Monitoring of the quality of French soybean production

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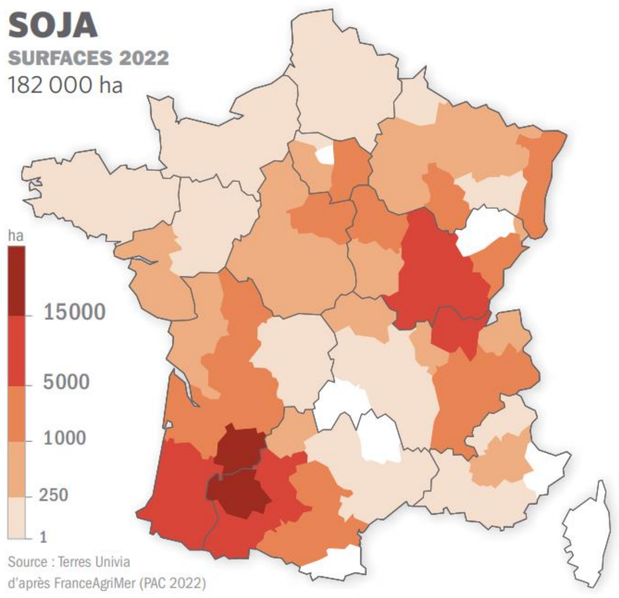
Background

In France, a soybean quality survey is published annually by Terres Univia, the French oil seed and rich protein crop interbranch association, and Terres Inovia, the technical institute. This survey is mainly based on samples of the yearly harvest submitted by the storage organisations. The quality parameters included are water content, impurities, oil and protein contents. Since 2014, more than 800 samples have been analysed showing that French production can reach a very good global quality.

Method

Collection of samples

- Thanks to storage organisations, with the best representativity of French soy producing regions.



- Taken at silo delivery, before any sorting or drying.

Information related to samples

- Location : samples are split into three regions defined by Terres Inovia, in order to give regional tendencies.

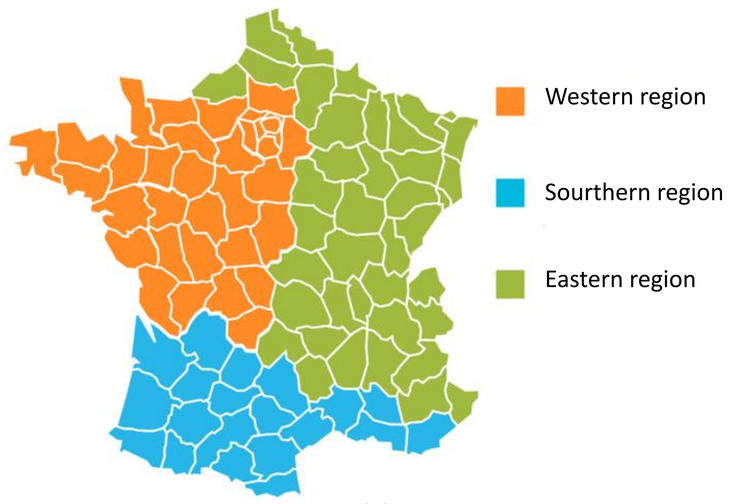


Figure. Main regions used by Terres Inovia.

- Water regime : rainfed or irrigated ;
- Outlet : feed or food.

Indicators and protocols

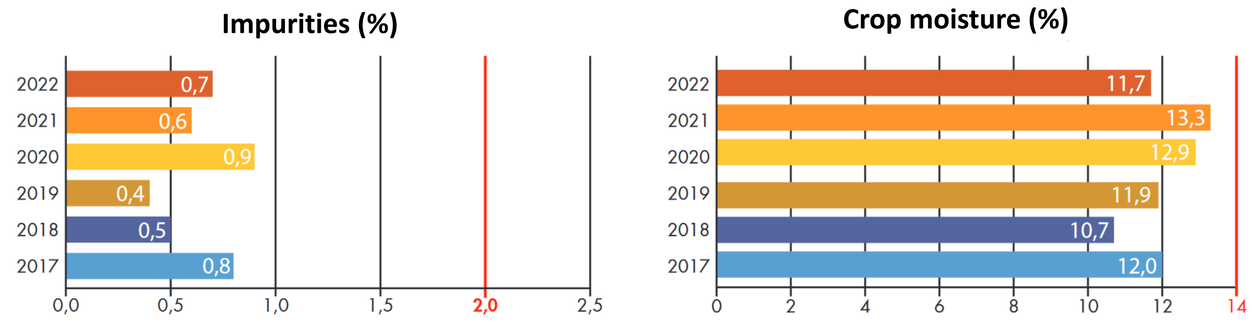
Indicator	Method
Protein content	Dumas method, internal (taken from NF EN ISO 16634-1)
Oil content	NMR, internal method (taken from NF EN ISO 10565)
Crop moisture	Dessication, internal method (taken from NF V03-909)
Impurities	Physical analyse, internal method
Thousand Kernel Weight (TKW)	Counting and wieghing, internal method

Table. Protocols associated to each monitored indicator. Source: Terres Inovia.

Pluriannual study of French soy quality : results

Global compliance to commercialisation norms of quality

- Commercialisation norms of quality determined by the Syndicat de Paris : 2% for impurities and 14% for crop moisture (see addendum IX).

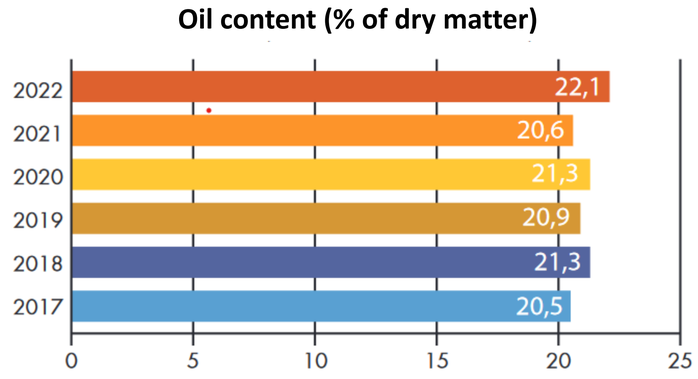


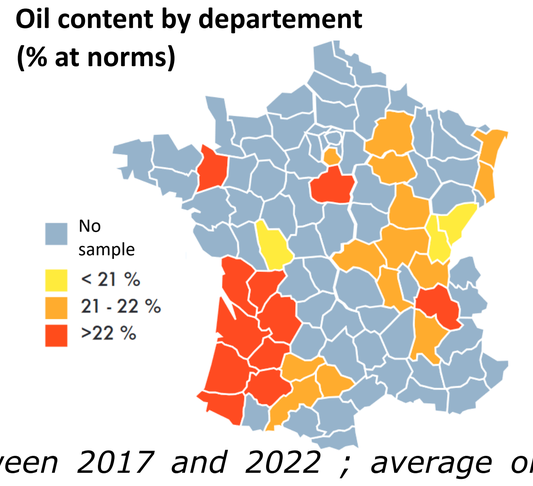
Figures. Average levels of impurities and crop moisture between 2017 and 2022.

- Impurities : low six-year average, showing a good weed management and favourable harvesting conditions.
- Crop moisture : six-year average of 12%, always under 14%.
- Little part of non-compliant samples for the two criteria each year.

Little variability of oil content

- Variability linked with variations of total radiations during the grain filling phase.
- Very high in 2022, due to non-limiting radiations.





Figures. Average levels of oil content between 2017 and 2022 ; average oil content by department in 2022.

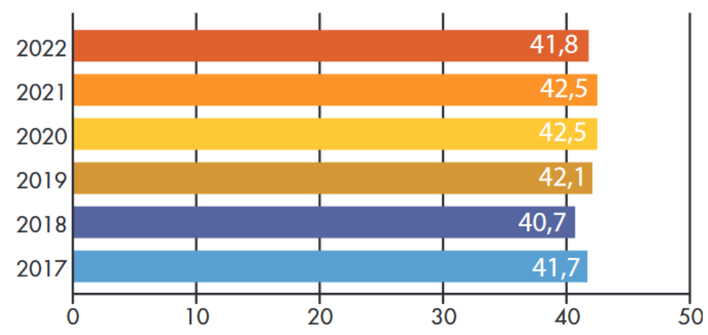
- Development of the sector rather based on protein content, but high oil content can also create added value depending on prices.

Quality monitoring as a tool to develop soy chains

- This survey was launched in 2014 as local Expellor crushing plants were developing in France. It was expanded to food quality in 2016 as this value chain has high quality standards.
- It allows a better monitoring of the quality in the value chain (contract requirements, variety choice, etc).
- It can also be used as a benchmark for operators to position themselves on the market, and there will be an important interest for similar studies elsewhere in Europe.

Relative importance of protein contents and TKW depending on the outlet

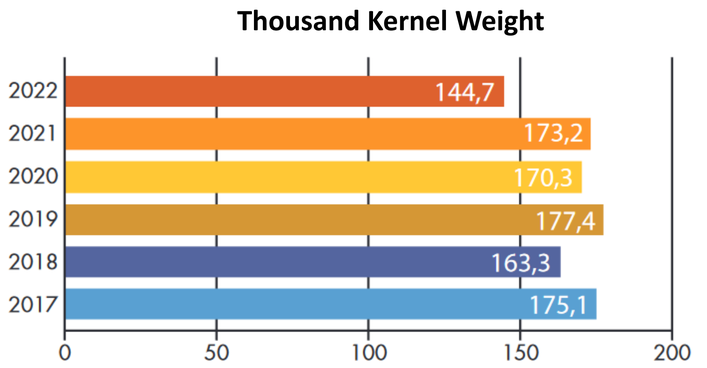
- Two main outlets are crushing (45% of the production) and food use (10%).



- Globally stable and high-levelled protein content, with a six-year average of 41,9% of dry matter.
- Better results for irrigated soy than rainfed one (+ 1,5 point on average).

Figure. Average protein content between 2017 and 2022.

- Very important criteria for food industry, with dedicated remuneration.
- Also important in feed industry but often offers no remuneration, even if some incentives emerge.



- Unusual and very low TKW in 2022, related to hot and dry climatic conditions.
- Five-year average (2017-2021) at 171,9 g, with an important varietal effect.

Figure. Average TKW between 2017 and 2022.

- Very important criteria for food industry as it facilitates dehulling.
- Compliant varieties are recommended by industrials.

Evolution of indicators linked with quality issues

- Alerts on high proportion of green beans in the samples by food industry in 2022, which might damage soyfood quality.
- Usual commercialisation norm : < 1%.

	<1%	1-10%	>10%
East	43%	34%	23%
West	45%	27%	27%
South	35%	44%	21%
National average	**40%**	**38%**	**21%**

Table. Part of samples for different proportions of green beans.

- Mature green beans might be linked to a halt in chloro-phyllases functions due to high temperatures.
- Integration of this criteria in the pluriannual monitoring, on demand of economic operators of the sector, especially since such climatic conditions (very high temperatures and dryness) might appear more and more frequently.