

Blasco R.¹, Delgado M.², Sandoval S.³, Acco S.⁴, Ferreira E.⁵, González I.⁶, and Tipán A.⁷

¹ INTI, Buenos Aires, Argentina. ² IBMETRO, La Paz, Bolivia. ³ ISP, Santiago, Chile. ⁴ INACAL, Lima, Perú. ⁵ LATU, Montevideo, Uruguay. ⁶ INM, Bogotá, Colombia. ⁷ INEN, Quito, Ecuador.

Summary

Aware of quinoa's valuable nutritional qualities and its adaptability to high-altitude cultivation, its resistance to temperature changes, and its low water consumption, Andean indigenous peoples spread quinoa from Lake Titicaca throughout the South American Andes, a crop that has been preserved for centuries.

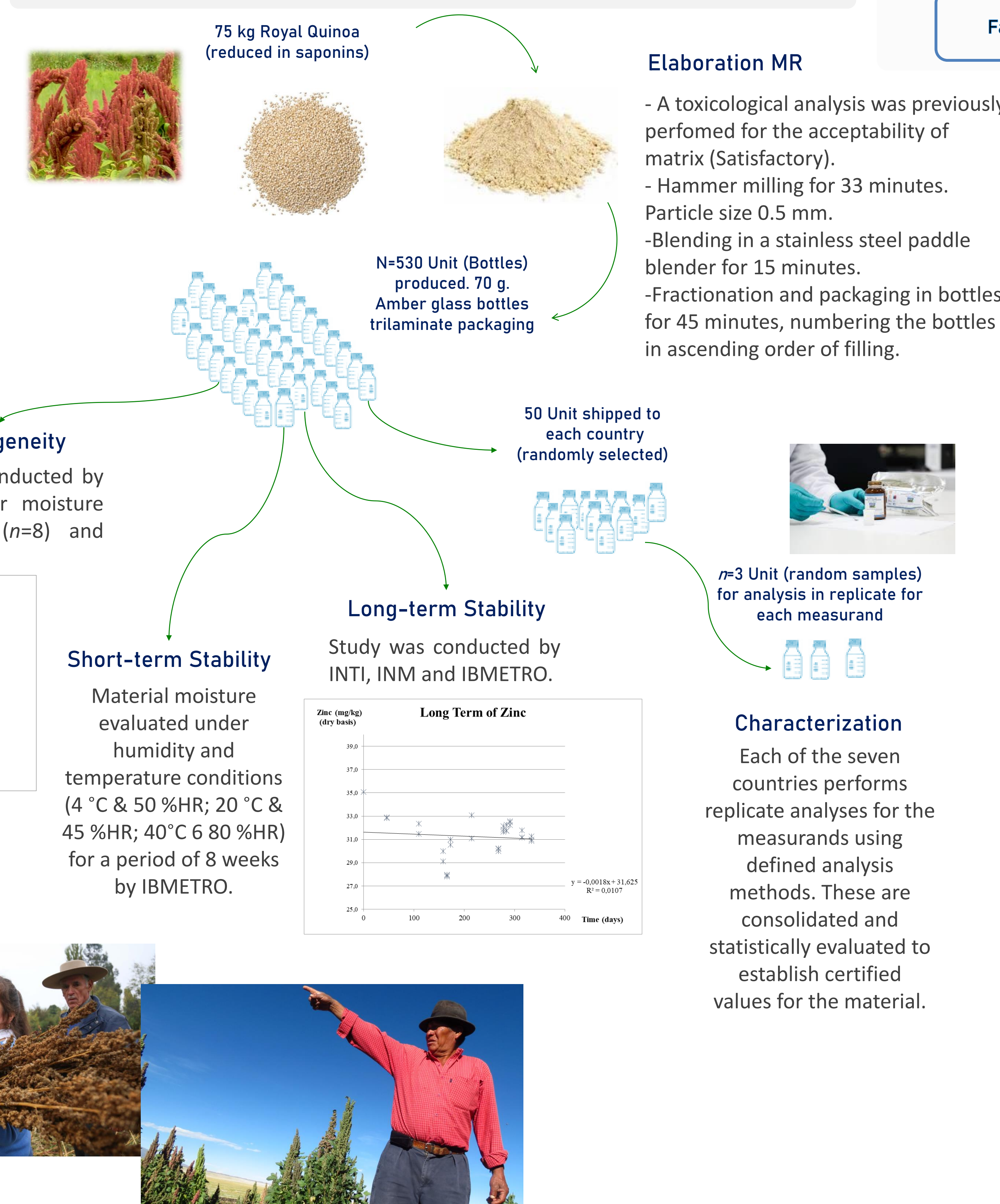
In the face of climate change and food security issues, there is a growing need in Andean countries to strengthen quinoa's quality infrastructure in terms of regulation, quality control, analysis, research, and promotion, thus promoting its cultivation by small farmers and Indigenous communities.

With this objective, the 7th INM of the SIM developed the first quinoa CRM through the Project "Quality assurance and metrological traceability of the analysis parameters used for the characterization of quinoa" (2015-2020), with funding from the German Government and administered by the Physikalisch-Technische Bundesanstalt (PTB) through the project "Regional Quality Infrastructure Fund for biodiversity and climate protection in Latin America and the Caribbean", the CRM intends to be used by laboratories for the control and nutritional characterization of quinoa.

Materials

The raw material was a variety of Bolivian white quinoa (Quinoa Real) treated to reduce its natural concentration of saponins. The lot of food was supplied by Sindan Organic S.R.L.

The reference material was then prepared, which involved homogenization, fractionation, packaging, and storage. Homogeneity, stability and characterization studies were carried out according to ISO Guide 35, IUPAC Protocol 2006 and ISO 13528.



Methods

The methods used to assess the homogeneity, stability, and characterization of the reference material were validated through interlaboratory comparisons between the 7 labs in 8 months. 3 different methods were used for metal analysis alone. Traceability to the SI was ensured in the measurements carried out. The acceptability criteria for the methods were previously defined according to Codex Alimentarius guidelines and international standards.

Ash	ISO 2171:2007	Dietary Fiber	AOAC 985.29	Moisture	ISO 712:2009
Fat	ISO 11085:2008	Metals	NMKL 161:1998 ; EC-FAAS; EC ICPAES, SA ICPAES; ID-ICPSFMS	Protein	ISO 1871:2009

Results

MRC Quinoa 01 – Quinoa Flour Certified Values			
	Assigned value	Incertainity (U , $k=2$)	Percentage relative Uncertainty (U %)
Moisture	9,00 g/100g	0,34 g/100g	3,8
Ash (*)	2,34 g/100g	0,21 g/100g	9,0
Protein (*)	14,4 g/100g	1,3 g/100g	9,0
Zinc (*)	31,5 mg/kg	4,7 mg/kg	14,9
Potassium (*)	0,70 g/100g	0,10 g/100g	14,3
Iron (*)	49,1 mg/kg	7,5 mg/kg	15,3
Calcium (*)	284 mg/kg	44 mg/kg	15,5
Cooper (*)	5,11 mg/kg	0,79 mg/kg	15,5

(*): certified values expressed on a dry basis

The CRM produced was used by each country to organize national proficiency testing and to provide reference material to national quinoa control laboratories for the validation of quinoa analysis methods.

Some NMIs were able to declare CMCs in the category of nutritional constituents in foods and also establish national standards and reference methods for the control of quinoa for food purposes. At the level of small-scale producers and farmers, techniques were provided nationwide to guarantee the nutritional quality of this food. In this way, Andean quinoa-producing countries strengthened their national quality infrastructure for this food and derived products, which favors food trade and contributes to safety food.

