

Promoting innovations in the Peruvian Altiplano

The case of tunta, an ancestral product

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Abstract

Since ancient times, the transformation of potato has been a key strategy for small producers in the Peruvian Andes. It allows them to diversify their consumption patterns, preserve their foodstuff and articulate to market. Tunta (*chuño blanco*) is produced at altitudes of over 4000 meters asl during winter by exposing the potatoes to frost, solar radiation and river flowing water. This process produces a dehydrated and highly nutritious staple. It is estimated that 70% of the national production of Tunta is concentrated in Puno.

Previous diagnostics have shown deficiencies in Tunta quality, an elementary traditional market and a weak producers' organization. In this context, the INCOPA project (Innovation and Competitiveness of the Potato), financed by SDC (Swiss Agency for Development and Cooperation), has been promoting a stakeholder platform in Puno since 2005 along with public and private institutions.

This platform has been endorsed with the following participatory and innovative actions.

- technological improvements to the development and diffusion of good manufacturing practices for tunta processing, certifying its quality
- the formation and strengthening of the "Aymaras Consortium", which has assembled 100 small producers from eight communities in Ilave
- the articulation of the consortium to different markets with the commercial brand "Los Aymaras".

In 2008, they sold 220 t, mainly to Bolivian markets, at a price of US\$ 2,500 per tonne (a higher rate than the traditional market). Currently, producers are empowered and report a substantial increase in each farmer's income, which translates to improvement in their livelihood, increase in crop land and investment in livestock.

Keywords: Tunta quality, stakeholder platform, good manufacturing practices for tunta processing, articulation to markets.

Tunta and its characteristics

Potato is one of the crops of great importance for the communities in the Andes, where its biodiversity has been preserved. Processing it gives aggregated value to the product, allowing the communities to diversify its consumption, preserve food and attain effective coordination with the market. One of the processed products is tunta, also known as *moraya* (in the Quechuan zones) o *chuño blanco* (in the urban centers) to distinguish it from black *chuño*. This product may well be one of the oldest processed products obtained from the potato, as documented in historical investigations of pre-Hispanic societies (Zapata, 2009). It is mainly harvested in the Aymara zones of the Peruvian highlands (Puno region). Tunta is a white dehydrated potato tuber (14-16% humidity), round or elongated (according to the variety of potato used). It has a high concentration of starch (80%) and fiber (20%) and is rich in calories and minerals (calcium and iron). See Table 1.

Table 1. Nutritional composition of tunta (per 100 grams)

Basic Elements	Quantity
Energy (Kcal)	323
Water (g)	18.10
Protein (g)	1.90
Carbohydrates (g)	77.70
Fiber (g)	2.10
Calcium (mg)	92
Phosphorus (mg)	54
Iron (mg)	3.3

Source: Peruvian Tables of Food Composition, Ministerio de Salud, Instituto Nacional de Salud, Centro Nacional de Alimentación y Nutrición, 1996.

Table 2. More frequently used potato varieties

Type of potato	Species	Common name
Sour native (contains glycoalcaloids)	<i>S. Juzepczukii</i>	Piñaza, Lucki, Locka
	<i>S. Curtilobum</i>	Choquepito, Parina
Sweet native	<i>S. tuberosum</i> spp andigena	Imilla negra, Imilla blanca, Sani imilla, Peruanita, Palita
Contemporary types (hybrids)	<i>S. tuberosum</i> spp andigena	Canchán, Ch'aska, Perricholi, etc.

Tunta is processed from fresh potato and has a conversion factor of 7:1 or 6:1, according to the variety used, which means that 6 to 7 metric tonnes of fresh potato are needed to produce 1 t of tunta. The varieties more regularly employed are the sweet native called *Imilla*, and the sour varieties such as the *Locka*. Other contemporary varieties are also used, such as the *Ch'aska*. See Table 2.

The major production area of tunta is the region of Puno, mainly concentrated in communities located above 4,000 meters above sea level, where "heladas" (freezing spells with drastic temperature drops to -5° C) occur in the winter time, and water supply is available (such as rivers or lakes), which are the key elements for producing tunta. It is estimated that the province of El Collao (the most important zone in Puno) produces around 5,000 t/per year and 4,000 t/per year is commercialized. 80% of the production is destined for the Bolivian market and 20% is sold in Peru (Arequipa, Cusco, Puno and, in less quantity, Lima). Slowly, tunta is being exported to Spain and the United States to cater to the Bolivian and Peruvian communities residing in those countries.

The studies conducted in these zones (Villena & Caro 2002; Lacour & Guet 2003) indicate that tunta is basically prepared by small producers, for whom it is an important source of income. But they face serious technological restrictions in its production, which, in turn, affect the quality of the end product. At the same time, the weak organization of producers does not allow a coordinated operation to generate technological and commercial improvements. In addition to these disadvantages, there is a market which is restricted to the traditional regional sector.

Within this context, the INCOPA project, implemented by CIP (International Potato Center) with funds from the Swiss Agency for Development and Cooperation (SDC), has, since 2005, supported the work platform "Alianza institucional para el desarrollo competitivo de la tunta". This project strives to integrate public and private institutions from Puno including organizations from the Ministries of Agriculture and Production, professional associations in Puno, NGOs and private producers' firms. The aim is to promote improved competitive production of tunta through technological innovation and through the strengthening of organizations and articulating the market with a product of quality (Giannela, 2004; Fonseca & Ordinola, 2009).

Improvements in technological innovation

Quality improvement work was initiated in 2005. This was based on analysis performed (Cota, 2005) drawing on local experiences, and brought together a group of leading producers from El Collao to jointly develop innovations in the tunta production process. Several participative trials were performed, in which critical points affecting the quality of the final product were identified. With the results of these trials, traditional “proficient processing practices” [“*buenas prácticas de procesamiento (BPP)*”] relating to tunta were developed, keeping in mind the ancestral technology of the producers.

BPP influenced such aspects as

- the selection of the potato (raw material), discarding pieces that were damaged by plagues, such as the Andean weevil (*Premnotripes spp*) and rotting diseases caused by fungus
- the use of floor mats (mantas) avoiding direct contact of the product with the soil during freezing and drying phases
- immersion of the product in the river in cages made out of fishing net instead of water ponds of stones (pircas), which helped to obtain sweet-smelling tunta free of stains
- adequate practices for peeling and cleaning processes.

At the same time, the use of adequate working clothes, such as overalls, rubber boots, gloves, hats and face masks were emphasized, which improved safety conditions for the producers and ensured the healthiness of the final product.

The results of the investigation were used to prepare training material such as a poster for *BPP* and the Guía de las BPP Artesanal de la Tunta (Fonseca *et al.*, 2008). Technical personnel and producers participated actively in these events and the guide has become an important piece of training material for improving the quality of tunta both within the target group and in adjacent communities within the project’s sphere of influence.



The producers’ leaders received coaching lessons on tunta BPP. They were trained as ‘farmers’ promoters’, who, in turn, would then teach primary producers. The advantage to this is that promoters can communicate in the local language (Aymara); thus guaranteeing the learning and communication process (see Figure 1).

Figure 1. Training in tunta BPP by farmers’ promoters. Ilave, Puno

The following basic aspects of BPP were emphasized during training

- cleanliness and hygiene in the production of tunta
- recommendation of tools that protect the product from direct contact with contaminants (floor mats) and also tools that help in obtaining a quality product (fishing nets)
- use of appropriate attire.

The producers that have been trained and their neighbors are adopting the BPP rules. as a result they are obtaining a good quality tunta product characterized by its intense white color, light weight, pleasant smell and

easy rehydration (less than 10 minutes) before cooking. All of this has brought direct benefits, increasing both demand and the market price.

Alongside the training, and on a larger scale, between 2007 and 2008 the work platform developed two Peruvian Technical Norms for Tunta, in conjunction with PRODUCE (Ministry of Production) and INDECOPI (Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual). This is to control the quality of the product and to contribute to its positioning in more demanding markets. (summoning representatives of the productive, commercial and consumer sectors of the region of Puno). The approved Technical Norms are: NTP 011.400: 2007: Processed tubers. Dehydrated potato. Tunta (INDECOPI, 2007) and NTP 011.401:2009: Processed tubers. Dehydrated potato. Tunta: Proficient practice of the traditional process (INDECOPI, 2009).

Strengthening the organizations

Initially, in 2005, organized groups of producers were identified within the work platform. , During subsequent years several other groups have joined and the organizations have been strengthened through management training and advice on legal aspects such as business definition, organizational business development principles and the business tax system.

The training sessions have been the bases of tunta BPP development and the organization of supply links to access the market.

Consorcio Los Aymaras is a small business formed by the producers' leaders of eleven associations. "The Consorcio unites 100 producers, mainly small farmers, coming from eight rural communities and from three micro basins from Ilave (Table 3). They produce on average 1.25 t of tunta per year, using 7 tm of fresh potato, of the sweet native varieties as well as sour and contemporary hybrids such as the Ch'aska acquired in Andahuaylas. 60 % of their production is destined for market consumption.

Table 3. Rural communities connected with Consorcio Los Aymaras, through producers' organizations

Micro basin	Camillaque	Huenque	Ilave
Community	Churomaquera	Concahui	Chijichalla
	Quellicani	Cutimbo	Jarani
		Jalamilla	
		Yarihuani	



A very important initiative for the creation of the Consorcio, has been the involvement of the leaders as 'commercial drivers' in the cities of Arequipa, Cusco, Lima and Tacna. Here, they contacted different venues such as fairs, wholesale food markets and food stores, as well as local authorities, and convened the press to promote the product's image. As a result of these contacts, the producers felt motivated to improve the quality of their tunta. They also captured the interest of supermarkets, leaving open doors for future commercial transactions (Fonseca & Julca, 2006). See Figure 2.

Figure 2. In Lima organized producers participate as commercial drivers. The D' Gallia Cooking School supports the initiative

The market challenge and the gastronomic potential of tunta

At the same time as the organization was improving and traditional BPP for tunta was implemented, the work platform designed, along with Consorcio Los Aymaras, strategies to expand market access and develop a commercial brand, Los Aymaras As a result of BPP practices the Consorcio had a product of excellent quality. They were able to obtain sanitary registry (R.S. DIGESA:N16036N/TECNLS) and greater potential for articulating different markets.

In 2006, the Consorcio began commercial transactions with supermarkets to introduce tunta as a quality product oriented to higher economic bracket social levels. The aim was to improve its image and to widen its consumption. Thus, the brand Los Aymaras is commercialized in packages of 300 grams at supermarkets in Arequipa (Franco and Super), Cusco (Mega), Lima (Tottus) and Puno (commercial stores). In all these cities, the producers also sold directly to consumers at regional fairs during the National Day of the Potato. Sales reached 6,000 packs (1.2 tm), which has prompted a change in the concept of quality and has motivated other producers' micro businesses to sell tunta in packages of 0.5 kg., (although they were generic.)

The commercial brand Los Aymaras (see Figure 3) has significantly improved the image of tunta and this has been reflected in the increase in demand and prices year after year in the markets of Arequipa, Cusco and Puno. In Puno, a study of the productive chain, done during 2003 (Lacour & Guiet, 2003) indicated that the price of tunta in the llave fair was between S/. 1.5 and S/. 3.0 per kilo (according to quality). Signalling an important increase since the Consorcio began working in 2006. by 2009 prices had risen to up to S/. 9.00 per kilo (an increase of 200%).

In 2007, commercial experience was expanded through the wholesale of the Los Aymaras brand in 50 kg sacks for the markets in llave, Puno and Desaguadero on the border with Bolivia. Consequently the Consorcio's small producers commercialized an average of 1.0 tm of guaranteed quality tunta in 2008, mainly at llave's weekly Sunday fair. . They sold a total amount of 70 tm of tunta at US\$ 2,600 per ton. Another group of 30 larger producers sold a total of 150 tm at the markets of llave and Desaguadero. A combination of these figures means that the 100 producers connected to the Los Aymaras consorcio achieved a sales volume of US\$ 583,300 during 2008.



Figure 3. Tunta Los Aymaras in Tottus supermarket – Lima. Commercial promotion supported by Gastrotur Perú

Tunta is one of the most significant gastronomic contributions of the pre-Hispanic cultures (Olivas, 2008; MIMDES, 2008), and it is still consumed today, in rural as well as in urban areas, mainly in the southern parts of the country: Arequipa, Cusco and Puno.. It is eaten in typical dishes, the most popular of which is *chuño pasi* (boiled tunta served with cheese and an assortment of deep-fried meats).It is also used to prepare *sopa blanca* (white soup), *chairo* (traditional soup with pork and pieces of tunta) and tunta pudding.

Aware of the culinary benefits of tunta and in an attempt to promote its consumption, the project supported haute cuisine schools in their work on gastronomic innovations using tunta. Research was done at Escuelas D'Gallia and Gastrotur Perú in Lima, the Cordon Bleu school in Cusco and La Casa de Avila in Arequipa. Other restaurants which participated were: El Rocoto in Lima, Ukucus, Los Balcones de Puno and Mojsa in Puno. These endeavors demonstrated the great culinary versatility of tunta. The flavor adapts well in sweet as as salty dishes meaning it can serve as the base for soups, stews and desserts. Chefs declared that tunta was a very malleable product, easy to combine with different ingredients: "Tunta is like a sponge, it absorbs the flavor of the ingredient it accompanies In a "chupe of camarones" (shrimp soup), it takes on the flavor of the shrimp and italso blends very well with aromatic herbs" (Anabel Augusto).

As a result, more than 20 recipes were developed out of which some stand out: ñoquis de tunta y trucha ahumada - -tunta gnocchi with smoked trout; manjar de tunta - a sweet tunta delicacy; humitas de tunta - small tunta tamales and chocotunta - a sweet made out of tunta, chocolate, sugar, and milk.



These culinary tunta innovations have been demonstrated at different events in Lima as well as in other regions, where they have been very well received. Several well known chefs from culinary schools and restaurants participated in these activities and are contributing to improving tunta's image. In the case of Puno, they have introduced this ingredient on the menu of tourist restaurants that want to promote Peruvian food (see Figure 4).

Figure 4. A simple and innovative dish: 'encebollado de tunta con queso' (tunta served with Andean cheese and fried onions, tomatoes and chili)

On the way to generating impact

The combination of improved technology, organization and market articulation has started to show results among small producers. A qualitative survey (through personal visits and talks to the producers' leaders exploring achieved goals, has established that the strengthening of the producers has had a significant influence. This has affected men as well as women and has resulted in the positive generation of a network that impacts their families and their communities. The producers point out that they have doubled production and sales due to the improved tunta quality, which resulted from applying BPP and a better understanding of the market. The testimony of one female producer (Teresa Ramos) claims "with the trainings I learned a lot; I feel I have grown; I like to teach others what I have learned; besides, my tunta has better value in the market; people recognize its good quality."

At the same time, the majority of the producers report that the increase in sales has had positive repercussions on their families' incomes. They have used their revenues mainly for

- increasing their farm land to grow potato to produce more tunta
- the acquisition of livestock to fatten and sell for slaughter
- improving their households within their communities and the construction of dwellings in the city of Ilave.

Twenty percent of the producers connected to the Consorcio turned into producer-gatherer, as in the case of one associate (Constantino Flores) who declared: "with the support of my wife, now I buy tunta to my neighbors to sell it in Ilave and Desaguadero at a price profitable to all of us."

Conclusions

As seen from this experience, tunta offers great potential, and the achievements accomplished by improving its competitiveness provide the foundations for commercial growth within national as well as international markets (Bolivia, Spain and the United States). It should be noted that tunta already has its custom classification: 0712.90.90.00 (Project BID-ADEX –RTA, 2008), which means it can be launched in different international markets. This is in addition to the culinary development that the product has been experiencing (the most important gastronomic schools and restaurants are working on its advancement as part of an integrated effort promoted by INCOPA) and therefore the product can be firmly placed in more demanding markets.

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