginning of the acquisition (after the lag phase)
- Minimum pH: minimum value of pH
- Vmax: Absolute maximum speed during the trial. Associated to Vmax the system also reports the related time and pH values.
On request can be given the option of Vrel (relative maximum speed during the trial. It will always lower than the absolute maximum speed).
- Marker n: pH value corresponding to minute *n* (defined by the operator).

The software stores every trial in independent files. An analysis software allows the operator to review up to 6 different curves in order to be able to study and to compare them it is also possible to associate them the temperature curve.

It allows the operator to open only the required stored files.

The acquisition time and frequency is defined before starting the acquisition. The trial can be stopped when a certain pH value is reached, or after a predefined time. Alternatively, the operator can decide to stop the acquisition by himself.

AMSA does not define a maximum number of acquired values, as all the data are stored on the hard-disk of the connected PC giving a practically unlimited acquisition capability.

TECHNICAL SPECIFICATION

System description

Laboratory equipment connected to the PC by USB door.

From 1 to 15 pH input + 1 PT1000 temperature (SRCN 5 poles for temperature compensated pH probes).

Hardware description

PH probes access impedance:	1012 ohm
Frequency:	0 – 1 MHz
Minimum gain :	50.000
A/D convert resolution:	16 bit
sampling speed:	1 Ms / channel
Precision:	+ 0,031% reading + 0,008% f.s.
Linearity error:	+ 2 LSB max

Software description

AMSA system is provided with two software: APM (Acidification Process Monitor) for monitoring and acquiring data, and APA (Acidification Process Analysis) to analyze acquired data.

- 1) Each probe can work independently by the others
- 2) The acquisitions do not have limit of time. For any probe the software will show the proceeding time and the temperature compensated pH value. Moreover, the acidification speed, the Vmax value (until that time)
- 3) The system is provided for making a two point calibration before every trial.
- 4) The trial can be stopped when a certain pH value is caught, or after a predefined time. Alternatively, the operator can decide to stop the acquisition by himself.
- 5) For each probe, the software generates an ASCII file containing the information about pH values, corresponding proceeding time and temperature
- 6) Post analysis: Descriptors identification
 - a. lag-phase
 - b. Vmax (Maximum speed dpH/dT)
 - c. Vmin (Minimum speed dpH/dT)
 - d. Tmax (time to detect Vmax)
 - e. Tmin (time to detect Vmin)
 - f. pHmax
 - g. pHmin
 - h. pH after *n* (hours, defined by the operator)
 - i. *Customization: Any eventual new descriptor can be required by the customer*

For further information

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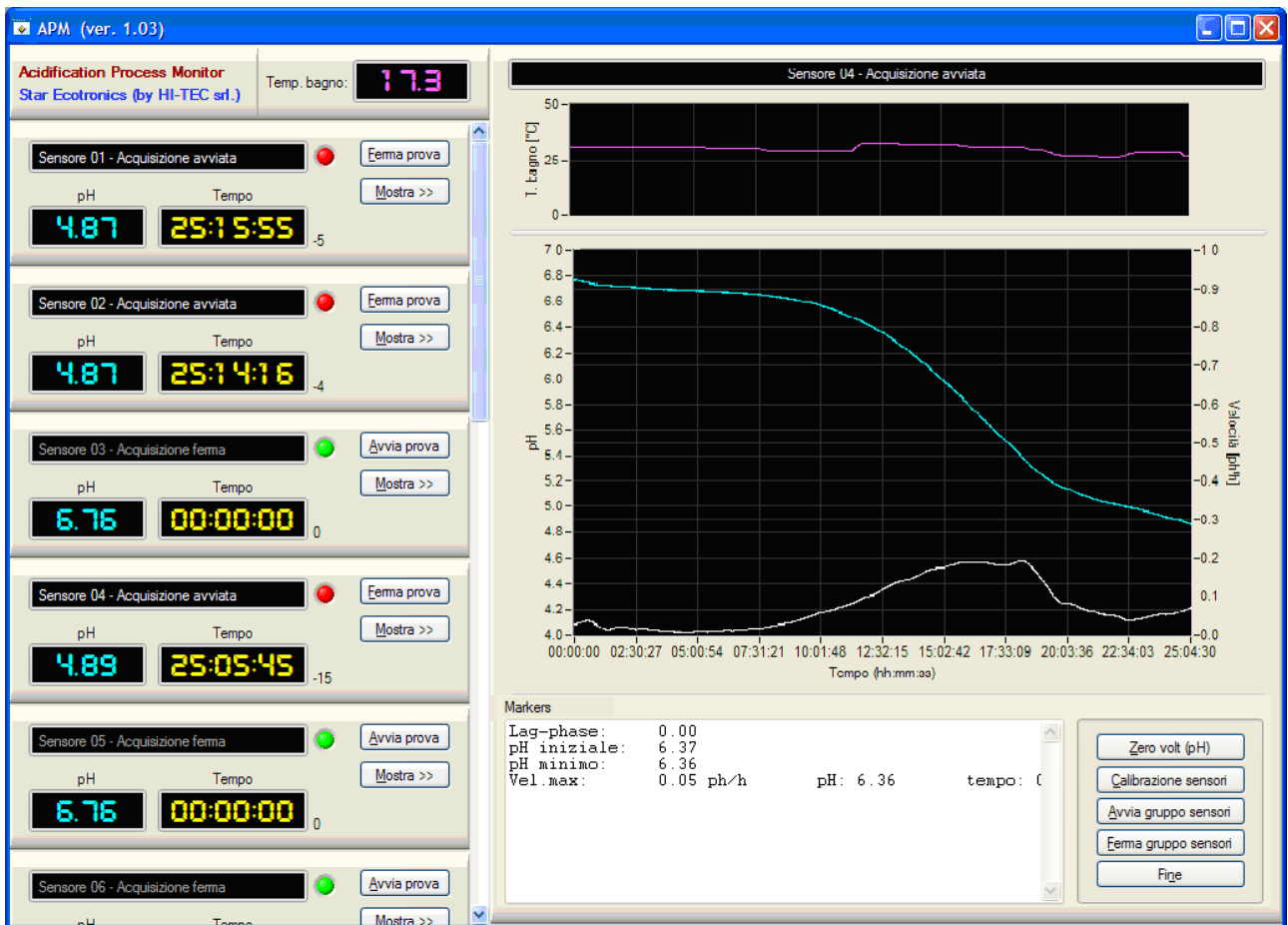


Fig. 1 Main page

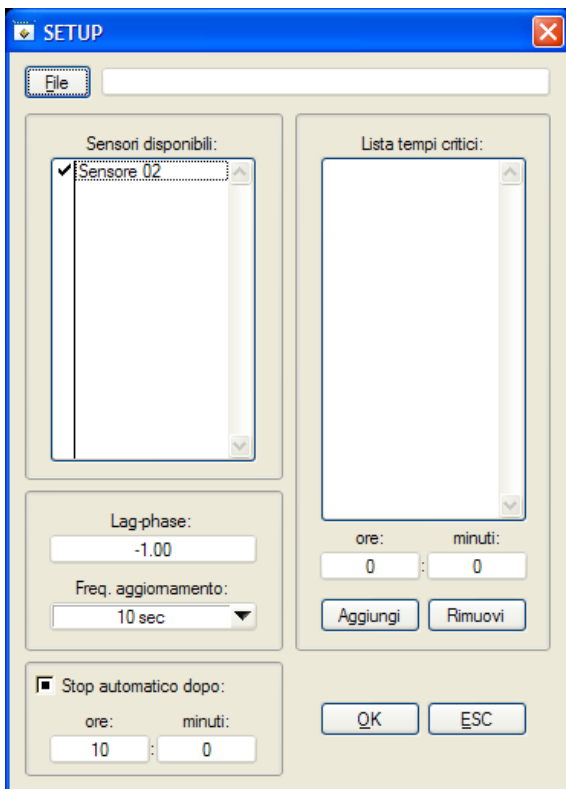


Fig. 2 Setup

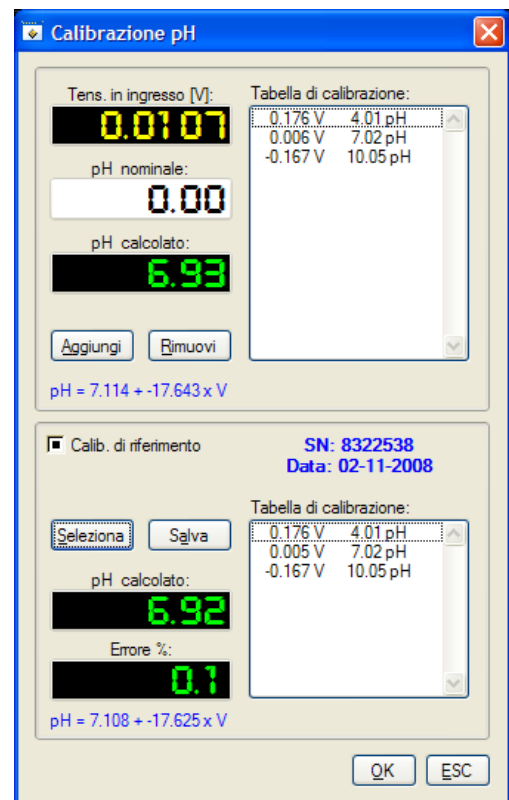


Fig. 3 pH calibration

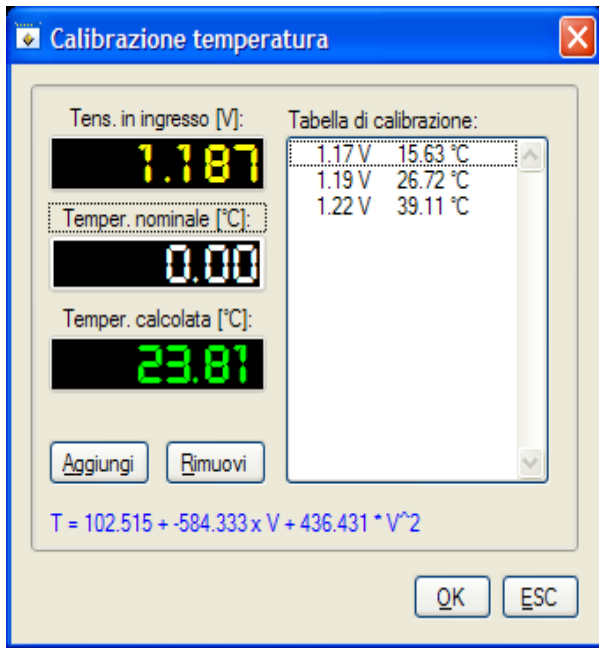


Fig. 4 Temperature calibration

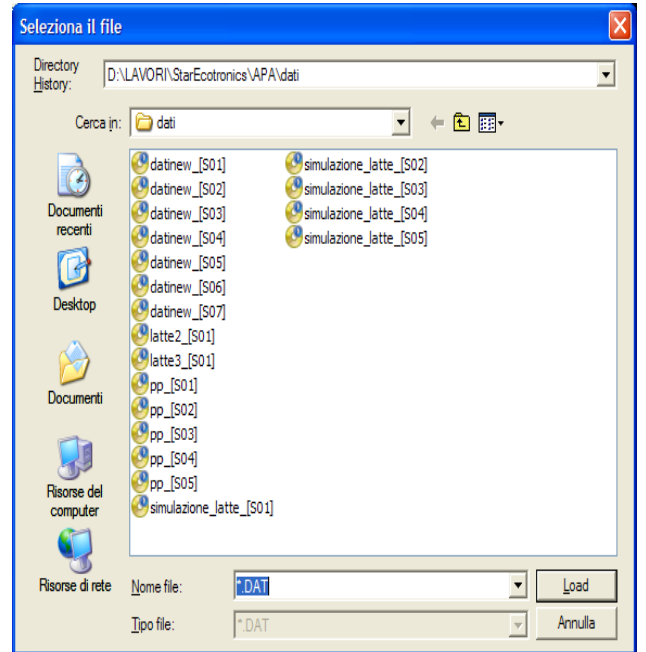


Fig. 5 Analysis file selection

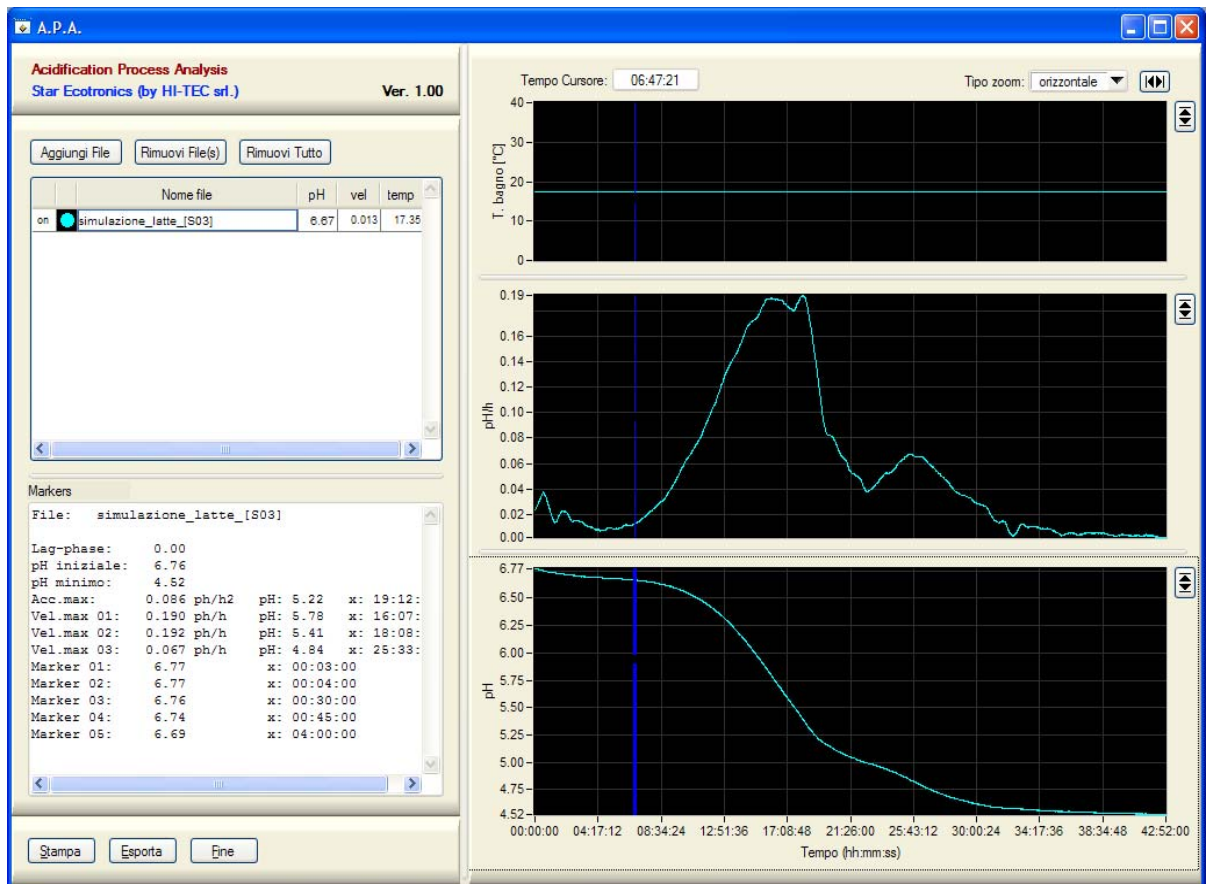


Fig. 6 Analysis main page