



Design and use of control or reference material for plant analysis

Strategy of a routine laboratory :

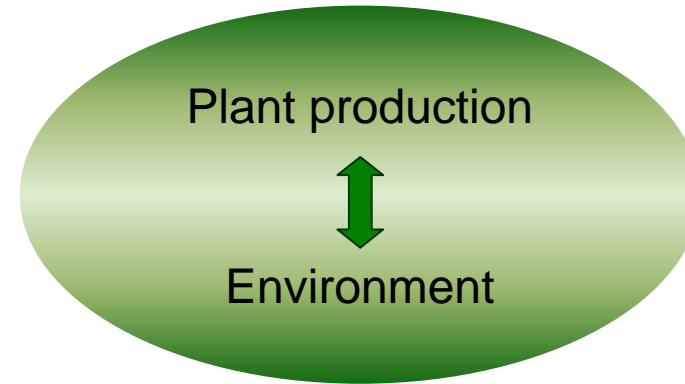
Maize and oak leaves samples

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USR VE
Analyses
Végétales



INRA Bordeaux Aquitaine

- Food security
- Fruits and cereals
- Forests
- Ecology

MATRICES AND ANALYTES

Plants

Analytes



Major and trace elements

Al, As, B, C, **Cd**, Co, **Cr**, **Cu**,
Fe, Hg, K, Mg, **Mo**, Mn, N,
Na, Ni, **P**, **Pb**, S, Se, **Zn**.

In red = accredited elements

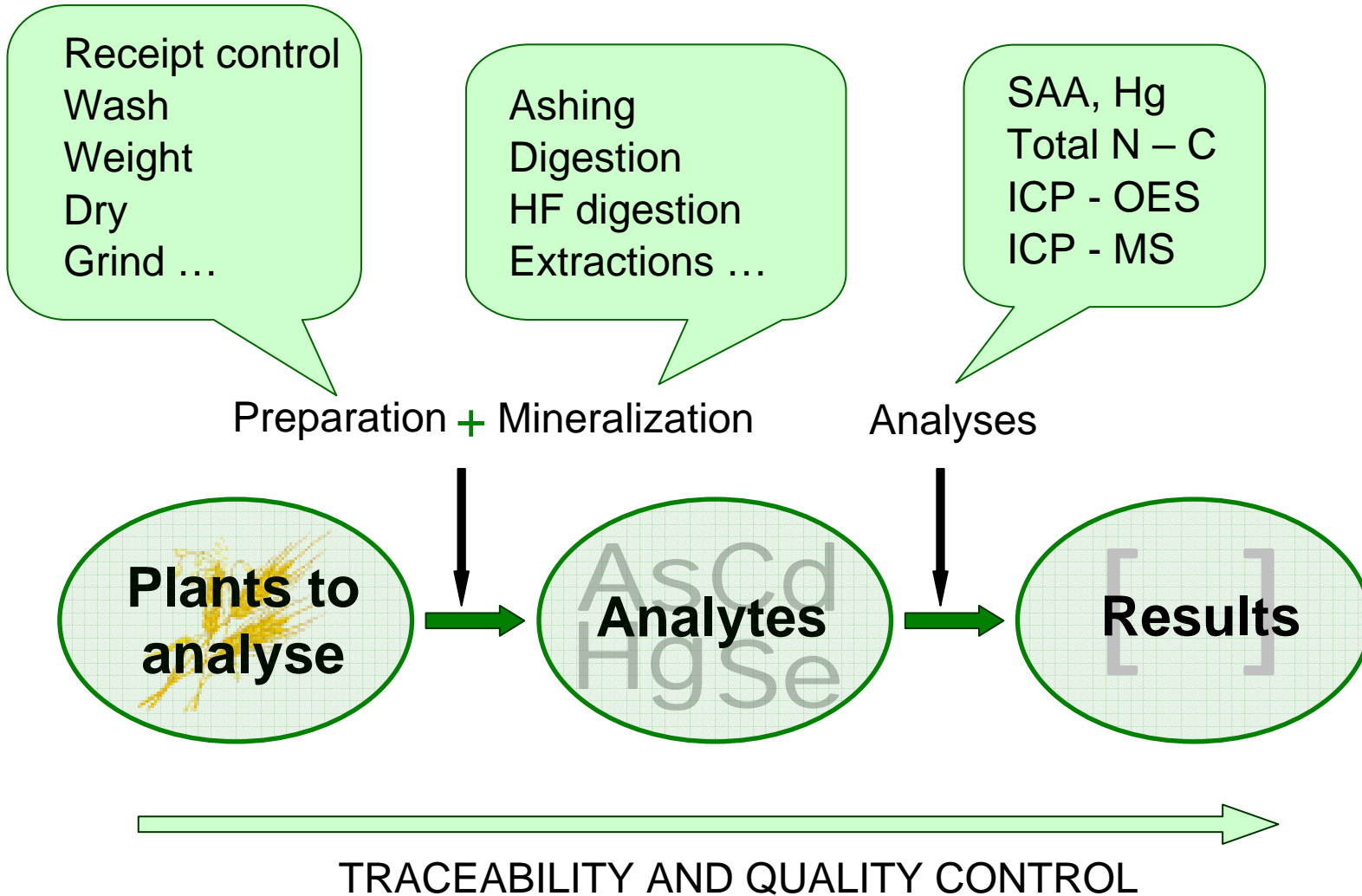
Ultra trace elements

Pt, Pd, Rh

Organic molecules

Sugars and organic acids

ANALYSES



DEVELOPMENT OF IN HOUSE SAMPLES

What kind of samples for which elements ?

Needs

- Analyse of grain, straw, ear of cereals
- Analytical catalogue of our laboratory
- Important quantities



Maize entire plant

Needs

- Broad-leaved tree leaves (RENECOFOR study)
- RENECOFOR elements + catalogue ones
- Enough quantity for long term study



Oak leaves

MAIZE SAMPLE

Sample Design:

Composite sample : maize samples dried and grinded in house were put together : grain, straw, ear ...

80kg

Sample treatment:

Homogenized and bottled by BIPEA
(French PT Scheme organizer)

Indicative values:

Stability, homogeneity (within a bottle and between bottles)

Analysis performed by a group of laboratories specialized in plant analysis and member of CII (Inter Institut Committee for analytical studies)

CONTROL VALUES : MAIZE : V463

More than 800 bottles produced

	%	SD		mg/kg	SD
Nitrogen (N)	1.28	0.03	Aluminium (Al)	172	13
Phosphorus (P)	0.24	0.01	Boron (B)	4.7	0.5
Potassium (K)	1.89	0.07	Cadmium (Cd)	1.7	0.3
Calcium (Ca)	0.26	0.01	Cobalt (Co)	0.18	0.06
Magnesium (Mg)	0.147	0.008	Chromium (Cr)	3.4	0.6
Sodium (Na)	0.015	/	Copper (Cu)	4.7	0.5
Chloride (Cl)	(0.36)	/	Iron (Fe)	366	25
Sulfur (S)	(0.105)	0.002	Mercury (Hg)	(0.001)	/
			Manganese (Mn)	24.9	0.8
			Molybdenum (Mo)	0.92	0.01
			Nickel (Ni)	3.37	0.18
			Strontium (Sr)	0.2	20
			Zinc (Zn)	61	1

No available value for lead, nugget effect (roots)

INTERNAL OAK SAMPLE

Sample design :

Leave sampling performed in the Fontainebleau Forest by the French National Forest Board (ONF)

80kg

Sample treatment :

Dried (80°C), grinded, homogenized and bottled by BIPEA (French PT Scheme organizer)

Sterilized by gamma treatment (BIPEA)

Indicative values :

Stability, homogeneity (within a bottle and between bottles)

Given to ICP-Forest foliar ring test organizers (oak sample 2005)

CONTROL VALUES : OAK LEAVES : V464

More than 800 bottles produced

	%	SD		mg/kg	SD
Nitrogen (N)	0.944	0.016	Boron (B)	25.45	0.55
Phosphorus (P)	0.049	0.001	Cadmium (Cd)	0.094	0.005
Potassium (K)	0.297	0.0054	Copper (Cu)	5.83	0.24
Calcium (Ca)	1.046	0.0135	Iron (Fe)	239	7
Magnesium (Mg)	0.115	0.0016	Manganese (Mn)	1257	18
Sulfur (S)	0.084	0.002	Lead (Pb)	2.63	0.13
Carbon (C)	49.16	0.303	Zinc (Zn)	26.93	0.83

Completed by in house defined values
for all the elements of our catalogue

CONCLUSION FOR INHOUSE SAMPLES

Samples are adapted to our specific needs

Good quality samples

High quantity of samples

Samples can be sold (in order to cover the production costs)

Samples are compatible with routine analysis

Long process (sampling, sample treatment, determining indicative values)

Financially worthwhile



Next step : certification (collaboration with LNE French national laboratory of metrology)

Thanks to



THANK YOU FOR YOUR ATTENTION...