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Profile and challenges of the production and commercialization of processed organic foods in the state of Rio de Janeiro

Perfil e desafios da produção e da comercialização de alimentos orgânicos processados no estado do Rio de Janeiro

Tayrine Martins de Souza do Valle[I,*]

Bruna Carraco de Azeredo Peres[II]

Marianna Miranda Rodrigues Vidal[II]

Maria Fernanda de Albuquerque Costa Fonseca[III,IV]

Aline Gomes de Mello de Oliveira[II]

ThadiaTuron da Costa Silva[I,IV]

Ellen Mayra Menezes Ayres[V]

[I] Programa de Pós-Graduação em Segurança Alimentar e Nutricional, Universidade Federal do Estado do Rio de Janeiro, Rio de Janeiro, RJ, Brasil

[II] Instituto de Nutrição Josué de Castro, Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brasil

[III] Empresa de Pesquisa Agropecuária do Estado do Rio de Janeiro (PESAGRO-RIO), Rio de Janeiro, RJ, Brasil

[IV] Programa de Pós-Graduação em Agricultura Orgânica, Universidade Federal Rural do Rio de Janeiro, Nova Friburgo, RJ, Brasil

[V] Departamento de Nutrição Fundamental da Escola de Nutrição, Universidade Federal do Estado do Rio de Janeiro, Rio de Janeiro, RJ, Brasil

* **E-mail:** tayriinem@gmail.com

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ABSTRACT

Introduction: Smallholder organic food processing contributes to an economically, socially and environmentally sustainable food system. It is important to know the profile and potential difficulties of organic food processors, organized under the modality of the Participatory Guarantee System of organic quality, due to their growth and social relevance for targeting actions and public policies with the consequent strengthening of agroecologically-based agriculture. **Objective:** To describe the profile of organic food processors in the state of Rio de Janeiro and identify the main challenges in the production and commercialization schemes. **Method:** This is an exploratory and descriptive study with transversal design developed by documental research of different documents: handling plans, good practices manual, minutes of the Participatory Guarantee System of organic quality, certificates issued by the Association of Biological Farmers of the State of Rio de Janeiro, and other updated documents from the Participatory Organic Compliance Assessment Bodies related to the registered producers. **Results:** Sixty per cent of organic processors in the state of Rio de Janeiro were linked to the Participatory Guarantee System of organic quality . The processing unit mostly used is one adjoining their homes. Most of them are farmers or family micro-entrepreneurs that have assistance of family members in the production process and the main activity carried out is the production of canned foods, jams, sauces, and homemade desserts. Less than 70% of the producers had an operation permit and sanitary license, 97% had an organic handling plan; 79% had a good practices manual and 78% had a traceability plan. Among the main difficulties, there were: raw material acquisition, sanitary rules adequacy and distribution logistics. **Conclusions:** The study demonstrated the potentiality of organic products processing for the local social and economic development, and the need of greater inducements to make a productive inclusion of small enterprises feasible.

KEYWORDS: Organic Food; Participatory Guarantee System organic quality; Food Processing Quality; Sanitary Legislation; Productive Inclusion

RESUMO

Introdução: O processamento de alimentos orgânicos por pequenos produtores contribui para um sistema alimentar economicamente, socialmente e ambientalmente sustentável. É importante conhecer o perfil e as potenciais dificuldades dos processadores de alimentos orgânicos, organizados sob a modalidade do Sistema Participativo de Garantia da qualidade orgânica, devido ao seu crescimento e relevância social, para direcionamento de ações e políticas públicas com consequente fortalecimento da agricultura de bases agroecológica. **Objetivo:** Descrever o perfil dos processadores de alimentos orgânicos do estado do Rio de Janeiro e identificar os principais desafios nas redes de produção e comercialização. **Método:** Estudo exploratório e descritivo com delineamento transversal realizado por pesquisa documental aos planos de manejos, manual de boas práticas, atas do Sistema

Participativo de Garantia, certificados emitidos pela Associação de Agricultores Biológicos do Estado do Rio de Janeiro, assim como outros documentos de atualização de Organismos Participativos de Avaliação da Conformidade Orgânica em relação aos produtores credenciados. **Resultados:** Observou-se que 60% dos processadores orgânicos no estado do Rio de Janeiro são vinculados ao Sistema Participativo de Garantia da qualidade orgânica. A unidade de processamento mais utilizada é a anexa ao domicílio. A maioria são agricultores ou microempreendedores familiares que recebem ajuda da família no processo produtivo e a atividade mais desenvolvida é a fabricação de conservas, geleias, molhos e doces. Menos de 70% possuíam alvará de funcionamento e licença sanitária, 97% tinham plano de manejo orgânico; 79% possuíam manual de boas práticas e 78%, plano de rastreabilidade. Das principais dificuldades, destacam-se: aquisição de matéria-prima, adequação às normas sanitárias e logística de distribuição. **Conclusões:** O estudo desvelou a potencialidade do processamento de produtos orgânicos para o desenvolvimento socioeconômico regional e a necessidade de mais incentivos para viabilizar a inclusão produtiva de pequenos empreendimentos.

PALAVRAS-CHAVE: Alimentos Orgânicos; Sistema Participativo de Garantia; Processamento de Alimentos; Legislação Sanitária; Inclusão Produtiva

INTRODUCTION

An adequate and healthy diet must come from socially- and environmentally-sustainable food production systems. It is therefore important to consider the impact of food production and distribution systems on the environment. Food should preferably be sourced from producers and traders who sell their food fresh or minimally processed and, even more, from those who sell organic and agroecological food[1].

Overall, organic and agroecological food is produced, processed and distributed around small and medium-sized urban centers, often connected to regional circuits, with close relationships between production and consumption. Short marketing circuits (SMCs) are typically characterized by the interaction between producers and consumers. This enables consumers to find information about the place where the food was produced, who produced it and the production system that was used, unlike what happens with the standardized model of industrial food supply[2]. SMCs—farmers' markets, delivery baskets, small producers' stores, farm sales (agritourism, sales to supermarkets), school meals, government procurement, among other forms of direct sales—involve a great diversity of people and food products that express cultural identities, maintain a close relationship with the local natural heritage and biodiversity, and ensure food and nutrition security (FNS)[3]. Proximity, production and consumption scales enable food to reach consumers while still fresh and with a minimum content of chemical additives, therefore in line with the Food Guide for the Brazilian Population[3].

Domestic and international demand for organic products is likely to increase over the next years as these products become progressively associated with lower environmental impact, lower health risks, ethical production, fair trade, recognition of smallholders and rural workers etc.[4,5]. From 2000 to 2017, the world's arable land dedicated to organic crops increased by 365%, almost 10% per year. In absolute terms, organic agriculture jumped from 15 million hectares of land to 69.8 million hectares in this period[5]. To monitor this type of activity, Brazil's Ministry of Agriculture, Livestock and Supply (MAPA) provides the National Register of Organic Production (CNPO) on the federal government's website. It is the main source of information on organic farming in Brazil. According to MAPA, in 2012, there were almost 5,900 registered organic farmers in Brazil and, in December 2019, about 21,000[6,7]. There was also an increase in the number of organic production units, from 5,400 units registered in 2010 to more than 22,000 in 2018, an increase of more than 300%[6].

Organic production systems adopt specific techniques to optimize the use of the available natural, social and economic resources and respect the cultural integrity of rural communities, with the following objectives: achieving economic and ecological sustainability, maximizing social benefits, protecting the environment, minimizing the dependence on non-renewable energy, employing, whenever possible, cultural, biological and mechanical methods, as opposed to the use of synthetic materials, and eliminating the use of genetically modified organisms and radiation ionizing agents, at any stage of the production, processing, storage, distribution and marketing process. Organic agriculture products or organic products, be they fresh or processed, are obtained from organic farming systems or sustainable collection activities and are not harmful to local ecosystems[8]. For marketing purposes, food can only be called organic if it complies with the requirements of an assessment conducted by MAPA-registered bodies. Certification is waived for Social Control Organizations (OCSs), which are used by family farmers for direct sales. However, these farmers cannot use the label of the Brazilian Organic Compliance Assessment System (SisOrg)[9,10,11].

Organic producers who can use the SisOrg label are linked to the Participatory Guarantee System (SPG) organic quality and Participatory Organic Compliance Assessment Bodies (OPAC) or are clients of certifying organizations, i.e. compliance assessment bodies registered by MAPA to operate the SisOrg.

The Brazilian regulation of organic production recognizes three certification mechanisms: by auditing, by the organic quality SPG and by OCSs. The organic quality SPG is not only an assurance system, it is also an instrument that enables a more ecofriendly, democratic and inclusive agriculture that is accessible

to all producers and consumers[9,10]. The organic quality SPG has enabled small farmers in Brazil to enter the growing market of organic products[12].

The organic quality SPG is responsible for assessing approximately 30% of Brazilian organic producers. It has members on the supply side (farmers/producers, processors, traders, carriers, distributors and storage), collaborating members (consumers, technicians and public or private organizations that operate in the organic production network), and an OPAC registeredby MAPA[13,7]. Compliance checks in production units are carried out by a committee formed by the members and decided in a participatory and collective fashion through the fulfillment and attestation of Organic Compliance. Therefore, all members of the organic quality SPG are responsible for ensuring organic quality, whereas the certificate is issued by the OPAC, which is legally responsible for the process before official bodies and society[9,10,13].

In the state of Rio de Janeiro, since 2009, the Association of Biological Farmers of the State of Rio de Janeiro (ABIO RJ) is registered by MAPA as an OPAC. In May 2020, ABIO RJ had certified 665 producers, approximately: 91% in primary plant production, 1.8% in primary livestock production, 3.5% in plant processing, 1.3% in edible mushrooms, 1.8% livestock processing, and 0.5% in production of seeds and seedlings[14].

In this context, learning more about the profile of organic producers and the hurdles they face from production to marketing is of the utmost importance. Once the challenges and opportunities are mapped out, targeted actions and public policies can be implemented to strengthen agroecological agriculture. In view of the above, the objective of this study was to describe the profile of producers and the production of processed organic food in the Brazilian state of Rio de Janeiro and identify the main challenges in the production chain.

METHOD

This is an exploratory and descriptive study with a cross-sectional design approved by the Research Ethics Committee, in compliance with the Resolution of the National Health Council no. 466, December 12, 2012, under no. CAAE: 72021717.7.0000.5257 (BRAZIL, 2012), included in the project entitled "*Desenvolvimento de instrumento de avaliação da qualidade de alimentos orgânicos processados: elaboração e validação de aparência,-conteúdo e confiabilidade interavaliadores*"[15].

To characterize the production of processed organic food, documentary research was carried out in the database of ABIO RJ, an OPAC registered by MAPA. The following documents were analyzed: management plans, good practices manual (GPM), minutes of meetings of the organic quality SPG groups, certificates issued by ABIO RJ, as well as other documents updating the OPAC in relation to registered producers. Information was collected from the register of each organic food processing unit between April and May 2019. ABIO RJ is the only OPAC operating in the state of Rio de Janeiro. In December 2019, it was responsible for more than 80% of organic producers in the state of Rio de Janeiro registered with CNPO/MAPA.

Information related to certified producers in the scope of plant processing (POV), livestock processing (POA) and edible mushrooms was retrieved from documents and databases.

The information collected comprised: municipality where the production unit is located, control mechanisms, production scopes, processed food/products, type of processing unit, origin of the raw material used for processing, marketing channels and markets reached, workforce, distribution logistics, existence of parallel production, product traceability plans, Statement of Aptitude for the National Program for Strengthening Family Farming (Pronaf), business license, health permit, organic management plan (PMO), MBP and seal of the federal, state or municipal agricultural inspection service for animal products.

To complement and/or assert the information, we used CNPO data from December 2019, available on the MAPA website[7].

The collected data were categorized using Microsoft Excel® and, for this, absolute and relative frequency measures were used for descriptive statistics.

To identify and assess the main challenges faced by organic food processors, we used the content analysis method proposed by Bardin[16] and performed three systematic procedures: pre-analysis, material exploration and inferences, and interpretation[16]. The purpose of content analysis is to provide readers with as much information (quantitative aspect) with maximum relevance (qualitative aspect) as possible.

For the pre-analysis phase, we did the so-called "skimming", which enabled us to become familiar with the documents, make notes and collect some first impressions. After skimming, the documents were reread more carefully in search of sentences, excerpts or ideas that alluded to the specific objectives of this research.

In the exploration stage, information was semantically categorized. For this, we identified recurrent and representative expressions and keywords in the documents, which were then organized according to the central idea conveyed by the messages.

The last stage included the treatment of results and interpretation. The categorized data were submitted to a descriptive-statistical analysis using Microsoft Excel® to facilitate the visualization and interpretation of results.

RESULTS AND DISCUSSION

Characterizing the production of processed organic food

According to CNPO, in December 2019, in the state of Rio de Janeiro, there were 102 organic food processors, 42% of which were linked to certifiers and 60% to the organic quality SPG.

The profile of organic food processors belonging to the organic quality SPG of ABIO RJ can be seen in Table 1.

Table 1. Profile of processed organic food production under the Participatory Guarantee System of organic quality of the Association of Biological Farmers of the State of Rio de Janeiro (ABIO RJ).

Variable	AF	RF
Processing unit type (n = 29)		
Processing unit adjoining the home	12	41%
Family agroindustry	6	21%
Agroindustry	4	14%
Home kitchen	3	10%
Manufacturing industry	2	7%
Kitchen in commercial property	2	7%
Family farmer/family micro-entrepreneur (n = 32)		
No	15	47%
Yes	17	53%
Holding an Aptitude Statement for the National Program for Strengthening Family Farming (n = 30)		
No	23	77%
Yes	7	23%
Family labor involved in production (n = 36)		
No	13	31%
Yes	23	63%
Workforce from outside the family (n = 36)		
No	15	42%
Yes, hire occasional employees	7	19%
Yes, hire permanent employees	12	33%
Yes, receive volunteers	2	6%
Employees with formal employment contract (n = 24)		
No	9	38%
Yes	15	63%
There is a good practices manual (n = 34)		
No	7	21%
Yes	27	79%
There is an organic management plan (n = 38)		
No	1	3%
Yes	37	97%
There is a health permit (n = 38)		
No	16	42%
Yes	22	58%
There is a business license (n = 38)		
No	12	32%
Yes	26	68%
Product scope (n = 38)		
POA processing	12	31%
POV processing	23	61%
Edible mushroom processing	3	8%
Registration in the inspection service for POA (n = 12)		
Does not have it	4	33%
Registered with the State Inspection Service (SIE)	4	33%
Registered with the Municipal Inspection Service (SIM)	2	18%

Continued

Continuation

Variable	AF	RF
Registered with the Federal Inspection Service (SIF)	1	8%
Registered with SIM and SIE	1	8%
There is a traceability plan (n = 37)		
No	8	22%
Yes	29	78%
Origin of raw material (n = 30)		
Third party production	8	27%
Own production	12	40%
Mixed (own and third parties)	10	33%
Parallel production (n = 36)		
No	23	64%
Yes	13	36%
Distribution logistics (n = 29)		
Public transportation	1	3%
Own vehicle	23	79%
Third party vehicle	5	17%
Valid certificate (n = 39)		
No	5	13%
Yes	34	87%

Source: ABIO RJ database.
AF: absolute frequency; RF: relative frequency; n: total number of records evaluated; POA: product of animal origin; POV: product of plant origin.

The most frequent units for processing organic food are those adjoining the producer's home, that is, although they may be modest facilities, they are separate from the domestic kitchen used by household members. In addition, most producers are farmers or family micro-entrepreneurs who engage more than one family member in the production process. Both are typical of small-scale production with minimal use of machinery and labor. Therefore, it is important that Joint Board Resolution (RDC) of Brazil's National Health Surveillance Agency (Anvisa) no. 49, of October 31, 2013, be regulated in the state of Rio de Janeiro or in the municipalities[17]. Regarding the documents required for operating a production unit, we found that 68% had a business license and 58% had a health permit. Among the processors of livestock products (n = 12; 31%), eight (67%) federal, state and/or municipal inspection records were available in the consulted documentation (Table 1).

Anvisa's Productive Inclusion with Health Safety Project (PIPSS) aims to enable greater integration between actions of the National Health Surveillance System (SNVS) and projects carried out by low-income populations in order to create opportunities for local development while ensuring health safety[18]. In 2017, this project was replaced by the Program for Productive Inclusion and Health Safety (PRAISSAN), through Ordinance no. 523, of March 29, 2017[19].

In this context, one of the main developments of PIPSS was RDC/Anvisa no. 49/2013, which provides for the regularization of activities of interest to health among individual micro-entrepreneurs (MEI), rural family enterprises (EFR) and solidarity economy enterprises (EECS), including food production. Its guidelines include having reasonable requirements, protecting craft production to preserve customs, habits and traditional expertise, promoting public policies and training programs as a way of eliminating, reducing or preventing health risks and increasing health security, in addition to encouraging and facilitating the process of requesting and receiving health permits, which is still an important bottleneck for the regularization of craft and/or small-scale food processing units[17].

However, despite some progress in health legislation aimed at simplifying and reducing bureaucracy to encourage the regularization of productive activities of small enterprises, regulatory and inspection bodies often fail to comply with or are unaware of the content of RDC/Anvisa no. 49/2013. Health legislation does not take into account local/regional contexts in its risk analysis and does not differentiate production scales; it is still focused on large-scale, standardized agro-industrial production models with intensive use of chemical inputs, which is a barrier to the regularization of small enterprises[20,21].

Without formalization, these enterprises cannot obtain and/or renew their organic certification, nor can they participate in public bids, auctions and tenders, especially under the Food Procurement Program (PAA) for family farming and the National School Meal Program (PNAE), which seek to include food produced by family farming and local or regional networks in government

purchases, in addition to meeting challenges in accessing credit from financial institutions and state programs[18,22].

Regarding some mandatory documents, almost all producers had a PMO (97%). Those who did not have it had an invalid organic producer certificate and approximately 80% had an MBP and a traceability plan, and 87% had a valid organic producer certificate (Table 1).

The PMO is a management instrument that enables the control and improvement of activities involving different types of production and sustainable collection. It must include procedures for post-production, packaging, storage, processing, transportation and marketing, environmental, economic and social relationships, among others. PMOs contain a traceability plan that is essential to ensure organic quality. In addition to this document, there must be an MBP with a description of all the methods adopted to meet the hygienic-sanitary requirements established in the current health legislation[23,24].

Decree no. 6.323, of December 27, 2007, allows the collection, cultivation, breeding or processing of organic and non-organic products in the same production unit (the so-called parallel production). But it must take place in isolated areas or at different times, and the entire production process must be described in the PMO[9]. In this study, only 13% of processors performed parallel production (Table 1).

It is noteworthy that the MBP, the traceability plan and the PMO are instruments that help identify and fix noncompliant items and implement good manufacturing practices, in addition to ensure the organic quality and traceability of the products. Preparing these documents is no simple task and, in some cases, technical assistance is required, especially when the producers have a low level of education or are illiterate. According to the 2017 Agricultural Census, in the state of RJ, about 10% of producers said they had never attended school, 29% attained only primary education and 25% only had elementary education[25].

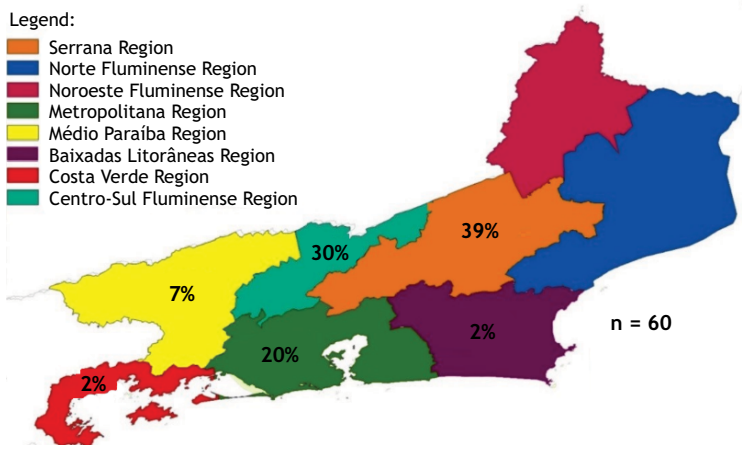
ABIO RJ has a paid technical team to support the organization, implementation and operation of the groups, to accompany verification visits to production units and provide technical assistance to fix noncompliant items and improve production systems[13]. However, with more producers having access to the system, there is also a greater need for specialized technical assistance, which is not always available from Technical Assistance and Rural Extension bodies (ATER). Moreover, the technical assistance of the organic quality SPG does not exclude the need and importance of other forms of providing this service and does not exempt the State from its roles and responsibilities[26].

It is important to note that in order to have access to government programs, producers need a Pronaf Aptitude Statement. This instrument enables the identification of family farmers and/or their associative forms organized into legal entities that sort, process or sell agricultural produce. The Aptitude Statement may be one of the bottlenecks for accessing public policies because some producers do not meet all the criteria established by the program[27]. Public ATERs can also help enterprises become regularized, adapt technologies and find alternatives suitable to the reality of each producer to remedy potentially noncompliant items[28].

Most organic food processors are located in the mountains of the state of Rio de Janeiro (*Serrana region*), as can be seen in Figure 1.

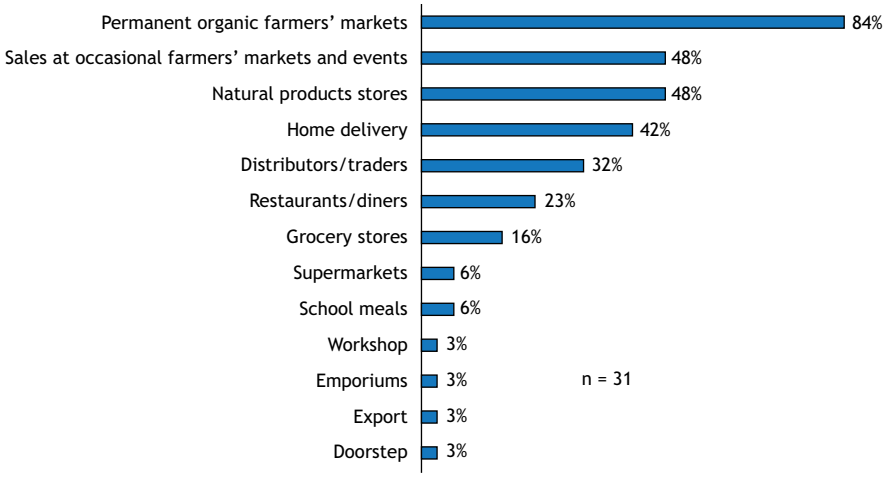
Their ways of marketing organic products are shown in Figure 2; permanent organic farmers' markets are the main marketing channel used by processors.

According to CNPO data, POV (75%) stands out in relation to POA. The most common activities are: production of food preserves, and/or jellies/marmalades, and/or sauces and/or sweets made of fruit, vegetables or greens, production of grains and flour, bakery and confectionery (Figure 3).



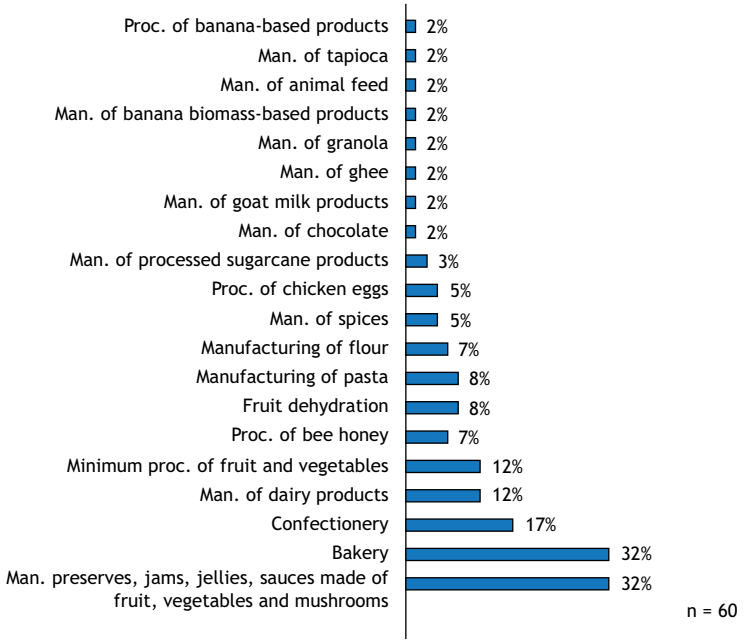
Source: ABIO RJ database, adapted from Clemente et al.[29].

Figure 1. Location of food processing units linked to the Participatory Organic Compliance Assessment Bodies (OPAC) of the Association of Biological Farmers of the State of Rio de Janeiro (ABIO RJ) according to the National Register of Organic Production (CNPO).



Source: ABIO RJ database.

Figure 2. Marketing outlets for organic products produced by food processors belonging to the Participatory Organic Compliance Assessment Bodies (OPAC) of the Association of Biological Farmers of the State of Rio de Janeiro (ABIO RJ).



Source: ABIO RJ database.
Proc.: processing; Man.: manufacturing.

Figure 3. Activities performed by processors belonging to Participatory Organic Compliance Assessment Bodies (OPAC) of the Association of Biological Farmers of the State of Rio de Janeiro (ABIO RJ) in the state of Rio de Janeiro.

ABIO RJ coordinates 13 organic farmers' markets, 12 of which belong to the Carioca Circuit of Organic Markets (CCFO), in the city of Rio de Janeiro, distributed as follows: 54% on the south side, 23% on the west side and 15% on the north side, in addition to a farmers' market in the city of Niterói[30]. In these markets, most of the food is sold fresh, but there are also products that have been processed manually or in small agro-industries, like cakes, cookies, gluten-free products, sweets and jams. Estimates consider that an average of 30% to 40% of the stalls market processed products in each farmers' market[31].

Challenges in the production chain of processed organic food

In view of the results achieved through content analysis[16], the main challenges for the production and marketing of organic products were identified and categorized into: processing difficulties, with five categories, and marketing difficulties, with eight categories, as can be seen in Table 2.

Regarding processing difficulty, the most evident challenge was related to the acquisition of raw material, since organic

Table 2. Challenges for the production and marketing of organic products: processing and marketing difficulties.

Variable	RF	AF
Processing difficulties (n = 27)		
Sourcing of raw material	11	41%
Compliance with health legislation	7	26%
Labor	5	19%
Labeling	2	7%
Process management	2	7%
Marketing difficulties (n = 25)		
Distribution and logistics	11	44%
Final product price	3	12%
Access to clients, PNAE and PAA	3	12%
Compliance with health legislation	2	8%
Lack of time to sell products	2	8%
Costly production process	2	8%
Few organic farmers' markets	1	4%
Lack of manpower	1	4%

Source: ABIO RJ database.
AF: absolute frequency; RF: relative frequency; n: total number of records evaluated; PNAE: National School Meal Program; PAA: Food Acquisition Program.

production systems respect the natural food production capacity according to the seasons and climate of each area. Moreover, there is a limited supply of organic raw materials at certain times of the year, which hinders the manufacture of more elaborate products[32]. In addition, organic ingredients are more expensive than their conventional counterparts, which can make processed organic food less competitive. Some of the difficulties pointed out by the processors in the documents we analyzed are described below: "[...] availability, access to fresh raw material"; "[...] availability of fresh raw material and impossibility to buy large volumes because the cost would be too high for small producers like me"; "[...] sometimes, lack of suppliers" and "[...] having to go to the city of Rio de Janeiro to buy supplies".

According to the Joint Normative Instruction of MAPA and Ministry of Health no. 18, of May 28, 2009, which deals with the processing of organic food, in order to have information on the label and use of the SisOrg seal, organic food can only have a maximum of 5% non-organic raw materials in its composition[33]. In this study, processors produced their raw material and/or purchased it from third parties (Table 1). Processing is a way to increase shelf life and income, add value and avoid waste for those who work with primary plant and/or livestock production[34].

The second greatest processing difficulty was related to compliance with health standards, as can be seen in the processors' comments: "Getting a permit, because the city administration does not recognize farmers who process their own production according to RDC no. 49/2013"; "Agribusiness can adapt to these health-related requirements. Not because the requirements are exaggerated, but because of the necessary investment and financial barriers to buying larger and more efficient equipment (ovens, vacuum packers), that's also a limiting factor".

The health regulation of food products in Brazil is a complex process divided into agricultural policies and health policies. At the federal level, the health inspection of livestock products during production phases is a responsibility of MAPA through the Federal Inspection Service (SIF). At the state and municipality level, it is up to the state and municipal departments of agriculture through State Inspection Services (SIE) and Municipal Inspection Services (SIM), respectively. In terms of health policies, Anvisa and state and municipal health surveillance bodies are responsible for inspecting products of plant origin (except for the inspection of beverages in general and the classification of plant products, which are the responsibility of MAPA)[3,35]. Therefore, reporting to these bodies is necessary to regularize an enterprise.

Since 2006, a new inspection system for products of animal origin has been implemented in Brazil: the Unified Agricultural Health System (Suasa), whose objective is to reorganize the inspection system in a decentralized and integrated manner[36]. MAPA is the central instance and coordinates the entire system. State and municipal inspection services must apply for membership, which is voluntary. Membership can be individual or municipalities can form consortia. Agribusiness products inspected by an inspection service that is part of the Suasa can be marketed throughout the Brazilian territory[36].

However, according to the National Council for Food and Nutrition Security (Consea)[3], Suasa is an intricate system, with a plethora of regulations and roles. States and municipalities struggle to set up their SIM and meet the requirements set by

MAPA, but without a SIM, a municipality and/or consortium cannot join Suasa. Some difficulties in joining the system stand out, like lack of funds to adapt the SIM to Suasa's rules, lack of technical support from MAPA, lack of human resources, municipal legislation does not meet the requirements of the system, among others. The non-adherence of municipalities to Suasa represents a bottleneck for the inclusion of products from family agriculture and small producers (rural, peri-urban and urban) in the market, since the MAPA bodies that are responsible for animal inspection services cannot be present in every municipality[3].

The distribution and logistics of processed food were reported as the main difficulties in marketing these products. We can also observe that adapting to health standards eventually becomes mandatory for producers who want to expand the sales of their products. That's because without the regularization of the enterprise it is impossible to sell to supermarket chains, institutional programs or have access to more customers, that is, selling the production becomes even more difficult. Some of the difficulties are related to distribution and logistics: "Logistics. Precarious roads. Long distances"; "Long way to the farmers' markets in Rio"; "Having to travel to Rio".

Most of them distribute their products in their own vehicles, followed by outsourced carriers and public transportation (Table 1).

A study by Valença[31] with CCFO producers indicated that, with the help of credit from Pronaf, some producers were able to buy vehicles and others formed groups to share their own cars or rent transportation from the production site to farmers' markets[31].

The challenges include setting up structures to support distribution and marketing in farmers' markets, with institutional and financial support, and the creation of new farmers' markets in different municipalities and neighborhoods. The latter is particularly relevant because SMCs are key to the concept of FNS as they promote local/regional income generation, employment, work, social inclusion and economic development[37,38].

The high cost of the production process and consequently the high price of final products compared to conventional ones are major challenges to the marketing of organic products. In this direct comparison, organic products are hardly competitive[39]. In turn, consumers are increasingly demanding and concerned not only with the quality of the products they consume, but also with their origin. For these consumers, knowing the conditions in which the food was produced is important, that is, if it was produced sustainably, without harming the environment. This change in behavior opens up possibilities for new market fronts, with the consequent recognition of the value of organic and wholesome products[40].

CONCLUSIONS

After characterizing the production of processed organic foods in the state of Rio de Janeiro, we observed that much of it is carried out by farmers or family micro-entrepreneurs who receive help from family members in the production process and make their products in kitchens adjoining their own homes. Organic farmers' markets are the main outlet for marketing these products, especially food preserves and/or jellies, sauces and/or fruit-based sweets, followed by the production of grains and flours and bakery and confectionery products. State and municipal administrators need clarification of RDC no. 49/2013, and the resolution itself should be regulated to enable productive inclusion.

One of the main reported challenges was complying with health standards because, despite the existence of PRAISSAN, small entrepreneurs still struggle to achieve health-sanitary formalization, which hinders the marketing of their products. Furthermore, we observed that most producers do not have the Aptitude Statement for Pronaf, which also hampers their access to institutional buyers, like the PAA and the PNAE. We emphasize the importance of ATER services in helping regularize these enterprises by adapting technologies and alternatives to the reality of each producer.

In the state of Rio de Janeiro, processing organic products is an opportunity to increase shelf life, add value to products, reduce waste and promote local social and economic development, and job and income generation, provided that more incentives are offered to enable the inclusion of small enterprises. There is also a need to encourage professionalization/qualification, training and education of multipliers based on technical assistance and teaching institutions, in addition to access to credit and technologies to facilitate access to direct and indirect sales channels.

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Authors' Contribution

Valle TMS, Fonseca MFAC, Oliveira AGM, Silva TTC, Ayres EMM – Conception, planning (study design), acquisition, analysis, interpretation of data and writing of manuscript. Peres BCA, Vidal MMR – Acquisition, analysis, interpretation of data and writing of manuscript. All authors approved the final draft of the manuscript.

Disclosures

The authors report that there is no potential conflict of interest with peers and institutions, nor political or financial conflicts in this study.

Conflict of Interest

Authors have no potential conflict of interest to declare, related to this study's political or financial peers and institutions.