LUMEX INSTRUMENTS

# LUMEX ANALYTICAL INSTRUMENTS AND APPLICATION PROTOCOLS FOR ANALYSES IN OENOLOGY

## CAPILLARY ELECTROPHORESIS SYSTEM CAPEL®–105M


Lumex Instruments is present on the market of analytical instrumentation for more than 20 years. During these years, Lumex has gained extensive experience in different fields of analyses with a special emphasis on food and beverage analyses. This knowledge allows us to offer the most efficient and reliable protocols for the determination of various important components in food and beverage matrices.

Below is what Lumex offers to oenological laboratories:

- Kits with detailed analytical protocols, most of them are National Standards
- Capillary electrophoresis system CAPEL®-105M to implement these protocols.

**The International Organization of Vine and Wine (OIV) has included capillary electrophoresis in the list of analytical methods which are recommended to be used in oenology.**

The following actual analytical tasks in modern wine-making industry can be carried out using Lumex developments:

- Safety and quality control of raw material and final products.
- Confirmation of authenticity or counterfeit.
- Quality control of water used for production of beverages.
- Process control of beverage production.

All Lumex analytical protocols, which are implemented on the basis of capillary electrophoresis method, have many common advantages:

- Very short analysis time, normally 4–6 min and, consequently, high throughput.
- Numerous compounds are quantified in a single analysis.
- Proposed method is very precise and highly reliable as compared with other analytical approaches.
- Very low reagent consumption, normally 3–5 ml per day.
- Very simple sample pre-treatment, normally just dilution and degassing.
- Very low analysis cost.

**The following components can be determined in wines, wine materials, brandy, spirits and wood extracts using Lumex analytical protocols and instrument CAPEL®-105M:**

- **Organic acids** (tartaric, malic, succinic, citric, acetic, lactic, formic, oxalic, etc)
- **Aromatic aldehydes** (coniferaldehyde, sinapaldehyde, syringaldehyde, vanillin)
- **Furfural derivatives** (furfural, 5-methylfurfural, 5-hydroxymethylfurfural)
- **Inorganic cations** either in water used for beverage production or directly in wine (ammonium, potassium, sodium, magnesium, calcium, iron, etc.)
- **Inorganic anions** either in water used for beverage production or directly in wine (chloride, bromide, nitrite, nitrate, sulphate, fluoride, phosphate)
- **Biogenic amines** (cadaverine, putrescine, histamine, tyramine)
- **Preservatives and antioxidants** (sorbic acid, benzoic acid, ascorbic acid)
- **Amino acids**
- **Sugars** (glucose, saccharose, fructose)
- **Synthetic dyes**
- **Pesticides**

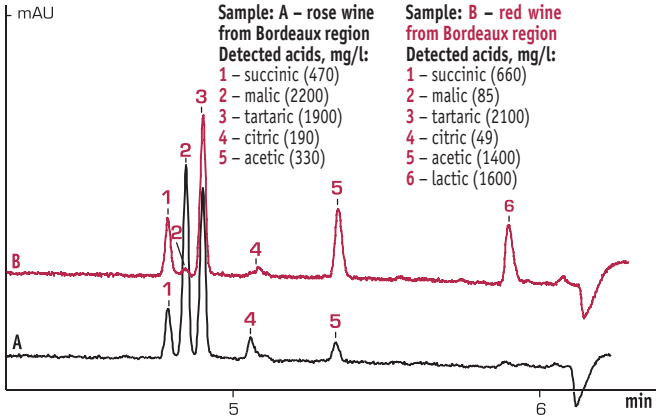
Some examples of real analyses are given below.

### ORGANIC ACIDS, VOLATILE ACIDITY

Organic acids profile in wines at different stages of their production can be highly informative since it reveals the important features of technological process. Alcoholic fermentation, malolactic fermentation, wine maturation, bacterial contamination – all these processes can be followed by analysing organic acids profile. Besides, it is one of the most important criteria of wine authentication.

Lumex offers an **Organic Acids Chemical Kit** with analytical protocol, which gives complete information about almost all organic acids in just 5–6 minutes. The kit also allows simultaneous determining some other acids, like ascorbic, benzoic and sorbic acids.

As volatile acidity in wines can be attributed by more than 98% to the amount of acetic and formic acids, this parameter can be also quantified with this kit just by quantifying the corresponding acids. Thus, very laborious and time consuming distillation stage, required for the "classical" analysis of volatile acidity, is eliminated.




**Lumex analytical protocol for the analysis of organic acids was recently acknowledged by the French Accreditation Committee COFRAC.**

### INORGANIC CATIONS AND ANIONS

Lumex analytical protocols, included in **Cations Analysis Chemical Kit** and **Anions Analysis Chemical Kit** provide determination of all most important inorganic ions either directly in wine and brandies or in water used for the production of alcoholic beverages. Detailed

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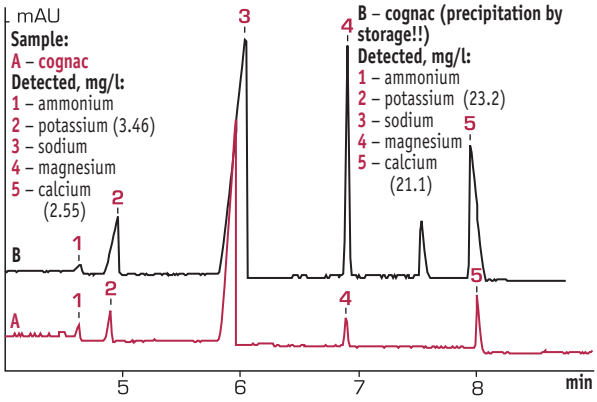
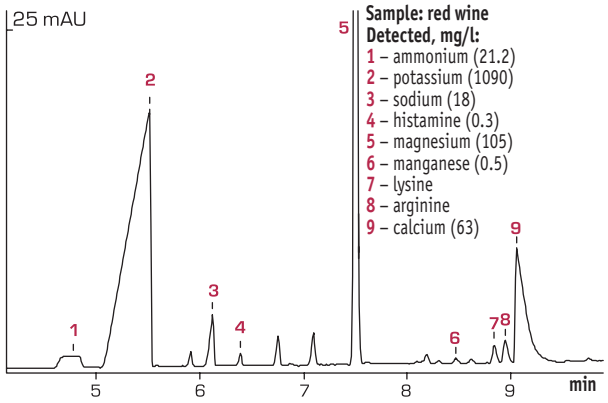
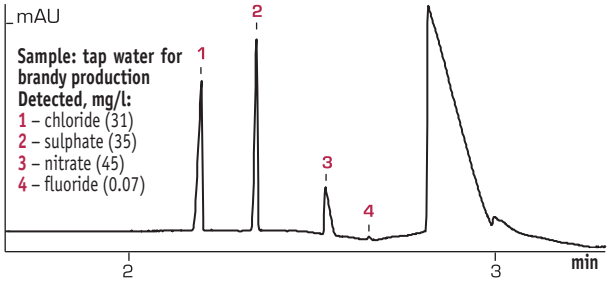
information about the ion content is highly important, since it helps in proving the authenticity or falsification of the product and can point out deviation in production technology. Furthermore, it helps estimate the capability of the final product to avoid precipitation, thereby predicting the safety storage time.

**Cations Analysis Chemical Kit** also allows determination of some amines and two important aminoacids simultaneously with inorganic cations. Especially the amounts of biogenic amines (putrescine, cadaverine, histamine, and thyramine) are very informative, because their presence reveals severe deviations in production technology and indicates the product spoiling.

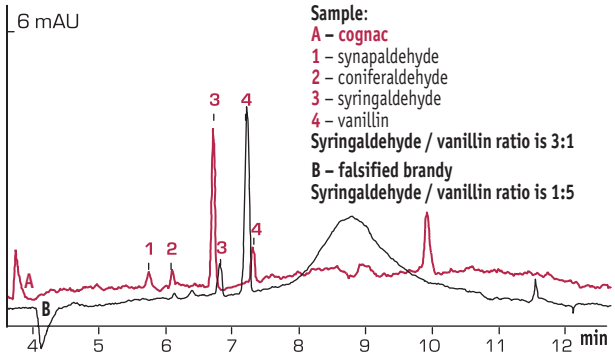


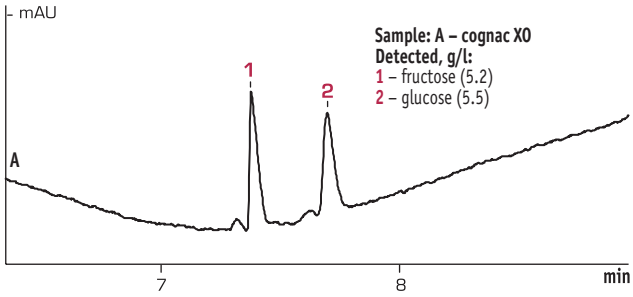

## AROMATIC ALDEHYDES

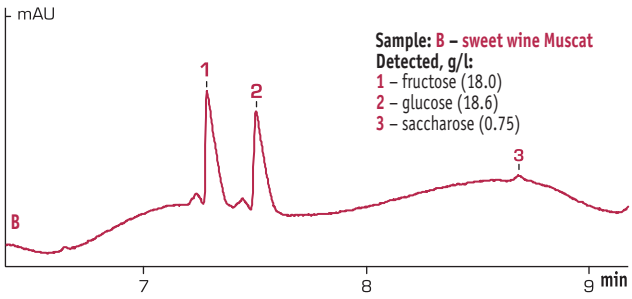
Aromatic aldehydes are very important nonvolatile components of brandy, cognac, whiskey, rum etc. Their amounts in cognacs can serve as the age criteria of the product since their accumulation is due to the storage of corresponding spirits in oak barrels. As all four aldehydes must be always present in cognac and as the ratio between two of them, syringaldehyde and vanillin, is known to be within certain range, this analysis helps significantly with identifying of counterfeit. Lumex analytical protocol enables aldehydes determination with the sensitivity better than that of the HPLC method.




## SUGARS

Content of sugars is one of the most important oenological parameter. Its level in wines and spirits is regulated by the international norms. All three important sugar species – glucose, fructose and saccharose – can be determined in one run using Lumex analytical protocol. Moreover, other sugars like xylose, maltose and lactose can be also quantified within this protocol.

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