Research Article

Functional Foods and Nutraceuticals in a Market of Bolivian Immigrants in Buenos Aires (Argentina)

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This paper presents the results of a research in urban ethnobotany, conducted in a market of Bolivian immigrants in the neighborhood of Liniers, Ciudad Autónoma de Buenos Aires (Argentina). Functional foods and nutraceuticals belonging to 50 species of 18 families, its products, and uses were recorded. Some products are exclusive from the Bolivian community; others are frequent within the community, but they are also available in the general commercial circuit; they are introduced into it, generally, through shops called dietéticas (“health-food stores”), where products associated with the maintenance of health are sold. On this basis, the traditional and nontraditional components of the urban botanical knowledge were evaluated as well as its dynamics in relation to the diffusion of the products. Both the framework and methodological design are innovative for the studies of the urban botanical knowledge and the traditional markets in metropolitan areas.

1. Introduction

This paper presents preliminary results obtained from a research line about Urban Ethnobotany developed in the Laboratorio de Etnobotánica y Botánica Aplicada (LEBA), Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata. The object of study is the botanical knowledge (BK) in the main metropolitan area of Argentina, the contiguous urban agglomerations surrounding Buenos Aires, the capital city of the country, and La Plata, the capital city of the province of Buenos Aires. The composition and the dynamics of the BK are evaluated. This knowledge guides the selection and use of plants, their parts and products deriving from them found in the context of the conurbation.

This survey has been developed in a Bolivian immigrant market located in the city of Buenos Aires, which provides the specific products for this community and it is also representative of the pluricultural context of the metropolitan area [1, 2].

Researches on traditional markets have usually been addressed from the anthropology and the economic geography points of view as systems in which their components (actors and social networks, exchange and distribution, the products with their origin and destination) have to be explored [3]. It is important to note that in Latin America, markets represent valuable places for ethnobotanical researches as they condense in a reduced area the local knowledge and values on biological products. “Markets are public spaces devoted to sell several products, as well as they are spaces of exchange and acquisition of cultural information. Those spaces are walking traces of a determined culture or society by reproducing in a small scale, the biological and cultural
diversity of a region” ([4], authors’ translation). Consequently, they have been object of study, especially those in rural areas [5, 6] but there are only some previous investigations about markets placed in urban areas as the one described here [7]. It is considered a priority subject, because markets are true germplasm banks that help to preserve plant diversity through the use of different species [8]. The aim of this paper is to contribute to the ethnobotanical studies of markets in Argentina from the perspective of urban ethnobotany and to promote ideas for other aspects related to the value of the markets in connection with the understanding of the BK of the urban areas.

2. Materials and Methods

2.1. Framework. Ethnobotany is a complex science due to both the diversity of issues and the variety of approaches that it includes. This plurality is framed in a broad concept of the discipline: the study of the relations between humans and their vegetal environment [9–11]. An aspect related to those relationships has acquired a central development: researches about 

**botanical knowledge** (BK), a set of knowledge and beliefs about the relationships between people and vegetal elements of their environment: plants, parts of plants, or products deriving from them.

Most of the surveys about BK have been oriented to societies called *traditional*. Even if this term is not exempt from discussion [12], it is considered that the *traditional botanical knowledge* (TBK), related to the concept of *traditional ecological knowledge* (TEK), is characteristic of culturally homogeneous contexts, with a long experience of human group in its environment; knowledge is transmitted from generation to generation orally and in the shared practices, and there is a direct link between production and consumption: those who produce consume [13–15]. Besides, the TBK is *adaptive*, because it allows adjustments of the group to the environmental changes; this is why it is not static or conservative but dynamic and innovative [16, 17]. There has been a rise in the number of studies about TKB, because they are usually endangered and their rescue is urgent.

On the other hand, the BK of the inhabitants of the urban agglomerations has been considered *nontraditional*; by contrast with the TBK, it corresponds to pluralcultural contexts, with human groups without a large experience in the environment; knowledge is transmitted through social means of communication, and there is an indirect link between production and consumption: those who consume do not produce. The majority of the urban population knows little about the properties of the vegetal elements and less about their components or their origin, and the ways of obtaining and processing them are even less known [18]. However, this type of BK is also *adaptive*, because it guides the choice of what to consume [19]. Therefore, not long ago, several researches on urban ethnobotany came out based on studies about the BK of some part of the population of the conurbations. While some contributions on this field deal with plants product used by the average consumer in urban areas [1, 19, 20], up to now, most of the papers on urban ethnobotany are devoted to groups of immigrants that preserve a BK linked to their native traditions, which are readapted to their new context. In this way, there are several contributions from different parts of the world [21–33] and Argentina [2, 34–39].

The characterization of the BK of urban agglomerations is deficient if only the nontraditional BK is considered; together with it (including the scientific knowledge), different kinds of BK within the pluricultural context related to different traditions coexist: those of immigrants from various origin and those that belong to a part of the population that keeps their “family traditions”. The BK of these segments is linked to traditions, but it does not constitute a TBK in the sense defined above. Thus, what we call *urban botanical knowledge* (UBK) is a complex and adaptive corpus formed with a set of knowledge and beliefs about vegetal elements that coexist and interact within the same pluricultural scope [1, 2, 37].

On this basis, urban ethnobotany gives an answer of how is the *composition* of the UBK, that is, which are its components: linked to traditions and nontraditional and what is its *dynamics*: how the transmission of knowledge about the vegetal elements and their uses take place in the studied area. Several plants, their parts, and products deriving from them are visible for all the urban population and belong to the general commercial circuit, and their uses are widespread by the media; other plants remain restricted to immigrant groups or to the sphere of familiar tradition, and they are invisible for the majority. Nevertheless, some of these vegetal elements become visible when they enter the general circuit. In terms of the UBK dynamics, a component of the restricted BK (linked to traditions) spreads, and it gets generalized.

2.2. Functional Foods and Nutraceuticals. In this paper, the survey data focused on species that are used, at the same time, for food and therapeutic purposes. In fact, the line between these categories of use is not always clear [40–42], and many plants “used for food” also “serve to heal”. This idea is in tune with the broad concept of *health* as a state of complete physical, mental, and social well-being and not merely the absence of disease [43]. In urban agglomerations, shops called *dietéticas* (“health-food stores”) [44] are the focus of attention about the concept of *healthy food*, which was widespread by the media, and they are the places chosen to buy dietary supplements, functional foods, and nutraceuticals.

The concept of functional foods is susceptible of different interpretations that referred to their characteristics, their active components, or their regulatory framework [45–48]. Overall, apart from their conventional value as a source of nutrients, functional foods provide benefits for certain body functions, important for the maintaining of health or to reduce disease risk [49, 50]. According to Kalra [51], functional foods are consumed for those purposes, but people are not aware of their specific components; however, they are recognized because they “are good for health”. The concept of *nutraceuticals* is also debatable. However, from the point of view of the consumer, nutraceuticals are functional foods that help to prevent a disease or collaborate in its treatment; therefore, their particular effects are recognized. In this context it is noteworthy that what for a consumer is a functional
food, for another one can act as a nutraceutical [51]. The categories presented in Table 1 derive from the consensus of informants.

Among immigrants, the integrative idea of “edible and healing plants” (functional foods and nutraceuticals included) is linked to their traditions, and it is invisible for the rest of the urban population. However, some functional foods and nutraceuticals prevalent within the immigrant community go on sale in the dietéticas (shops that are related to the nontraditional component of the UBK), and according to their diffusion level, spread by the media, they enter the general commercial circuit, and they become visible. The evaluation of this situation is an important methodological tool to understand the UBK dynamics: these health-food stores become visualization agents.

2.3. Study Area and Involved Actors. The Ciudad Autónoma de Buenos Aires or Capital Federal is placed over the West margin of the Río de la Plata in South latitude 34°36’ and West longitude 58°26’ [52]; it has an area of 202 km² and a population of 2,891,082 inhabitants [53]. Together with 24 departments of the Buenos Aires province, it forms the Great Buenos Aires [54, 55], with a total area of 3,833 km². These departments have a total population of 9,910,282 inhabitants [53]. In population terms, the Great Buenos Aires is the fifth of America, and the seventeenth in the world [56]. This large metropolitan area comprises strictly urban areas, most of which are diversified, and then, they settle again but this time in the provinces of Jujuy, Salta, and Tucumán, working in the horticultural sector. The activity is more intense in the Liniers market during the weekend (in fact the vehicular traffic is stopped), when a lot of people from all over the city and nearby cities of the province of Buenos Aires go there to purchase products as well as a tour and meeting place. The market is visited by the members of the Bolivian community that ask for specific products to preserve their own traditional recipes (dietary and therapeutic), members of the Peruvian immigrant community, for similar reasons, neighbors who are not part of these immigrants segments who find it a cheap place with a wide and diverse selection and purchase of food and therapeutic, and, finally, some people from other neighborhoods of the city and different social sectors that have started to use this market as a place to buy functional foods and nutraceuticals.

The Bolivian immigration, caused especially for work reasons, settled first in the Northeast of the country, in the provinces of Jujuy, Salta, and Tucumán, working in the harvest. In the second half of the 20th century, their destinations diversified, and then, they settle again but this time in the metropolitan area of Buenos Aires, working with the horticulture in the periurban areas and the manufacturing industry, commerce, and the construction business in the urban areas [60, 61]. In 2001, 22% of the Bolivian population in Argentina (2,233,464 inhabitants according to that year census) was living in Jujuy and Salta, a low percentage compared to the 60% settled in Capital Federal (22%) and in the province of Buenos Aires (38%) that same year.

The preference of recent immigrants to settle in metropolitan areas is also seen in the age structure of population: in Capital Federal and Buenos Aires province, the Bolivian immigrants over 54 years old are about 15% of the total population, and in Jujuy, they are over 43%. In Buenos Aires city, the immigrants coming from Bolivia, Peru, and Paraguay are the 5% of its total population, and in the whole country, they represent a little less than the 2% [62].

The called horticultural belt of Buenos Aires (Berazategui, Florencio Varela, and La Plata departments) supplies fresh vegetables to the inhabitants of the conurbation Buenos Aires-La Plata and other provinces. In 2001, 39.2% of the producers were Bolivian; of that total 75% are tenants, 25% owners that work almost exclusively with work force coming from their own country [63]. If it is considered that the first Bolivian immigrants, who arrived in the area about two or three decades ago [59, 63], worked as agricultural laborers, the social mobility of the group is marked [64].

2.4. Liniers Bolivian Market. The market of Bolivian immigrants that is the object of study of this research is placed in the neighborhood of Liniers, in Buenos Aires, and it is known as Liniers market (or Bolivian market for the population that does not belong to the segment). Liniers is one of the 48 neighborhoods or districts in which the Capital Federal is divided. It is located in the west of the city, its area is of 5.4 km², and its population is of 44,234 inhabitants. With regards to public urban and intercity transportation, the neighborhood is one of the main points of the city, with a lot of buses short- and long-distance routes that communicate the Capital Federal with departments of the Great Buenos Aires. Its central bus station is the second most important of the city, after Retiro. Likewise, there is a train station of Ferrocarril Sarmiento that links Buenos Aires city with the provinces of Buenos Aires, La Pampa, Córdoba, San Luis, and Mendoza, west to the country [52]. Surrounding this train station and Rivadavia Avenue (that goes through the city from East to West and it continues to the province of Buenos Aires), there is a commercial area with different shops, an important shopping mall, and the Bolivian market.

This market is a set of premises and street stalls that is especially concentrated in the street José León Suárez, one block away (a hundred meters) from the train station which is in the intersection of José León Suárez and Rivadavia Avenue. In the premises and street stalls, located in the sidewalk, food and medicinal vegetables and several products deriving from them are sold; there are also bars and restaurants of typical food and other shops of the sort in the cross and side streets. This receives the name of market or, sometimes, fair. In a broad sense, it is a market, because it is a site designed to sell products, either permanently or on specific days. However, it is different from other markets in the city, because the premises and stalls are not inside a building. On the other hand, it can be considered a fair, but local fairs are usually placed outdoors (streets and parks) and are held on specific days.

The activity is more intense in the Liniers market during the weekend (in fact the vehicular traffic is stopped), when a lot of people from all over the city and nearby cities of the province of Buenos Aires go there to purchase products as well as a tour and meeting place. The market is visited by the members of the Bolivian community that ask for specific products to preserve their own traditional recipes (dietary and therapeutic), members of the Peruvian immigrant community, for similar reasons, neighbors who are not part of these immigrants segments who find it a cheap place with a wide and diverse selection and purchase of food and therapeutic, and, finally, some people from other neighborhoods of the city and different social sectors that have started to use this market as a place to buy functional foods and nutraceuticals.
Table 1: Exclusive and frequent functional food and nutraceuticals in the market of Bolivian immigrants in Liniers, Ciudad de Buenos Aires, Argentina.

| Families/species | Local name | Parts/products | Uses | Situation | Samples |
|------------------|------------|----------------|------|----------|---------|
| **Apiaceae**     |            |                |      |          |         |
| *Coriandrum sativum* L. | Cilantro | Fresh leaves | Food and condiment, as a substitute of parsley. Nutraceutical: diuretic, aperitive, digestive, and antispasmodic | Frequent | FB 430 (LEBA) |
| **Asteraceae**   |            |                |      |          |         |
| *Baccharis articulata* (Lam) Pers. | Carqueja | Fresh aerial parts (in bunches) | Beverage flavouring. Nutraceutical: tonic, digestive, hepatic, diuretic, febrifuge, and cordial; in external application, vulnerary | Exclusive | FB 416 (LP) |
| *Baccharis trimera* (Less.) DC. Carquejilla/ Carqueja | Carqueja | Fresh aerial parts (in bunches) | Same as above | Exclusive | FB 424 (LEBA) |
| *Cynara cardunculus* L. (= *C. scolymus* L.) | Alcachofa Leaves in bags and pills | For infusions. Nutraceutical: hepatic, cholagogue, choleretic, and depurative | Exclusive | JH H093, H094 (LEBA) |
| **Matricaria recutita** L. | Manzanilla | Fresh aerial parts (in bunches) | Beverage flavouring. Nutraceutical: sedative, slimming, digestive, antispasmodic, emmenagogue, pectoral, emollient, and vermifuge | Exclusive | FB 427 (LP) |
| *Porophyllum ruderale* (Jacq.) Cass. Quirquiña | Quirquiña | Fresh aerial parts (in bunches) | Food and condiment, for soups, stews and sauces. Nutraceutical: diaphoretic, antispasmodic; in external application, vulnerary | Exclusive | FB 413 (LP) |
| *Smallanthus sonchifolius* (Poepp. & Endl.) H.Rob. Yacón | Yacón | Fresh roots and jams | Food, as fruit or in salads (raw), for juices, syrups, jams, and teas. Functional food or Nutraceutical: antidiabetic | Exclusive | JH 6891 (LP), L006 (LEBA) |
| *Stevia rebaudiana* L. Yerba dulce | Yerba dulce | Fresh aerial parts or whole plant | Sweetener, for infusions and confectionary. Nutraceutical: antidiabetic and “antiageing” (antioxidant) | Exclusive | FB 415 (LP) |
| *Tagetes minuta* L. Huacatay | Huacatay | Fresh aerial parts (in bunches) | Condiment for soups, stews and sauces. Nutraceutical: diuretic, digestive, and antispasmodic. Insecticide | Exclusive | FB 403 (LEBA) |
| **Basellaceae**  |            |                |      |          |         |
| *Ullucus tuberosus* Caldas Papa lisa/ Ulluco | Fresh tubers (sold loose or packed) | Food, for soups, stews, locro, and purees. Functional food: “healthy” food (antioxidant) | Frequent | FB 439 (LEBA) |
| **Boraginaceae** |            |                |      |          |         |
| *Borago officinalis* L. Borraj | Fresh aerial parts | Food, eaten as a vegetable or in patty fillings; condiment in sauces, soups, and stews. Functional food or nutraceutical: expectorant, cordial | Frequent | FB 414 (LP) |
| **Brassicaceae** |            |                |      |          |         |
| *Lepidium meyenii* Walp. (= *L peruvianum* G. Chacón) Maca | Roots in powder or as flour (sold loose or packed) | Nutraceutical: tonic of the nervous system, to stimulate memory, to improve fertility, against fatigue and stress, “antiageing” (antioxidant). It is added to food and drinks | Frequent | JH H091, H160 (LEBA) |
| **Cactaceae**    |            |                |      |          |         |
| *Opuntia ficus-indica* (L.) Mill. Tuna | Arrope (syrup) (in bottles) | Food. Functional food o nutraceutical: diuretic, antispasmodic, emollient, and vermifuge | Exclusive | JH L002 (LEBA) |
Table 1: Continued.

| Families/species | Local name | Parts/products | Uses | Situation | Samples |
|------------------|------------|----------------|------|-----------|---------|
| **Chenopodiaceae** |            |                |      |           |         |
| *Dysphania ambrosioides* (L.) Mosyakin & Clemants (= *Chenopodium ambrosioides* L.) | Paico | Fresh aerial parts (in bunches) | Condiment in soups, stews, and other foods. Beverage flavouring. Nutraceutical: tonic, aperitive, febrifuge, digestive, antispasmodic, carminative, hypotensive, emmenagogue, and vermifuge; in external application, antihemorrhoidal | Exclusive | FB 419 (LP) |

| **Cucurbitaceae** |            |                |      |           |         |
| *Cyclanthera pedata* (L.) Schrader | Caiwa/Achojcha | Fresh fruits. | Food, used as pumpkin, in soups and stews. Functional food or nutraceutical: antidiabetic, analgesic, and hypotensive | Exclusive | FB 417 (LEBA) |
| *Cucurbita ficifolia* Bouché | Cayote/Alcayote | Fresh fruits | Food, as a fruit; also in soups and stews. Functional food or nutraceutical: antidiabetic | Exclusive | JH 565 (LP) |
| *Sechium edule* (Jacq.) Sw. | Chayote/Papa del aire | Fresh fruits | Food, in stews, soups, fried, pies, and jams. Functional food or nutraceutical: diuretic, antidiabetic, and hypotensive | Exclusive | FB 418 (LEBA) |

| **Euphorbiaceae** |            |                |      |           |         |
| *Plukenetia volubilis* L. | Sacha inchi | Seeds in snacks, liquid, ointment and in powder | Food. Nutraceutical: depurative, hypocholesterolemic, antioxidant; in ointment, for bone pain, and inflammation | Frequent | JH L029 (LEBA) |

| **Lamiaceae** |            |                |      |           |         |
| *Melissa officinalis* L. | Toronjil/Melisa | Fresh aerial parts | Condiment for sauces and various dishes. Nutraceutical: digestive, carminative, antispasmodic, cordial, and emmenagogue | Exclusive | FB 422 (LEBA) |
| *Mentha x piperita* L. | Menta | Fresh aerial parts | Condiment for various dishes. Beverage flavouring. Nutraceutical: aperitive, stimulant, digestive, antidiarrheal, carminative, and vermifuge | Exclusive | FB 428 (LEBA) |
| *Mentha spicata* L. | Yerba buena | Fresh aerial parts | Condiment for various dishes. Beverage flavouring. Nutraceutical: stimulant, digestive, hepatic, cholagogue, and pectoral | Exclusive | FB 423 (LEBA) |
| *Rosmarinus officinalis* L. | Romero | Fresh aerial parts | Condiment for various dishes. Nutraceutical: antispasmodic, digestive, hepatic, depurative, and emmenagogue | Exclusive | FB 457 (LEBA) |

| **Leguminosae** |            |                |      |           |         |
| *Arachis hypogaea* L. | Maní boliviano | Dry seeds (sold loose) | Food, for soups and stews. Functional food or nutraceutical: laxative, emollient, and pectoral | Exclusive | JH L007 (LEBA) |
| *Cicer arietinum* L. | Garbanzo | Dry seeds and flour (sold loose) | Food, for soups, stews, and side dishes. Functional food or nutraceutical: diuretic, hypocholesterolemic | Frequent | JH L027 (LEBA) |

Families/species | Local name | Parts/products | Uses | Situation | Samples |
|-----------------|------------|----------------|------|-----------|---------|
| *Geofroea decorticans* (Gillies ex Hook. & Arn.) Burkart | Chañar | Arrope (syrup) (in bottles) | Food. Nutraceutical: antitussive, expectorant, antitussive, emollient, and antiasthmatic | Frequent | JH L005 (LEBA) |
| *Glycyrrhiza glabra* L. | Regaliz | Dry chopped roots | Sweetener. Nutraceutical: anti-inflammatory, digestive, antispasmodic, hepatic, diuretic, emollient, laxative, expectorant, and antiasthmatic | Frequent | JH H084 (LEBA) |
| *Glycine max* (L) Merr. | Soja | Dry seeds and flour (sold loose) | Food, for stews, soups, and salads. Functional food or nutraceutical: diuretic, hypocholesterolemic, digestive, and laxative | Frequent | JH L019 (LEBA) |
Table 1: Continued.

| Families/species | Local name | Parts/products | Uses | Situation | Samples |
|------------------|------------|----------------|------|-----------|---------|
| Lablab purpureus (L.) Sweet | Poroto japonés | Fresh beans | Food (cooked). Functional food or nutraceutical: astringent, antidiarrheal, digestive, and febrifuge | Exclusive | FB 404 (LEBA) |
| Lens culinaris Medik. | Lenteja común | Dry seeds (sold loose) | Food, for soups and stews. Functional food or nutraceutical: antianemic, digestive, and laxative | Frequent | JH L018 (LEBA) |
| | Lentejón | Same as above | | Frequent | JH L017 (LEBA) |
| | Lenteja turca | Same as above | | Frequent | FB H05 (LEBA) |
| | Lenteja canadiense | Same as above | | Frequent | JH L013 (LEBA) |
| Lupinus albus L. | Lupín | Dry seeds (sold loose) | Food, for soups and stews. Functional food or nutraceutical: diuretic, vermifuge, emmenagogue | Frequent | JH L014 (LEBA) |
| Lupinus mutabilis Sweet | Taurí/Tarwi | Dry seeds (sold loose) | Food, for soups, stews, purees, tamales, humita, and tortillas. Functional food or nutraceutical: diuretic, emollient, and vermifuge | Exclusive | FB H14 (LEBA) |
| Pachyrhizus ahipa (Wedd.) Parodi | Ajipa | Fresh roots | Food, as fruit (raw) or vegetable (cooked). Functional food or nutraceutical: diuretic, expectorant, and antitussive | Exclusive | FB 374 (LEBA) |
| Phaseolus lunatus L. | Poroto pallar | Dry seeds (sold loose) | Food, for salads, soups, and stews. Functional food or nutraceutical: astringent, febrifuge, and emollient | Frequent | FB H13 (LEBA) |
| | Poroto de manteca | Same as above | | Frequent | JH L024 (LEBA) |
| Phaseolus vulgaris L. | Poroto/Chaucha | Dry seeds and fresh legumes (sold loose) | Food, for salads, soups, stews, and locro. Functional food or nutraceutical: diuretic, hypoglycemic, hypotensive, and resolutive | Frequent | JH L028 (LEBA) |
| | Poroto albúia | Same as above | | Frequent | JH L023 (LEBA) |
| | Poroto negro | Same as above | | Frequent | JH L021 (LEBA) |
| | Poroto colorado | Same as above | | Frequent | JH L022 (LEBA) |
| | Poroto regina | Same as above | | Frequent | JH L008 (LEBA) |
| | Poroto cranberry | Same as above | | Frequent | JH L010 (LEBA) |
| | Poroto San Francisco | Same as above | | Frequent | FB H11 (LEBA) |
| | Poroto pitai | Same as above | | Frequent | FB H12 (LEBA) |
| Pisum sativum L. | Arveja | Dry seeds and flour (sold loose) | Food, for salads, soups, and stews. Functional food or nutraceutical: digestive, febrifuge, against dermatosis, and contraceptive | Frequent | JH L026 (LEBA) |
Table 1: Continued.

| Families/species | Local name | Parts/products | Uses | Situation | Samples |
|------------------|------------|----------------|------|-----------|---------|
| Prospis alba Griseb. | Algarrobo blanco | Arrope (syrup) (in bottles) and flour (sold loose). | Food. Nutraceutical: stomachic, laxative, diuretic, pectoral, and antiasthmatic | Frequent | JH L004 (LEBA) |
| Tamarindus indica L. | Tamarindo | Fruit pulp. | Food and Condiment. Functional food or nutraceutical: digestive, refreshing, laxative, and purgative | Frequent | JH L001 (LEBA) |
| Vicia faba L. | Haba | Dry and toasted seeds (snacks) and fresh legumes (sold loose) | Food, for salads, soups and stews. Functional food or nutraceutical: diuretic, emollient, resolutive, and against colds | Frequent | JH L015, L016 (LEBA) |
| Vigna angularis (Willd.) Ohwi & H. Ohashi | Poroto adzuki | Dry seeds (sold loose) | Food, for soups and stews, with cereals and rice, and confectionary. Functional food or nutraceutical: digestive, laxative, and hypoglycemic | Frequent | JH H101 (LEBA) |
| Vigna radiata (L.) R. Wilczer | Poroto mung | Dry seeds (sold loose) | Food, for soups and stews. Functional food or nutraceutical: digestive, antidiarrheal, febrifuge, and tonic. | Frequent | JH L011 (LEBA) |
| Vigna unguiculata (L.) Walp. | Poroto tape/ Caupí | Dry seeds (sold loose) | Food, for soups, stews and purees. Functional food or nutraceutical: diuretic, digestive, laxative, tonic, and galactogene | Frequent | JH L012 (LEBA) |
| Moraceae | | | | | |
| Ficus carica L. | Higo | Arrope (syrup) (in bottles) | Food. Functional food or nutraceutical: anti-inflammatory, emollient, vermifuge, and antioxidant | Exclusive | FB 453 (LEBA) |
| Myrtaceae | | | | | |
| Eucalyptus cinerea F. Muell. ex Benth. | Eucalipto | Branches with fresh leaves (in bunches) | Beverage flavouring. Nutraceutical: expectorant, against colds, antitussive, antiasthmatic, and antirheumatic | Exclusive | FB 425 (LEBA) |
| Oxalidaceae | | | | | |
| Oxalis tuberosa Molina | Oca | Fresh tubers (sold loose or packed) | Food, for soups, stews, purees (cooked). Functional food: “healthy” food (antioxidant) | Frequent | FB 438 (LEBA) |
| Poaceae | | | | | |
| Cymbopogon citratus (DC.) Stapf | Pasto limón/ Citronela | Fresh tillers (in bunches) | Condiment for food and beverage flavouring. Nutraceutical: sedative, stomachic, carminative, and antiasthmobal | Frequent | FB 407 (LEBA) |
| Zea mays L. | Maíz morado (kulli) | Whole dry spikes or in powder (sold loose) | To make chicha morada (refreshing drink). Nutraceutical: depurative, hypotensive, anti-inflammatory, and antioxidant | Exclusive | FB 431 (LEBA) |
| Families/species | Local name | Parts/products | Uses | Situation | Samples |
| Maíz chuspillo | Dry grains (sold loose or packed) | For toasted corn. Functional food | Exclusive | FB 448 (LEBA) |
| Maíz huilcaparu | To make chicha (alcoholic beverage). Functional food | Exclusive | FB 447 (LEBA) |
| Maíz colorado | For soups, stews and other dishes. Functional food | Exclusive | FB 450 (LEBA) |
| Maíz blanco | Same as above | Exclusive | FB 449 (LEBA) |
| Maíz mote o pelado | Dry or cooked grains (sold packed) | For stews and other dishes, boiled in water. Functional food | Exclusive | FB 451 (LEBA) |
Table 1: Continued.

| Family   | Genus                            | Plant Part                          | Description                                                                 | Frequent       |
|----------|----------------------------------|-------------------------------------|-----------------------------------------------------------------------------|----------------|
| Rubiaceae| Coffea arabica L.                | Sultana                              | Seeds (seed coat) (sold loose or packed)                                  | Exclusive JH C095 (LEBA) |
|          | Morinda citrifolia L.            | Noni                                 | Pulp made flour or powder (loose or packed) and capsules                   | Frequent JH H092, H161-H162 (LEBA) |
| Solanaceae| Capsicum annuum L.               | Aji picante                          | Fresh and dry fruits (sold loose or packed)                              | Exclusive JH C096 (LEBA) |
|          |                                  | Aji escabeche                        | Food and condiment, for sauces, soups, stews, side dishes, and patty fillings. Functional food or nutraceutical: tonic, analgesic, and stimulant of the digestive system | Exclusive FB 433 (LEBA) |
|          |                                  | Aji amarillo                         | Condiment for soups, sauces, stews, patty fillings, and various dishes. Functional food or nutraceutical: tonic, analgesic, and stimulant of the digestive system | Exclusive FB 435 (LEBA) |
|          |                                  | Aji campanita                        | Same as above                                                              | Exclusive FB 421 (LEBA) |
|          | Capsicum pubescens               | Locoto/ Rocoto                       | Dried tubers (chuño) (sold loose or packed)                              | Exclusive FB 441-442 (LEBA) |
|          | Ruiz & Pav.                      | Papa blanca, papa negra              | Same as above                                                              | Exclusive FB 440 (LEBA) |
|          | Solanum tuberosum L.            | Papines                              | Same as above                                                              | Frequent FB 454 (LEBA) |

2.5. Methodological Design. Generally, for researches on traditional markets, the methodology proposed by Cunningham [3] has been followed. 30 outlets (street stalls and premises) have been surveyed, where samples of different vegetal elements were gathered. They have been placed, to document the work, in the collections of LEBA and the herbarium samples in the Herbario LP, División Plantas Vasculares, Museo de La Plata. For the species nomenclature, database of different institutions were followed for reference purposes [65, 66]. Ethnobotanical data were obtained according to usual qualitative methods [67–70], especially, using simultaneously participant observation (to record the plants actually marketed) and interviews (both open and semistructured ones), besides the literature review relevant to the observed plant elements. Questions were designed to obtain information concerning the name of species at the market, the parts of the plant commercialized, and the use(s) attributed to each of them. These procedures always performed with the consent of the informants. Data was registered following the parameters used in other studies about urban markets [7, 8, 71]. For some products, the information from labels and inserts was also assessed that for the general public, these directs the selection of products to consume.

Informants were interviewed on the basis of saturation of information, so 50 market sellers (from a total of 95 salesmen) of both sexes and different ages have been included. They are considered qualified informants: immigrants that expressed their knowledge about the characteristics and properties of
different vegetal elements and the way they are used. They showed a positive attitude to provide the requested information.

The record of the gathered data for plants that are sold in the Bolivian market of Liniers pointed to three distinct categories.

1. **Exclusive** items of the Bolivian immigrant segment are not found in the general commercial circuit, and they satisfy the characteristic needs of this group, which allows identifying the UBK linked to traditions.

2. **Generalized** items which are also found in the general circuit (supermarkets, greengrocers, herbalist’s shops, and dietéticas), and consequently, they are related to the nontraditional UBK.

3. **Frequent** items in the immigrants setting that are also found in the general circuit but their presence is sporadic or, at least, they do not vary very much. However, they are sold in dietéticas, so these items are related to the UBK dynamics. The frequency within the market refers to the fact that they are for sale in all the analyzed premises and street stalls.

For the purpose of this research, the generalized items were not considered, because they are visible for everyone. The focus is placed on the exclusive items (invisible) and the frequent ones (in process of visualization).

### 3. Results and Discussion

Until the moment, 160 edible species commercialized in Liniers Bolivian market have been surveyed (vegetables, legumes, fresh and dry fruit, condiments, and beverage flavorings). Of that total, products or part of plants considered functional foods or nutraceuticals, exclusive or frequent within the market, belonging to 54 species of 19 botanical families are sold. These are shown in Table 1, organized by families, in alphabetical order. The table also includes the local name, parts of the plant or products obtained from them, their uses, product situation: exclusive or frequent (under the terms defined above), and samples obtained and deposited in LEBA and LP under the leg. J. A. Hurrell et al. (JH) and F. Buet Costantino et al. (FB).

It is relevant to remember that the exclusive or frequent character concerns to the products and not to the species. In this way, the “arrope de higo” (“fig syrup”), *Ficus carica* L., is exclusive of the market but the edible fresh or dry fruits or the jams, which are also available in Liniers, are products with a wide diffusion in the general commercial circuit, so they are generalized, according to the categories of use. In the case of *Phaseolus vulgaris* L., the common bean and the ones called “alubia”, “colorado” (red), “negro” (black) and “regina”, among others [35], are frequent in the market (and consequently, they are available in the general circuit but generally they are sold packed); meanwhile, another beans called “canario” and “panamito” are exclusive of the Liniers market, where they are only sold loose.

#### 3.1. Origin of Functional Foods and Nutraceuticals

The fresh vegetables commercialized in Liniers market are cultivated in homegardens of the conurbation periurban areas; most of them are situated in the Buenos Aires horticultural belt. This information was given by the interviewed informants, but it was also taken from researches about peri-urban homegardens developed in other research lines of the LEBA [63, 72–74]. In some cases, like *Porophyllum ruderale* (Jacq.) Cass., “quirquiña”, and *Tagetes minuta* L., “huacatay”, they were cultivated with seeds brought from Bolivia. Dry or manufactured products usually come from Bolivia as well, even if the origin of the product is different; for example, the leaves of *Cynara cardunculus* L., “ạchichó”, “alcachofa”, of the tea bags and the pills that are sold in street stalls of Liniers are products originated in Peru but they have entered from Bolivia.

All the informants agree that the vegetal elements come from Bolivia and not from the Argentinean Northeast even if this region belongs to the same ecological and cultural Andean unit and the same edible and therapeutic plants are consumed; this is the case of, for example, the Andean edible roots *Smallanthus sonchifolius* (Poopp. and Endl.) H. Rob., “yacón”, and *Pachyrhizus ahipa* (Wedd.) Parodi, “ajípa” [75–80].

#### 3.2. Contexts of Circulation of Functional Foods and Nutraceuticals

There are some fresh aerial parts of plants that are exclusive from Liniers market, like *Baccharis articulata* (Lam) Pers. “carqueja”; *B. trimera* (Less.) DC., “carquejilla”; *Matricaria recutita* L., “manzanilla”; *Borago officinalis* L., “borrajá”; *Dysphania ambrosioides* (L.) Mosyakin and Clemants, “paicó”, *Melissa officinalis* L., “toronjill”; *Mentha x piperita* L., “menta”; *M. spicata* L., “yerba buena”; *Rosmarinus officinalis* L., “romero”, *Eucalyptus cinerea* F. Mull. ex Benth., “eucalípto”, *Aloysia citriodora* Palau, “cedrón” and *A. polystachya* (Griseb.) Moldenke, “burrito”. Nevertheless, they are also part of within-family product exchange, and they are also available from direct harvest in the conurbation periurban and nonurban areas. Of the species listed, the dry aerial parts are sold as an herbalist product in the general commercial circuit. In contrast, the aerial parts of *Porophyllum ruderale* and *Tagetes minuta* are not available in herbalist’s shops and dietéticas.

The fresh aerial parts of *Coriandrum sativum* L. are only commercialized in Liniers market (they are rarely found in the general circuit), and they are named “cilantro”; on the other hand, their mericarps, called “semillas” are named “co-riandro”; and they are widespread in supermarkets, dietéticas and spices’ shops. In Liniers market, the whole plant of *Stevia rebaudiana* L., “yerba dulce”, is sold, while in the dietéticas, there are only available packed products: in bags, liquid, or powder.

Fresh products which are exclusive of this Bolivian market are the edible fruits of the Cucurbitaceae: *Cyclanthera pedata* (L.) Schrader, “caíva” or “achojcha”, *Sechium edule* (Jacq.) Sw., “chayote” or “papa del aire”, and the *Cucurbita ficifolia* Bouché, “cayote”, or “alacayote”. The last example is sporadically available in greengrocer, and the jam made from its pulp is sometimes sold in supermarkets, because it is from time to time cultivated in the homegardens of the periurban...
area [35, 36, 72, 78]. Among the Solanaceae, there are some varieties of *Capsicum annuum* L. that are exclusive of Liniers market like (various fruits of different color that are offered fresh or dry, not powdered); and *C. pubescens* Ruiz and Pav., “locoto” or “rocoto” (fresh fruit and packed powder product). Other varieties of *C. annuum*, like peppers, fresh chilies, and condiment in powder (ground chili and paprika), are generalized vegetal elements. Of *Solarium tuberosum* L., “papa”, are exclusive of Liniers market the dry tubers called *chuño*, from both “blancas” (white) and “negras” (black) potatoes; while the fresh potatoes are available in the general commercial circuit [35], other small tubers of this species called “papienes”, are frequent in Liniers, but they are not exclusive: sometimes they are found in some greengrocer around the city.

Andean microthermal tubers, *Ullucus tuberosus* Caldas, “papa lisa” or “ulluco”, and *Oxalis tuberosa* Molina, “oca”, are valued nowadays due to their antioxidant properties [81], they are sold fresh, and they are frequent in Liniers market; sporadically, they can also be seen in some greengrocer of the general circuit. Occasionally, in the past, tubers of *Tropaeolum tuberosum* Ruiz and Pav., “isahu” or “añu” were sold in Liniers market, but they stopped selling them because there were no buyers; according to an informant, they have anaphrodisiac effects (apparently were used for this purpose by the soldiers of the Inca Empire), so people dismiss them [82, 83].

Among the Poaceae, *Cymbopogon citratus* (DC.) Stapf, “pasto limón” (“lemon grass”), the fresh fillers are sold in Liniers market and sporadically in the general circuit. Different varieties of “maíz”, *Zea mays* L., are exclusive of the Bolivian market, like the “maíz morado” (“purple corn”), that are sold dry, whole, or in powder to make “chicha morada” (a refreshing beverage of Peru). The dry styles, called “barba de choco”, is frequent in the market and also in some herbalist’s shops. Fresh corn is a generalized item.

Arrope (syrup) from fruits of *Ficus carica* L., *Opuntia ficus-indica* L. and *Vitis vinifera* L. are exclusive products of Liniers market; however, the fresh and dry fruits of these species are available both in Liniers and in the general circuit. On the other hand, arrope of “algarrobo”, *Prosopis alba* Walp., “maca”, *Plukenetia volubilis* L., “sacha inchi”, and *Morinda citrifolia* L., “noni”, in different products but mostly in powder are very frequent in Liniers, and lately, they are also available in *dietéticas*, quickly spreading in the general commercial circuit. “Maca” and “sacha inchi” come from Peru, where they have been known since Pre-Inca times [84, 85]. On the contrary, “noni” comes from Polynesia, from there it entered Peru, then it went to Bolivia and then to Argentina. It has had world diffusion because of the wide range of therapeutic effects are attributed to it [86].

The legumes that are sold in Liniers usually are found in the general circuit, but the dry seeds and flours obtained from some of them are less frequent; in Liniers market, they are frequent and they are sold loose. This is the case of the *Cicer arietinum* L., “garbanzo”; *Glycine max* (L) Merr., “soja”; *Lens culinaris* Medik., “lenteja”, and its varieties, “lentejón”, “lenteja turca” and “lenteja canadiense”; *Lupinus albus* L., “lupín”; *Phaseolus lunatus* L., “poroto de manteca” and “pal-lar”; *Pisum sativum* L., “arveja”; *Vicia faba* L., “haba”; *Vigna angularis* (Willd). Ohwi and H. Ohashi, “poroto adzuki”;

*Vigna unguiculata* (L.) Walp., “poroto tape” o “caupí” and *Vigna radiata* (L.) R. Wilczer, “poroto mung”. The sprout of this last species is available in Buenos Aires as “brotes de soja” which are spread widely [35]. Exclusive of Liniers is the fresh legumes of *Lablab purpureus* (L.) Sweet, “poroto japonés”, and the dry seeds of *Lupinus mutabilis* Sweet, “tauri” o “tarwi”; this one is an important Andean crop due to its high protein value [80, 83, 87] and the seeds of a variety of *Arachis hypogaea* L. called “mani boliviano” (“Bolivian peanut”) [88]. The case of *Phaseolus vulgaris* has been mentioned before. *Glycyrrhiza glabra* L., “regaliz”, is sold as therapeutic and as sweetener in Liniers and in some *dietéticas* and herbalist’s shops.

The preserved pulp of *Tamarindus indica* L., “tamarindo”, is available in Liniers market and, occasionally, in the general commercial circuit. It is interesting to notice that this same product is also commercialized in shops owned by Chinese immigrants, which are concentrated in another neighborhood of Buenos Aires, Belgrano, and the set of shops as a whole is called “barrio chino” (“Chinese neighborhood”). The same happens with the dry sees (sold loose) of the species of *Vigna*: “poroto adzuki”, “poroto mung” and “poroto tape” [34–36]. The presence of these in two immigrant segments so different in origin and traditions within the same conurbation opens a future comparison, taking into account the UBK component linked to traditions.

Even though it has not been dealt in this paper, a project is being developed, within LEBA, which aims to the understanding of the setting of exchange networks. The informants describe clearly defined routes to obtain the products that enable obtaining them very quickly (48–72 hours from their origin place, in Bolivia, to their outlet place in the Liniers market), and they make the selling of perishable products feasible. However, it has to be highlighted the incorporation of the plants that provide these fresh products so they can be incorporated to the stock-in-trade of the periurban vegetable gardens, which results in an increase in the agrobiodiversity of the area.

4. Conclusions

The research developed in Liniers market, identified with the segment of Bolivian immigrants (a group with a long history in Argentina but with a recent presence in the metropolitan area of Buenos Aires), enables a characterization of the component of the UBK linked to traditions and its own dynamics. Besides, this market being placed in an urban area suggests that traditional markets are an important source of plant diversity, which adds variety and choices to the UBK, process that takes place in a short time and that is spread quickly to the rest of the population. In this way, elements previously
invisible become visible. Considering dietéticas as visualization agents is a relevant methodological contribution for Urban Ethnobotany, because it helps to understand the BK dynamics in large metropolitan areas.

On one hand, typical elements of a community are incorporated through the market; in this particular case, well-known Andean crops, like “papines” (Solania tuberosa), “oca” (Oxalis tuberosa), “ulluco” (Ullucus tuberosus), “yacón” (Smallanthus sonchifolius), “ajípa” (Pachyrhizus ahipa), “tau-ri” (Lupinus mutabilis), “caíwa” (Cyclanthera pedata), and “cayote” (Cucurbita ficifolia), and, likewise, the market imply a quick entrance of several exotic elements (both to the city and to the immigrant group), which becomes easier due to the informality of the products circulation; for example: the “noni” (Morinda citrifolia). Besides, sometimes several fresh product are incorporated to local horticulture to enhance their availability, thus promoting agrobiodiversity. On the other hand, a special mention about the use of vegetables and their availability, thus promoting agrobiodiversity. The usage of food with therapeutic ends is not new, it has been part of human knowledge since ancient times, and it is present in several cultures, that is why it has been an object of study to professional of different areas of knowledge, including, especially in recent years, ethnobotany [40–42, 89, 90]. In the last three decades, this concept about “edible and healing plants” has been globalized and a renewed interest can be seen about the healing properties of food and the products that are known as dietary supplements, which are added to different substances so they are beneficial to the health. In this sense, traditional markets are relevant places to acquire functional foods and nutraceuticals, this is why they can satisfy the needs of regular consumers (members of the community) and, at the same time, respond to the demands of the pluricultural conglomerate in which they are immersed.

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