

# Procedure for an efficient liming

The soil analysis is necessary for liming. It measures the  $pH_{\text{water}}$  and the  $CEC_{\text{Metson}}$  with its saturation rate. The result of the analysis shows whether liming is necessary and suggests a CEC saturation rate target to adjust the acidity and increase the pH.

## Getting highest efficiency from liming

► The following procedure includes 5 essential steps:

- 1 Making soil analysis at least every 5 years on a homogeneous area of the tested plot.
- 2 Deciding a suitable target (S/CEC saturation rate) according to the cropping system.
- 3 Choosing the adapted product thanks to the **API** that matches with the saturation rate target.
- 4 Calculating the lime requirement and determining the application rate according the product neutralizing value (NV).
- 5 Spreading uniformly and mixing the liming material with the soil as far as possible.

The NV and **API** values are complementary, independent and essential information for liming. These values are indicated on the product technical data sheet.

### Mix the liming material with the soil

As far as possible, mixing the liming material with the soil will help to:

- Avoid the liming material to run off
- Mix homogeneously the liming material everywhere in the soil.

The liming efficiency is so improved.

## Who is involved in the **API** system ?

- The liming material producers and members of UNIFA, have decided to collectively create this index in order to provide a simple tool that makes advising easier.
- All the signatories that use the **API** can calculate it on the same way, thanks to a software especially created for that purpose.
- The **API** system of reference is the UNIFA's property.
- Yearly audits are made by Bureau Veritas Certification, an independent certification institution.

The list of members using this approach and more information, in particular the requirement calculation, are available on [ipa-chaulage.info](http://ipa-chaulage.info) internet website.

*The french fertilizer industry association (UNIFA) represents a category of strategic actors for the agricultural sector. Its mission is to promote the responsible use of fertilizers and the important role of their producers in the development of a competitive and sustainable agriculture in France.*

*UNIFA has 49 members who produce fertilizers (mineral and organo-mineral) and liming in France and Europe. These members represent 92% of the french production of fertilizers and 78% of deliveries on an annual market of around 10.5 million tons.*



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## Agronomic Positioning Index **API**

How to choose a liming material...  
with the **Agronomic  
Positioning Index**

Agronomic Positioning Index  
**API**



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# For an easier choice

## Liming materials: principles of action

► **The liming material action, especially for (calcium and/or magnesium) carbonates, depends on soil acidity that make them react and on the blend with the soil.**

- The closer to neutrality the soil is (pH7), the higher the product reactivity should be,
- The finer the product is, the faster the reaction with the soil (for carbonates) is,
- The better the blend with the soil is, the more efficient the neutralizing action will be.

## The Agronomic Positioning Index

The **API** aims at simplifying the choice of a liming material, associating each product with a value that matches with the soil cationic exchange capacity (Metson method) saturation rate target.

The calculation of the **API** of a liming material depends on:

- Its type (carbonate in limestones and dolomites, oxide or hydroxide in limes, silicate in slags)
- Its various components in mixed liming materials
- Its presentation (dry, wet, liquid)
- For carbonates:
  - The fineness
  - The reactivity



The index ranges from **40 to 150** and is graduated each 5.

### One single calculation rule for API

The UNIFA members, who propose the **API** system, calculate this index according to one collective rule and software.

They are yearly controlled by Bureau Veritas Certification, an independent certification institution, on the basis of a system of reference that guarantees the right application of the **API** calculation rules.

## Acidity diagnosis and indicators

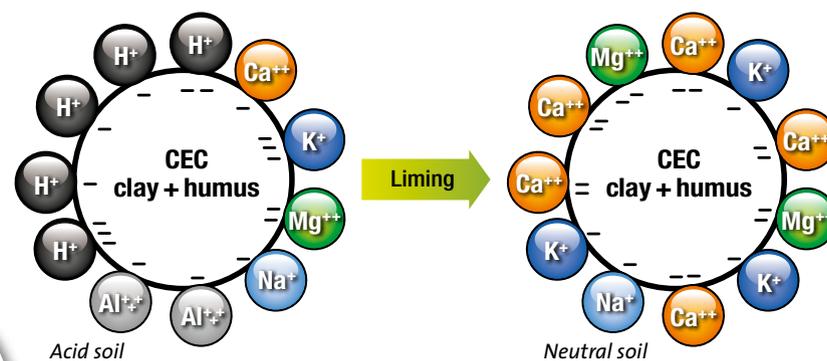
Acidification is a natural process under crops or meadows in soils subject to this risk. Correcting the acidity brings several benefits for agriculture and environment (see FERTI-practices UNIFA 06 and 13).

The soil analysis measures the acidity's evolution. The  $pH_{water}$  commonly used has large seasonal variations (until 1 point weaker in Summer than in Winter).

**This is why the COMIFER recommends using the cationic exchange capacity saturation rate for the diagnosis and advising as an additional indicator to the pH.**

The saturation rate is the sum of the exchangeable cations  $S=(Ca^{2+} + Mg^{2+} + K^{+} + Na^{+})$  divided by the  $CEC_{Metson}$  (measured at pH7). In most cultivated soils, this S/CEC rate varies between 40% for a very acid soil and 150% for a basic soil. A 70% saturation rate shows, for example, a reduced amount of the CEC exchangeable ions.

The others charges are blocked by  $H^{+}$  (protons) present in an acid soil. The nutrient's availability for the plant is limited by the soil acidity.



### The choice of a liming material depends on the target S/CEC

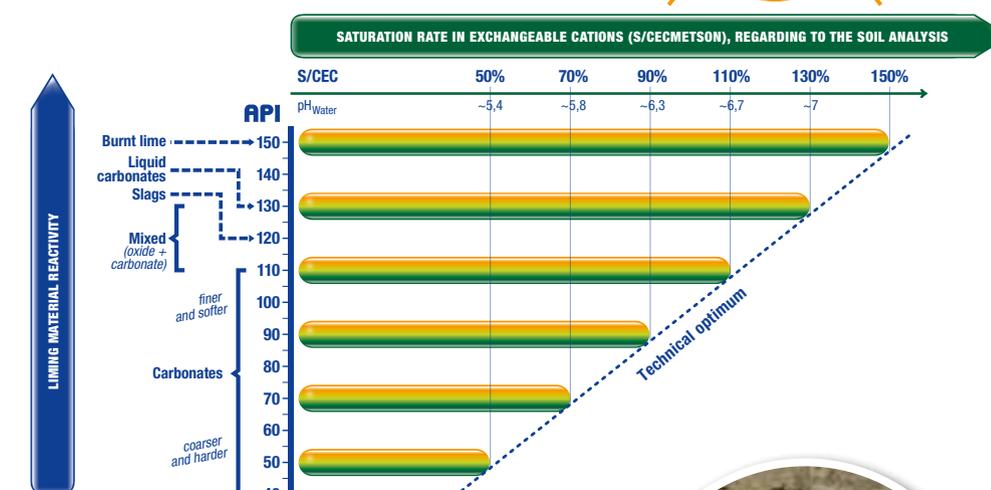
In very acid soils, we can use a wide choice of products because the plenty of  $H^{+}$  (protons) will accelerate the liming material dissolution. On the other hand, if a high saturation rate is aimed, the choice is limited to more reactive products (burnt lime, mixed products or soft and fine carbonates) because there will be less  $H^{+}$  (protons) in the soil solution to dissolve them.

## How to use the API?

The **API** takes the products' reactivity into account. Choosing a product, first needs to decide the target of the S/CEC saturation rate according to the cropping system.

This target will directly give the **API** to be used.

### Choose a liming material with the Agronomic Positioning Index (API)



A product with an **API** higher than required gets the target more quickly. A product with an **API** lower than required is not efficient enough to reach the target (with the standard amount).