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Quality management for different legumes markets

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Introduction

In legume markets quality aspects play a crucial role for different stakeholders. Quality aspects differentiate markets as private actors use quality aspects to develop competitive advantages by meeting consumers' requirements (Smadja et al. 2021). Thereby, quality parameters are part of price-determining factors (Smadja et al. 2021). The influence of quality parameters varies, depending on the legume crop.

In the EU-project LegValue, quality criteria and quality management system (QMS) in the EU and outside for faba bean, field pea, soybean, lentil and chickpea were described (Smadja et al. 2021). Krieger and Schiefer (2004) define QMS as formalised systems that document process, procedure and responsibilities for achieving quality policies and objectives. The objective of this research note is to summarize and consolidate the findings of the EU-project LegValue with regard to quality aspects and to make these results more accessible.

Data and methods

Two kinds of analyses were conducted in this work. First, different quality management systems (QMSs) were studied across four production areas: USA, EU, Australia, France and Canada. To this end, bibliographic and internet resources were exploited to elaborate the regulatory framework, the control system and the safety and standards of quality. Secondly, the same work was done to describe quality criteria. For each analysis, a comparative analysis was carried out between QMSs and between countries.

Results and Discussion

Both public and private organisations play an essential role in the quality management and the definition of quality criteria (see Tab.1). The legislative and the health sides of quality are more important under the responsibility of the government and its representatives. Governments relay on food industry and associations' recommendations to make decision. The technical (intrinsic) quality of crop proteins is determined by private stakeholders with public authorities' supervision. All of these actors work with each other to control and improve legume's quality. Depending on the country, there might be minor inconsistencies in the quality issues. While the soundness is a specific criteria for lentil in Canada including the aspect "colour", in the US the "colour" alone is enough to characterise the form (see Tab.2). Moisture content is about 14% in all regions. This varies with 1% more or less, mainly depending on the use (see Tab.3). Same to many other quality criteria, the disregard of these criteria could lead to the reduction of prices. Foreign material is not defined similar in all countries. This could make foreign trade more difficult. These criteria might be varied depending on the chosen legume. Many quality criteria of legumes derive from those of cereals. Oil and protein contents are only relevant for soybean yet.

Table 1: Quality management systems of legumes

	System 1	**System 2**	**System 3**
Countries	EU, France	USA, Canada	Australia
Shared principles	Quality management is led by public authorities which draws regulations guideline and ensure enforcement. Food industry contributes to the process of standards elaboration by giving advice and doing propositions.		
Public authorities	European Commission (EC) Set up regulations applied in member states.	Departments of agriculture outline standards that are interpreted by local government.	The FSANZ (Food Standards Australia New Zealand) develops quality standards for the country. States and territories set up standards.
Private companies	Accompany EC in quality management, but there are not grain legumes' organisation at EU level.	Organised and intervene in national quality implementation.	Organised and more impact on quality management process.

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Table 2: Main quality criteria for American and Canadian lentils

	US			Canada		
	Grade			Grade		
	n°1	n°2	n°3	n°1	n°2	n°3
Variety*				Seeds act	Seeds act	Any variety
Soundness				Uniform size, good natural color	Uniform size, reasonably good natural color	Poor color
Colour	Good	Fair	Poor			
Foreign material	0.2% max	0.5% max	0.5% max	0.2% max	0.5% max	1% max
including stones	*0.1% max*	*0.2% max*	*0.2% max*	*0.1% max*	*0.2% max*	*0.2% max*
including ergot				*0.05% max*	*0.05% max*	*0.05% max*
including excreta				*0.01% max*	*0.01% max*	*0.01% max*
including insect parts				*0.02% max*	*0.02% max*	*0.02% max*
including sclerotinia				*0.05% max*	*0.05% max*	*0.05% max*
including other foreign material				*0.2% max*	*0.5% max*	*1% max*
Defective grains	2% max	3.5% max	5% max	2% max	3.5% max	10% max

**empty boxes means there is no data available*

Table 3: Main quality criteria for France and Australia's faba beans

	France		Australia	
	Addendum n° VII	Contracts	Grade n°1	Grade n°2
Physical characteristics*		uniform light colour, uniform medium size	sound, dry, fresh, light to medium brown or pale green	
Moisture content	14%, 16% max	15% max	14% max	14% max
Foreign material	2%, 4% max	1% max	1% max	3% max
of which unmillable material	*1% max*		*0,1% max*	*0,5% max*
of which grainsof cultivated plants	*2% max*			
Broken grains and seed coats	4%, 9% max			
Broken and split grains		5% max		
Insect damaged grains		3%, 5% max		
Defective grains			6%, 10% max	12%, 14% max
of which poor colour			*3% max*	*7% max*
Mold grains			1%	1%
Dead insects			2 max (per 400g sample)	30 max (per 400g sample)

**empty boxes means there is no data available*

Conclusion

In the selected countries, quality management is under public and private organisations' responsibility. Each of the involved stakeholder has a specific role to play in quality criteria and quality management system definition. The architecture of organisations in charge of quality is similar for the countries analysed. The more food industry organisations are gathered around one or several legumes species' development, the more quality is managed to respond market needs. This study also shows that quality criteria are similar between legume species and countries but their name, their definition and their method of evaluation can vary.

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Sources

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