

LATINFOODS activities and challenges during the period of 2009-2012

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SUMMARY. The Latin American Network of Food Composition Data System (LATINFOODS) is the regional data center of the global network “International Network on Food Data Systems” (INFOODS) co-sponsored by the Food and Agriculture Organization of the United Nations (FAO) and the United Nations University (UNU). The aim of this work is to provide information on the main activities held and challenges during the period 2009-2012. The activities included: network organization, technological development, research, web site modification, database location, publication of new food composition tables, organization and participation in scientific activities, assistance and training. During this period, new strategic alliances where food composition is key were developed. This promoted more activities and strengthen working links in the region. The main challenges were: 1) to improve and update the regional database 2) to improve the national capacities for generating and compiling data to elaborate and update the national food composition tables 3) to establish and implement the database software in branches; 4) to reach technical and financial sustainability. Despite the fact that the network has a dynamic structure consolidated, trained and experienced members, a database of regional food composition, specialized tools and documents; more support for sustainability and progress is required.

Key words: Food composition, LATINFOODS, INFOODS, FAO/UNU, Latin America, food database, sodium, salt.

RESUMEN: Actividades y desafíos de LATINFOODS durante el período 2009-2012. La Red Latinoamericana de Composición de Alimentos (LATINFOODS) es el centro regional de datos de la red mundial “Red Internacional de Sistemas de Datos de Alimentos” (INFOODS), copatrocinada por la Organización de las Naciones Unidas para la Alimentación y la Agricultura (FAO) y la Universidad de las Naciones Unidas (UNU). Este trabajo tiene por objeto proporcionar información sobre las principales actividades realizadas y los desafíos durante el período 2009-2012. Las actividades incluyeron: la organización de la red, el desarrollo tecnológico, la investigación, la modificación del sitio web, la ubicación de la base de datos, publicación de nuevas tablas de composición, la organización y la participación en actividades científicas, asistencia y capacitación. Se llevaron a cabo nuevas alianzas estratégicas donde la composición de alimentos es clave, que promovieron más actividades y fortalecieron los vínculos de trabajo en la región. Los principales desafíos fueron: 1) mejorar y actualizar la base de datos regional; 2) mejorar las capacidades nacionales para generar y recopilar datos para las tablas nacionales de composición de alimentos; 3) establecer y poner en práctica el software de base de datos en los capítulos; 4) llegar a contar con sostenibilidad técnica y económica. A pesar del hecho de que la red dispone de una estructura dinámica consolidada, miembros capacitados y experimentados, una base de datos regional de composición de alimentos, herramientas y documentos especializados; hace falta más apoyo para que sea sostenible y continúe progresando.

Palabras clave: Composición de alimentos, LATINFOODS, INFOODS, FAO/UNU, América Latina, base de datos de alimentos, sodio, sal.

INTRODUCTION

The Latin American Network of Food Composition Data System (LATINFOODS) is the regional data center of the global network INFOODS (International Network on Food Data Systems). INFOODS was established in 1984 on the basis of the recommendations of an international group convened under the auspices of the United Nations University (UNU), with the mission to stimulate and coordinate efforts to improve the status of food composition data across the world and was initially coordinated by a Secretary established in the Massachusetts Institute of Technology in United States of America (1). Since 1999 the Food Agriculture Organization (FAO) has served as coordinator (2). LATINFOODS was created in 1986 (3) with the mission to develop and strengthen food composition activities in the Latin American region, tending to elaborate and disseminate food composition tables and bases. This contributes to protect the consumer, promote population's health and international trade.

The regional network has an organized structure with national branches, sub-regional centers and geographical representatives which is always under evaluation. It has also developed operating rules for adequate functioning. The members of LATINFOODS meet in a General Assembly which takes place during the Congress of the Latin American Nutrition Society, which is held every three years, to elect the next representatives, to discuss about changes or modifications in their organizational structure, to evaluate the activities carried out in the period and to develop and approve the new plan of action for the next three year period.

The purpose of this work is to provide information on the main activities and the challenges of LATINFOODS during the period of November 2009 to 2012.

ACTIVITIES

1. Organization

The structure and operating rules of LATINFOODS were modified for a better performance. The network is organized in major committees, sub-regional centers and branches or national branches described by de Pablo (4) and Samman (5). Two instead of three sub regional centers and geographical representatives exist: SAMFOODS for the South American countries and MESOCARIBEFoods for Mexico, Central America and Spanish-speaking Caribbean countries (as a result of the unification of MEXCARIBEFoods and CAPFOODS). The updated structure of LATINFOODS is shown in Figure 1. An ad hoc support office for resource mobilization and marketing was created in 2009. More details can be found in the website of LATINFOODS network (6).

Of the 19 originally created branches, seven were active (37%: ARGENFOODS, BOLIVIAFOODS, BRASILFOODS,

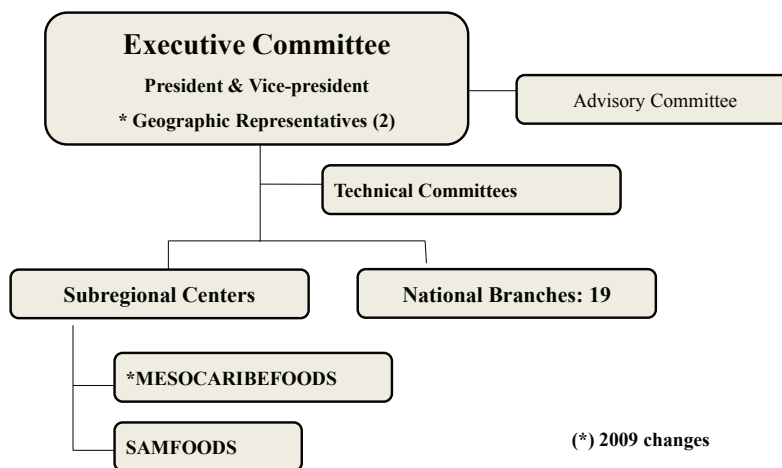


FIGURE 1. Updated structure of the regional network.

CAPCHICAL (Chile), COSTA RICAFOODS, GUATEMALAFOODS, PERUFOODS), nine (47%: CUBAFOODS, ECUADORFOODS, EL SALVADORFOODS, HONDURASFOODS, MEXICOFOODS, NICARAGUAFOODS, PANAMAFOODS, PARAGUAYFOODS, URUGUAYFOODS) were under strengthening and/or reorganization and in three (16%: DOMINICANFOODS, HONDURASFOODS and VENEZUELAFOODS) the contact was lost. The main reason for the loss of contact and reorganization of the branches were administrative/political changes in the country and work retirement of the representatives. Strengthening of the branches was under way thanks to the strategy developed by the LATINFOODS Geographical Representatives who during their visits to other countries, in addition to their own academic schedules, had meetings with the members of the corresponding LATINFOODS branches in order to stimulate reorganization of the local committees and participate in advocacy meetings at different levels. The functions of all components of the LATINFOODS structure are described on the operating rules available at the network website (6).

2. Technological development and research

Relational database software for LATINFOODS

As a follow-up activity of the FAO TCP/RLA/3107 project, involving Argentina, Chile and Paraguay (7), an interdisciplinary team was formed to develop a model, software and tools for a relational food composition database (FCDB). Developed tools were based on the compilation charts agreed by LATINFOODS. Foods were classified according to the groups established by the regional network and described by LanguaL™ thesaurus (8).

Food components were defined by INFOODS tagnames (9). The technology used (Oracle Express® and Java®) complies with open source software requirements. The DB allows a

structure of local, national and regional nodes, where the compiled information is stored. Short term perspectives were made to finish the software document and web-based application (J2EE technology), as well as the installation of the system on a web application server and database. Validation of the application and tools for improvements were scheduled to be assessed during the training of users.

Food Composition Sampling Manual for Latin America

Also, a follow-up activity of the FAO TCP/RLA/3107 project was the peer revision by LATINFOODS Executive Committee of the Food Composition Sampling Manual for Latin America, developed by Joanne Holden, Pamela Pehrsson and Charles Perry from the Nutrient Data Laboratory-United States Department of Agriculture and Heather Greenfield from The University of Sydney, Australia. The manual shows how to sample different food groups from vegetable and animal origin, and gives examples and exercises of the sampling plans for specific foods from Argentina, Chile and Paraguay. It also promotes the understanding of the country's unique characteristics and concerns related to food composition and include a chapter on sampling for biodiversity (10).

Web site modification and database location

The regional web site has been hosted at the Instituto de Nutrición y Tecnología de Alimentos (INTA) of the University of Chile since its creation in 1999. The home page was improved and includes links to national, sub-regional, specialized (carotenoids) and regional food composition tables (FCT) (Table 1). Eight FCT from six countries (Argentina, Brazil, Colombia, Costa Rica, México, Perú) were located in LATINFOODS website or updated during 2009-2012. See details in Table 2.

Current information for most of the branches is documented (national executive committee integration, list of priority foods for analysis and period work plan). Newsletters, reports and

TABLE 1. LATINFOODS tables of food composition

Country/ region/ specialized	Name and year of food composition table	Link/publisher
Argentina	Tabla de composición de alimentos, 2010	http://www.unlu.edu.ar/~argenfoods/Tablas/Tabla.htm
Bolivia	Tabla boliviana de composición de alimentos, 2005	http://www.fao.org/infoods/infoods/tablas-y-bases-de-datos/america-latina/es/
Brazil	Tabela Brasileira de Composição de alimentos, 2012	http://www.fcf.usp.br/tabela/
Carotenoides	Carotenoides y preparación de alimentos: la retención de carotenoides en alimentos procesados, preparados y almacenados, 1999	http://www.inta.cl/latinfoods/TEXTO%20FINAL%20COMPLETO%20CON%20TAPAS%20.pdf
Centro América	Tabla de composición de alimentos de Centroamérica, 2007	http://www.incap.int/mesocaribefoods/index.php/es/tac-1/software-tca
Chile	Tabla de composición de alimentos chilenos. Octava edición, 1992	http://mazinger.sisib.uchile.cl/repositorio/lb/ciencias_quimicas_y_farmaceuticas/schmith03/
Colombia	Tabla de Composición de Alimentos Colombianos. Fourth edition, 1978	http://alimentoscolombianos.icbf.gov.co/alimentos_colombianos/consulta_alimento.asp
Costa Rica	1. Tabla de composición de Alimentos de Costa Rica: Macronutrientes y fibra and dietética, 2006 2. Tabla de composición de Alimentos de Costa Rica: Alimentos fortificados, 2006 3. Tabla de composición de Alimentos de Costa Rica: Ácidos grasos, 2006	http://www.inciensa.sa.cr/actualidad/Tabla%20Composicion%20Alimentos.aspx
Latinoamérica	Tabla de composición de alimentos de América Latina, 2009	http://www.rlc.fao.org/es/conozca-fao/quehace-fao/estadisticas/composicion-alimentos http://www.inta.cl/latinfoods/Tablas%20nacionales.html
México	Tablas de uso práctico de los alimentos de mayor consumo, 2009 2ª ed. México: McGraw-Hill; 2009	(portada, http://dl.dropbox.com/u/3673758/tabla1.gif)
Perú	Tablas peruanas de composición de alimentos. Octava Edición, 2009	http://www.ins.gob.pe/porta/jerarquia/5/385/tabla-de-composicion-de-alimentos/jer.385
Uruguay	Tabla de Composición de Alimentos de Uruguay, 2002	http://www.inta.cl/latinfoods/Tablas%20nacionales.html
Venezuela	Tabla de Composición de Alimentos para Uso Práctico, 2001	Revisión 1999. Primera reimpresión Enero 2001.

TABLE 2. Details of food composition tables located in LATINFOODS website during 2009-2012: new, updated or published.

Country	Name	Number of foods included	Date of publication	Responsible
Argentina	Tabla de Composición Alimentos	431	2010	Universidad Nacional de Luján, Argentina
Brazil	Tabela Brasileira de Composição de Alimentos (TBCA-USP)	2089	1998 (updated 2010)	Faculty of Pharmaceutical Science. University of São Paulo, Brazil
Colombia	Tabla de Composición de Alimentos Colombianos. (preliminar update versión, virtual versión)	Not specified	1978	El Instituto Colombiano de Bienestar Familiar, Ministerio de Salud
Costa Rica	Tabla de Composición de Alimentos de Costa Rica: Macronutrientes y fibra and dietética	84	2006	Instituto Costarricense de Investigación y Enseñanza en Nutrición y Salud (INCIENSA), Costa Rica
	Tabla de Composición de Alimentos de Costa Rica: Alimentos fortificados	5	2006	INCIENSA y Ministerio de Salud de Costa Rica
	Tabla de Composición de Alimentos de Costa Rica: Ácidos grasos	242	2006	INCIENSA, Costa Rica, Universidad de Harvard, EUA
México	Composición de Alimentos Miriam Muñoz de Chávez: Valor Nutritivo de los alimentos de mayor consumo en México. Second edition.	860	2010	Instituto Nacional en Ciencias Médicas y Nutrición Salvador Zubirán
Perú	Tablas peruanas de composición de alimentos 8° edición	674	2009	Instituto Nacional de Salud, Perú

publications are also available. There is open access to the current organization of the network, contacts and work plans of the branches, activities held by the sub regional centers and links to other food composition networks in this web page.

The web hosts the regional database. Table 3 describes the data available for 6197 foods

distributed in 17 food groups. The complete content of 25 nutritional components per food is the goal of the database (4), but there are missing data in terms of components covered and constant necessity of updating. The number of food entries increased one fifth in relation to the reported two years ago by Samman et al (5) and food group distribution is almost the same.

TABLE 3. Latin American food composition database: Distribution of foods according to food category.

Food Categories	Total/ category	(%)
Cereals and derivates	956	15.4
Vegetables and derivates	999	16.1
Fruits and derivates	683	11.0
Fats and oils	141	2.3
Fish and seafood	544	8.8
Meat and derivates	775	12.5
Milk and derivates	405	6.5
Alcoholic and soft drinks	183	3.0
Eggs and derivates	73	1.2
Sugar products	216	3.5
Miscellaneous	75	1.2
Special dietary foods	38	0.6
Native foods	86	1.4
Infant foods	101	1.6
Manufactured foods	423	6.8
Prepared foods	186	3.0
Legumes and derivates	313	5.1
Total	6197	100.0

During this period the web page for MEXICOCARIBEFODDS was developed by the Central America and Panama Nutrition Institute (11).

Activities of LATINFOODS Regional Technical Compilation Committee

Creation of the Reference Electronic Register (RER): This software was created to systematize the search for bibliographic references. The RER allows a fast rescue of information on compiled and not used data, building the profile of the published food composition information.

Coordination of the electronic discussion

“INFOODS/ EuroFIR Carbohydrate Group on Component Identifiers”. The main objective was to improve the harmonization on component identifiers between the two networks.

Participation of the working group and “Technical meeting on attributing AOAC methods to INFOODS tagnames”: The objectives were the following: develop a comprehensive list of all possible AOAC methods per tagname; identify any difficulties in attributing an AOAC method to the corresponding tagname; identify missing tagnames for components analyzed through existing AOAC methods; identify potential problems in the naming or definition of existing tagnames when attempting to attribute an AOAC method (12).

Participation in international collaborative projects to compare and monitor the nutritional composition of processed foods and fast foods. The protocol for a project to support non communicable diseases (NCD) control and prevention was developed by The George Institute for Global Health in Australia and improved by the members of the Food Monitoring Group (13). The overall goal of the project is to collate nutrient composition data for processed foods in different countries of the world, including Latin American, with the objective of improving the nutritional composition of the world’s processed food supply. Eight (42%) of LATINFOODS branches are participating in the project. Information about product composition will be collected in a standardized format in a number of countries and compared. The primary outcome measures to be assessed will be energy content, saturated fat, total sugar, sodium, and serving size, in line with the World Health Organization’s global strategy on diet, physical activity, and health.

LATINFOODS members are expected to participate in the International collaborative project to compare and track the nutritional composition of fast foods (14). This project also collates the nutrient composition data from fast food web pages and food labels with the Food Collector application in different countries of the world.

The members of the network have already agreed that data taken directly from the labels of processed foods will not be introduced in the regional database (15) despite that this information can be very useful for other purposes, such as have an overall idea of the content of some nutrient in products of the market, evaluate the nutritional claims, as a baseline for food composition sampling plans and to establish targets and chronologies for nutritional improvement of processed foods, such as salt reduction.

Survey on sodium data in processed and prepared foods from Latin America

Updated and high-quality data on sodium content of foods is critical to estimate the baseline consumption, identify the main food sources and monitor intervention strategies related to sodium. A semi-structured questionnaire with 26 questions on sodium content in processed and prepared foods was emailed in February 2011 to LATINFOODS members and related laboratories from 19 countries. 22 forms of 14 countries were completed. Sixty eight per cent of the participants had some information on sodium content in all food categories, mainly in breads, cereals and snacks. Data was generated mostly in the last two decades, although some had recent data that has not been registered into de LATINFOODS database.

Convenience foods, snacks and cereals were identified as priority foods to have data on sodium content. There is strong interest in those surveyed to assess the sodium content of foods and working with Pan American Health Organization (PAHO/WHO) Initiative for Cardiovascular Disease Prevention through Population- Wide Dietary Salt Reduction (14). Up to date information on the sodium content of food is needed in the region, as well as resources and training to obtain this data.

Research project “Food, Nutrition and Health”

It was established in 2007 in the frame of the cooperation program between the Flemish Interuniversity Council (VLIR) from Belgium and Cuenca University from Ecuador. The main objective is to assess the nutritional status, feeding

and physical activity patterns of the population of two communities of Ecuador. To develop this integral assessment, the availability of an updated food composition database is highly needed. The project took over the task of analyzing 105 local foods (mainly fruits and vegetables), locally produced and prepared since December 2010. At the end of 2012, 30% of selected foods were analyzed for macronutrients, including dietary fiber and total and available carbohydrates.

3. Scientific activities, assistance and training

In order to strengthen the organization and activities of some branches, Geographical Representatives from the Central America and Spanish-speaking Caribbean countries and South America, as well as LATINFOODS President Coordinator, organized or participated on a wide variety of scientific activities such as workshops and meetings on food composition in Central American countries (El Salvador, Honduras, Nicaragua and Panamá) and seminars and courses in South American countries (Ecuador and Bolivia). Attendees expressed interest in participating in activities on food composition, to join and strength the branches. More details in the network period final report (15).

Capacities in the production and use of food composition data in nutrition were strengthened through the participation of representatives of the network on the 10th International Graduate Course on the Production and Use of Food Composition Data in Nutrition organized by the Wageningen University with the cooperation of the UNU, FAO of the United Nations and the European Food Information Resource Network of Excellence (EuroFIR).

The members of the network were trained at the LATINFOODS General Assembly held during the Congreso Latinoamericano de Nutrición, Cuba in November 2012 on: the FAO Food Composition Compilation Tool and Monitoring Salt and Sodium in Processed Foods with the Data Collector Application and the protocol developed by the George Institute for Global Health (13, 16).

Knowledge and experience on biodiversity in relation to food composition and support to

international initiatives on health in Latin America were shared by LATINFOODS representatives with the international community. The research entitled “Proximate and mineral profile of quinoa (*Chenopodium quinoa*) and kiwicha (*Amaranthus caudatus*) consumed in North of Argentina” was honored with the prize of best of the Latin Americans.

In this same field, a contribution about “Achievements in Biodiversity in Regard to Food Composition in Latin America” was done (18). Aspects about history, culture, foods and their social impact, Latin American food biodiversity related to food composition and health has been commented, with special details about some native foods such as potatoes, corn, quinoa, beans, tomato, pumpkin, hot and sweet chili, yuca, avocado, cherimola, papaw, pineapple, prickly pear, strawberry, peanut, cacao, vanilla, etc, which are now daily in the table of millions of homes around the world, contributing not only to put color in the table, but to enhance a healthy life, through the macro, micro nutrients and bioactive compounds they contain.

Two commitments related with NCD where food composition is essential were signed: the Aruba Declaration on Obesity, with special attention to childhood obesity, and the Initiative from PAHO on Preventing Cardiovascular Disease in the Americas by Reducing Dietary Salt Intake Population (17). Also, a proposal for specific actions to prevent obesity and collaboration at the regional level was prepared and is available at the newsletter number 4 from LATINFOODS website (6).

At least three numbers per year of the LATINFOODS newsletter were published and distributed among all the members with the purpose of informing, updating, motivating and keeping together the network team. The ten newsletters are available at network website.

CHALLENGES

Despite of the advancements made, LATINFOODS has still many tasks to carry out. The main challenges were: 1) to improve and update the regional database 2) to improve the national capacities for generating and compiling data to elaborate and update the national food

composition tables 3) to establish and implement the database software in chapters; 4) to reach technical and financial sustainability.

In conclusion during this period, LATINFOODS consolidated a dynamic structure with trained and experienced members, developed a regional database, elaborated specialized tools and documents, and developed new strategically alliances that promoted more activities and strengthen working links in the region. However, in order to continue generating food composition data and to assure a strong network for a long-term and achieve self-sustainability; funds, technical and governmental support from each Latin American country are required.

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REFERENCES

1. Rand W. INFOODS y los datos de composición de alimentos. Memorias de la Primera Reunión sobre Tablas de Composición de Alimentos LATINFOODS. Arch Latinoamer de Nutr. 1987; (37): 609-617.
2. Food and Agriculture Organization of the United Nations. Background to INFOODS. (Accessed 27 September 22, 2014) Available <http://www.fao.org/infoods/infoods/en/>
3. Bressani R. Prólogo. Memorias de la Primera Reunión sobre Tablas de Composición de Alimentos LATINFOODS. Arch Latinoamer Nutr. 1987; (37): 607-608.
4. De Pablo S. LATINFOODS: Food composition activities in Latin America 2001–2002. J Food Comp Anal. 2004; (17): 539–543.

5. Samman N, Oyarzun MT and de Pablo S. LATINFOODS, The Latin American network on food composition. *Food Chem.* 2009; (113): 795-798.
6. Red Latinoamericana de Composición de Alimentos. Chile: LATINFOODS Web site; (Accessed 27 August 2014) Available at <http://www.inta.cl/latinfoods/>
7. Samman N, Masson L, de Pablo S and Ovelar E. Composition Activities in Argentina, Chile and Paraguay. *J Food Comp Anal.* 2011; (24): 716-719.
8. LanguaL™ thesaurus. Denmark: LanguaL Web site. (Accessed August 27, 2014) Available at <http://www.langual.org/>
9. INFOODS/FAO. Tagnames for Food Components. (Accessed August 27, 2014) Available at: <http://www.fao.org/infoods/infoods/standards-guidelines/food-component-identifiers-tagnames/en/>
10. Holden J, Pehrsson P, Perry C and Greenfield H. FAO Sampling Workbook for Latin American Countries (in press).
11. Instituto de Nutrición de Centroamérica y Panamá –INCAP-. MEXICOCARIBEFOODS. (Accessed September 22, 2014). Available at: <http://www.incap.int/mesocaribefoods/index.php/es/>
12. FAO/INFOODS Technical Meeting. Report on Technical meeting on attributing AOAC methods to INFOODS tagnames. (Accessed September 16, 2014). Available at: <http://www.fao.org/infoods/infoods/standards-guidelines/food-component-identifiers-tagnames/en/>
13. Dunford E, Webster J, Blanco Metzler A, Czernichow S, Ni Mhurchu C, Wolmarans P, et al (for the Food Monitoring Group). International collaborative project to compare and monitor the nutritional composition of processed foods. *Eur J Prev Cardiol.* 2012; 19(6):1326-32.
14. The Food Monitoring Group. International collaborative project to compare and track the nutritional composition of fast foods. *BMC Public Health.* 2012; 12:559-565. (Accessed September 26, 2014). Available at <http://www.biomedcentral.com/1471-2458/12/559>
15. Food Agriculture Organization, Latin Foods Network on Food Data Systems (FAO/LATINFOODS). Informe final de la conferencia electrónica sobre compilación de datos y tablas de composición química de alimentos; 2002. (Accessed August 24, 2014) Available at http://www.inta.cl/latinfoods/inf_circ_publicaciones.html
16. Blanco-Metzler A. Informe de actividades de la Red LATINFOODS, período 2009- 2012. Congreso Latinoamericano de Nutrición (SLAN) 13 y 14 de noviembre del 2012- La Habana, Cuba. (Accessed August 16, 2014). Available in: http://www.inta.cl/Latinfoods/Informes%20y%20publicaciones/2012/circular10/Informe_final_Presidencia.pdf
17. Pan American Health Organization. WHO/PAHO Regional Expert Group for Cardiovascular Disease Prevention Thought Population –Wide Dietary Salt Reduction. Final Report; 2011. (Accessed 16 August 2014) Available at: http://www.paho.org/hq/index.php?option=com_content&view=article&id=2015&Itemid=4024&lang=en
18. Masson L. Achievements in Biodiversity in Regard to Food Composition in Latin America. Proceedings of the International Scientific Symposium Sustainable Diets and Biodiversity. Ed. Barbara Burlingame and Sandro Dernini Pp 214-221, FAO, Rome, 2010. (Accessed 12 September 2014). Available at <http://www.fao.org/ag/humannutrition/28506-0efe4aed57af34e2dbb8dc578d465df8b.pdf>

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