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MEDICINA VETERINÁRIA

ILLEGAL ANIMAL-ORIGIN PRODUCTS SEIZED IN BAGGAGE FROM INTERNATIONAL FLIGHTS AT SAO PAULO GUARULHOS AIRPORT (GRU / SBGR), BRAZIL

APREENSÃO DE PRODUTOS DE ORIGEM ANIMAL ILEGAIS EM BAGAGEM DE VOOS INTERNACIONAIS NO AEROPORTO DE SÃO PAULO - GUARULHOS (GRU / SBGR)

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Abstract

Air transportation is one of the most important means to introduce illegally imported animal-origin products into a country. Studies have demonstrated that these items pose a risk of disseminating diseases. São Paulo Guarulhos International Airport (GRU / SBGR) is the main international airport in Brazil in terms of people movement and it has the largest number of seizures of animal-origin products. The aim of the present work was to describe the dynamics of the seizure of illegally imported animal-origin products in baggage from international flight passengers at GRU / SBGR Airport in Brazil. Five hundred and eighty-nine different flights from 43 airlines, arriving from 117 countries were analyzed between 2006 and 2009. The total number of seized items increased from 2006 to 2009 and a single flight from France had the highest number of seizures, followed by flights from South Africa and Germany. Countries were grouped into regions or continents to facilitate the analysis. This grouping was based on historical and cultural ties rather than geographical aspects. Seafood was the most frequently seized product, followed by dairy products, as well as processed and raw meat.

Keywords: airport customs; animal health; illegally imported food; public health.

Resumo

O transporte aéreo é um dos meios mais importantes de introdução ilegal de produtos de origem animal importados em um país e estudos têm demonstrado que esses itens representam um risco para a disseminação de doenças. O Aeroporto Internacional de São Paulo - Guarulhos (GRU / SBGR) é o principal aeroporto internacional no Brasil em termos de movimento de pessoas e tem o maior número de produtos de origem animal apreendidos. O objetivo do presente trabalho é realizar análise descritiva da dinâmica de apreensão de produtos de origem animal importados ilegalmente em bagagens de passageiros de voos internacionais no Aeroporto GRU / SBGR. Foram analisados 589 diferentes voos de 43 companhias aéreas, que chegaram de 117 países entre 2006 e 2009. O montante total de itens apreendidos aumentou entre 2006 a 2009 e um voo da França teve o maior número de

apreensões, seguido de voos da África do Sul e Alemanha. Países foram agrupados em regiões ou continentes para facilitar a análise. Este agrupamento foi baseado em laços históricos e culturais em vez de relações geográficas. Frutos do mar foi o tipo de produto mais apreendido, seguido por produtos lácteos e carnes processadas e cruas.

Palavras-chave: alfândega; alimentos importados ilegalmente; saúde animal; saúde pública.

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Introduction

Air transportation has shown an increase in the number of people and products transported worldwide⁽¹⁾, mainly for tourism⁽²⁾. Considering recent events, such as the Olympic Games in 2016 in Brazil, this transit increased and could have been responsible for diseases and infectious agents dissemination^(3,4).

Illegally imported animal-origin products can carry pathogens⁽⁵⁾, changing the regular epidemiological patterns of a disease in a region⁽⁶⁾. This has occurred in several countries⁽⁷⁾ and is taking place continuously, damaging a country's economy through the outbreak of infectious diseases^(7,8). In Brazil, African swine fever was introduced in 1978 via airline food waste, and it took six years for the disease to be eradicated, causing losses of millions of dollars⁽⁹⁾. Studies have demonstrated that the presence of infectious agents is dangerous for public and animal health in illegally imported animal-origin products and food seized from passengers at airports in Brazil and worldwide⁽⁹⁻¹¹⁾.

São Paulo Guarulhos International Airport (GRU / SBGR) is the largest airport in Brazil and the second in the Southern Hemisphere, behind Sydney International Airport in Australia⁽¹²⁾. It is a reference in Latin America, handling over 11 million passengers. Considering that illegally imported animal-origin products represent a recurring problem in the international scenario and that Brazil is one of the largest exporters of beef and their byproducts⁽¹³⁾, it is necessary to know what arrives in Brazil through international flights. Therefore, the aim of the present study was to analyze the dynamics of seizures of illegally imported animal-origin products in baggage from international passengers at GRU / SBGR Airport.

Material and Methods

The database of seizures from 2006 to 2009 was provided by the International Agricultural Surveillance–Ministry of Agriculture, Livestock and Food Supply (VIGIAGRO/MAPA) in GRU / SBGR Airport. The following information was studied: type of product seized, weight (kg), flight, country of origin of the product, airline, and year of seizure. Five hundred and eighty-nine flights from 43 airlines, coming from 117 countries, were analyzed. Countries were grouped into regions or continents to facilitate the analysis. This grouping was based on historical and cultural ties rather than geographical aspects (Table 1).

Table 1. Grouping of regions or continents and countries based on historical and cultural characteristics used for analysis

Regions or continents	Countries
Africa	South Africa, Mozambique, Zimbabwe
Asia	China, North Korea, South Korea, Japan, Taiwan, Sri Lanka, Hong Kong
Central America	Aruba, Costa Rica, Cuba, Curacau, Dominican Republic, El Salvador, Guatamala, Honduras, Mexico, Panama, Puerto Rico, Sto. Tome and Principe
East Europe	Albania, Bulgaria, Czech Republic, Hungary, Poland, Serbia, Slovakia, Slovenia, Ukraine, Romania, Turkey
Europe	Austria, Belgium, Cyprus, Denmark, Ireland, Germany, Netherlands, Poland, United Kingdom, Switzerland, Greece, Luxembourg
Iberia	Spain, Portugal, Andora, Malta
Latin Europe	France, Italy
Middle East	Afganistan, Egypt, Qatar, Jordan, Kuwait, Benin, Syria, Palestine, Saudi Arabia, United Arab Emirates, Israel, Iran, Iraq, Israel, Lebanon, Turkey
North Africa	Egypt, Morocco, Suan, Kenya, Lybia, Niger, Nigeria, Tchade, Tunisia, Uganda, Zambia.
North America	Canada, United States
Oceania	Australia, New Zealand
South America	Argentina, Bolivia, Chile, Colombia, Paraguay, Equador, Peru, Uruguay, Venezuela
South Asia	India, Bangladesh, Pakistan, Cambodia, Indonesia, Laos, Malaysia, Myanmar, New Guinea, Thailand, Vietnam, Philippines
West Africa	Angola, Ghana, Ivory Coast, Namibia, Senegal, Congo, Cape Verde and Cameroon

Results and Discussion

The type and total weight (Kg) of animal-origin products without international health certificates seized from passenger's baggage at GRU / SBGR Airport are shown in Table 2. There was an increase in the total amount of seized items from 2006 to 2009 for all types of products and in 2007 the volume was double than it was in 2006. Most of the seizures were seafood, followed by dairy, processed and raw meat, with 3,612 kg, 3,510 kg, 2,361 kg, and 2,064 kg, respectively. The lowest amount of seizures was veterinary products and pet food, with 39 and 38 kg, respectively (Table 2).

A growth in air transportation, as reported by Hwang et al.⁽¹⁴⁾ and INFRAERO⁽¹²⁾, and consequently an increase in the movement of products between countries⁽¹⁾ was already expected. This fact directly reflects in the expansion of the number of seized items observed in the present study, since the growth in passenger movement increases the chance of illegally imported animal-origin products entering

the country.

Table 2. Product type and weight of illegal food seized in the GRU / SBGR Airport (2006-2009)

Product type (food) (kg)	Year (Kg)				Total
	2006	2007	2008	2009	
Seafood (fish, shrimp, etc.)	580	865	711	1,456	3,612
Dairy	237	658	1,164	1,451	3,510
Sausage	288	576	545	952	2,361
Meat	226	519	463	856	2,064
Bee products	29	81	54	111	275
Others (exotics)	15	33	23	148	219
Vet products	-	10	7	22	39
Pet food	-	26	12	-	38
Total	1,375	2,768	2,979	4,996	12,118

- = No data.

Many authors have emphasized the importance of international transit in the dissemination of diseases^(15, 16); similarly, the increase in the number of illegally imported animal-origin products over the studied years (2006-2009) is of great concern. In Brazil, the entry of animal products without health certification has been prohibited since 1934⁽¹⁷⁾. In spite of that, passengers insist on bringing products clandestinely, and many products go unnoticed. The large number of illegally imported animal-origin products detected in the present study has also been reported in other countries⁽⁵⁾. Although some authors have affirmed that the reason for a passenger bringing illegally imported animal-origin products is often lack of knowledge of the risks and prohibition⁽¹⁸⁾, in our study some of the products seized at GRU / SBGR Airport had fake packaging, demonstrating that the passenger was fully aware of the ban, but still tried to fool the agricultural and customs departments. Among these products, shrimp was the major item with false packaging, being packed in cigarette packs and even in sealed chocolate cans.

This inappropriate packaging (sometimes a simple newspaper wrap without ice to maintain the right temperature to preserve the food for consumption⁽¹⁹⁾) may cause the product to deteriorate and, as a result, it is discarded on arrival. These products may end up in rural areas where a viable infectious agent can find its host and cause an outbreak, as reported by Hartnett et al.⁽²⁰⁾.

Table 3 shows the top 20 origin countries and the total weight (Kg) of illegal animal-origin products seized in passenger's baggage at GRU / SBGR Airport. China was the main country of origin of the seized items with 3,119 kg, accounting for 26% of the total. Italy (1,076 kg) and Portugal (1,041 kg) had almost the same volume (9% of the total), followed by Spain and France with 6%. Many products were manufactured in other countries, such as the USA, Lebanon, South Korea, Peru, and Bolivia, ranging from 534 kg to 392 kg.

Table 4 shows the nationality of the 10 top air companies (airlines) and the total weight of illegal animal-origin products seized in passengers' baggage at GRU / SBGR Airport (2006-2009).

Table 3. Top 20 origin countries and total weight (Kg) of illegal animal-origin products seized in passenger's baggage at GRU / SBGR Airport (2006-2009)

Country	Total weight (Kg)
China	3,119
Italy	1,076
Portugal	1,041
Spain	784
France	738
USA	534
Lebanon	469
South Korea	430
Peru	423
Bolivia	392
Germany	362
Netherlands	293
Nigeria	210
South Africa	209
Japan	182
Argentina	180
Switzerland	119
Angola	101
Taiwan	99
Chile	84

Table 4. Top 10 airlines, nationality of the company and total weight of illegal animal-origin products seized in passengers' baggage at GRU / SBGR Airport (2006-2009)

Airline*	Nationality of the company	Total weight (Kg)
Airline 1	Brazil	1,701
Airline 2	France	1,446
Airline 3	South Africa	1,297
Airline 4	Portugal	1,020
Airline 5	Italy	847
Airline 6	Spain	788
Airline 7	Germany	651
Airline 8	Germany	631
Airline 9	China	552
Airline 10	El Salvador	385
29 others		2,800

*Commercial name of the airlines was omitted for security reasons.

The regular flights (route) with a greater volume of seizures and main cities of departure were also analyzed. A French airline flight (from Paris, airline 2) had the most significant volume of illegal animal-origin products seized (911 kg), followed by a flight of a South African airline (from Johannesburg, airline 3), with 805 kg and a flight from Germany (Brazilian airline, airline 1) with 538 kg. The next 13 most significant flights had 242 to 495 kg of seized products. Twelve flights brought from 104 to 166 kg, 83 flights carried between 10 to 98 kg and finally 478 flights had less than 10 kg of seized products. Table 5 shows the 10 main flights, flight departure and total weight

(Kg) of illegal animal-origin products seized in passengers' baggage at GRU / SBGR Airport (2006-2009).

Table 5. The 10 main flights*, flight departure and total weight (Kg) of illegal animal-origin products seized in passengers' baggage at GRU / SBGR Airport (2006-2009)

Flight	Flight departure (route)	Total weight (Kg)
Flight 1	Paris	911
Flight 2	Johannesburg	805
Flight 3	Frankfurt	538
Flight 4	Amsterdam	495
Flight 5	Beijing	482
Flight 6	Paris	407
Flight 7	Frankfurt	406
Flight 8	Madrid	404
Flight 9	Lisbon	396
Flight 10	Johannesburg	379

* The number of the flights was omitted for security reasons.

Among the 589 flights, 478 had low volumes of seizures, making it easier for international agricultural inspectors to target specific flights. Three flights had more than 500 kg of products seized; they were from Paris (France), Johannesburg (South Africa) and Frankfurt (Germany) (Table 5). All three flights had many passengers from China because Chinese travelers use Europe and Africa as a hub to come to Brazil and this may be the reason why most of the illegally imported animal-origin products, mainly food, originated from China.

China and African countries offer a great health risk to Brazil since many diseases that occur in these countries are not present in Brazil⁽²¹⁾ or are controlled through Brazilian health programs, such as Foot and Mouth Disease (FMD)^(22, 23) and Tuberculosis^(24, 2). Many products were made in Italy, Portugal, Spain, and France. Although they are rigorous in controlling the movement of animal products, according to OIE⁽²¹⁾ they have numerous diseases that are not present in Brazil, such as *Brucella melitensis* biovar 3, which was reported in France in 2012⁽²⁵⁾.

A study in two German airports showed that 51% of the illegally imported food originated either from Turkey or Russia. Also, they noticed clear differences in the types of food brought from the different countries⁽¹⁰⁾. In Our study, seafood was the most popular item brought by passengers (3.5 tons). This can be justified by the origins of these products, with passengers bringing mainly shrimp from China as well as cod and sardines from Portugal. Chaber et al.⁽⁵⁾ also reported a high amount of illegally imported fish at International Roissy-Charles de Gaulle Airport in France. They analyzed 29 flights and fish was found in the greatest overall quantity (446 kg). However, Falk et al.⁽²⁶⁾ detected fish as the third most seized product at the international airports in Zurich and Geneva, Switzerland. These differences in types of products depend on the origins of flights and passengers, demonstrating that each airport is different. This reinforces the need for studies in the area, which are still scarce.

Dairy products were the second most seized products, but numerically very close to seafood. The main dairy products were artisanal cheeses, which are typical of many countries in Europe and offer a great risk to public health, as they may contain viable infectious agents. Illegally imported meat was separated into processed or fresh meat. Within each group, there was wild and domestic animal meat, as it is not often possible to distinguish these species since the product usually has been cut up and shown no identification. In general, wild animal meat poses a higher risk to animal and public health^(26, 27); however, as all of the products were illegally imported, even the industrialized ones were classified as high risk because they did not have certificates of health and origin. In Spain, two hundred food samples, including meat, confiscated from passengers arriving on flights from non-European countries at the International Airport of Bilbao (Spain) during 2012 and 2013 were analyzed and 20 products were tested positive for *L. monocytogenes* (10%) and 11 for *Salmonella* spp. (5.5%)⁽¹¹⁾.

Conclusion

There was a growth in the number of illegally imported animal-origin products seized at GRU / SBGR Airport from 2006 to 2009 and flights from France, South Africa, and Germany were the most significant ones. Most of the animal-origin products originated in Asia and seafood was the illegally imported food most frequently confiscated.

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References

1. Narrod C, Tiongco M, Scott R. Current and predicted trends in the production, consumption and trade of live animals and their products. *Revue scientifique et technique (International Office of Epizootics)*. 2011; 30, 31-49.
2. WHO - World Health Organization. Global Tuberculosis Report 2013. 2014 [Cited 2015 Aug 23]; Available from: http://apps.who.int/iris/bitstream/10665/91355/1/9789241564656_eng.pdf
3. Pfaff G, Lohr D, Santibanez S, Mankertz A, van Treeck U, Schönberger K, Hautmann W. Spotlight on measles 2010: Measles outbreak among travellers returning from a mass gathering, Germany, September to October 2010. *Euro Surveillance*. 2010; 15, 1-4.
4. Khan K, McNabb SJN, Memish ZA, Eckhardt R, Hu W, Kossowsky D, Sears J, Arino J, Johansson A, Barbeschi M., McCloskey B, Henry B, Cetron M, Brownstein JS. Infectious disease surveillance and modelling across geographic frontiers and scientific specialties. *The Lancet Infectious Diseases*; 2012; 12, 222-230.

5. Chaber AL, Allebone-Webb S, Lignereux Y, Cunningham AA, Marcus Rowcliffe J. The scale of illegal meat importation from Africa to Europe via Paris. *Conservation Letters*. 2010; 3, 317-321.
6. Bronsvoort BM, Alban L, Greiner M. Quantitative assessment of the likelihood of the introduction of classical swine fever virus into the Danish swine population. *Preventive Veterinary Medicine*. 2008; 85, 226-240.
7. Domenech J, Lubroth J, Eddi C, Martin V, Roger F. Regional and international approaches on prevention and control of animal transboundary and emerging diseases. *Annals of the New York Academy of Sciences*. 2006; 1081, 90-107.
8. Rushton J. (2009). The economics of animal health and production. 364p. Cabi. 2009 [Cited 2015 Aug 23]; Available from: <http://blogtiengviet.net/media/users/tamthanh27/tailieu/cbaebook/animalhealth.pdf>
9. Moura JA, McManus CM, Bernal FE, de Melo CB. An analysis of the 1978 African swine fever outbreak in Brazil and its eradication. *Revue scientifique et technique (International Office of Epizootics)*. 2010; 29, 549-563.
10. Beutlich J, Hammerl JA, Appel B, Nöckler K, Helmuth R, Jöst K, Ludwig ML, Hanke C, Bechtold D, Mayer-Scholl A. Characterization of illegal food items and identification of foodborne pathogens brought into the European Union via two major German airports. *International Journal of Food Microbiology*. 2014; 209, 13-19.
11. Rodríguez-Lázaro D, Ariza-Miguel J, Diez-Valcarce M, Stessl B, Beutlich J, Fernández-Natal I, Hernández M, Wagner M, Rovira J. Identification and molecular characterization of pathogenic bacteria in foods confiscated from non-EU flights passengers at one Spanish airport. *International Journal of Food Microbiology*. 2015; 209, 20-25.
12. INFRAERO - Empresa Brasileira de Infraestrutura Aeroportuária (2013). Anuário Estatístico Operacional 2012. 2013 [Cited 2015 Aug 23]; Available from: <http://www.infraero.gov.br/index.php/br/estatistica-dos-aeroportos.html>
13. ABIEC. Exportações Brasileiras de Carne Bovina de 2013. ABIEC - Associação Brasileira das Indústrias Exportadoras de Carne. 2014 [Cited 2015 Aug 23]. Available from: <http://www.abiec.com.br/texto.asp?id=31>
14. Hwang GM, Mahoney PJ, James JH, Lin GC, Berro AD, Keybl MA, Goedecke DM, Mathieu JJ, Wilson, T. A model-based tool to predict the propagation of infectious disease via airports. *Travel medicine and infectious disease*. 2012; 10, 32-42.
15. De La Rocque S, Balenghien T, Halos L, Dietze K, Claes F, Ferrari G, Guberti V, Slingenbergh J. A review of trends in the distribution of vector-borne diseases: is international trade contributing to their spread? *Revue scientifique et technique (International Office of Epizootics)*. 2011; 30, 119-130.
16. Thiermann A. International standards in mitigating trade risks. *Revue scientifique et technique (International Office of Epizootics)*. 2011; 30, 273-279.
17. BRASIL. Decreto 24.548, de 3 de julho de 1934. Aprova o Regulamento de Defesa Sanitária Animal. Ministério da Agricultura, Pecuária e Abastecimento, Presidência da República Federativa do Brasil. 1934 [Cited 2015 Aug 23]. Available from: http://www.planalto.gov.br/ccivil_03/decreto/1930-1949/D24548.htm
18. Zach L, Doyle ME, Bier V, Czuprynski C. Systems and governance in food import safety: A U.S. perspective. *Food Control*. 2012; 27, 153-162.
19. Likar K, Jevšnik M. Cold chain maintaining in food trade. *Food Control*. 2006; 17, 108-113.
20. Hartnett E, Adkin A, Seaman M, Cooper J, Watson E, Coburn H, England T, Marooney C, Cox A, Wooldridge M. A quantitative assessment of the risks from illegally imported meat contaminated with foot

and mouth disease virus to Great Britain. *Risk analysis*. 2007; 27, 187-202.

21. OIE (2013). Interface, WAHID - OIE World Animal Health Information Database (WAHID) Database. 2013 [Cited 2015 Aug 23]; Available from: http://www.oie.int/wahis_2/public/wahid.php/Wahidhome/Home
22. Di Nardo A, Knowles N, Paton D. Combining livestock trade patterns with phylogenetics to help understand the spread of foot and mouth disease in sub-Saharan Africa, the Middle East and Southeast Asia. *Revue scientifique et technique (International Office of Epizootics)*. 2011; 30, 63-85.
23. Ding YZ, Chen HT, Zhang J, Zhou JH, Ma LN, Zhang L, Gu Y, Liu YS. An overview of control strategy and diagnostic technology for foot-and-mouth disease in China. *Virology Journal*. 2013; 10, 78.
24. Gushulak BD, MacPherson DW. Globalization of infectious diseases: the impact of migration. *Clinical Infectious Diseases*. 2004; 38, 1742-1748.
25. Mailles A, Rautureau S, Le Horgne J, Poinet-Leroux B, d'Arnoux C, Dennetière G, Faure M, Lavigne J, Bru J, Garin-Bastuji B. Re-emergence of brucellosis in cattle in France and risk for human health. *Euro Surveillance*. 2012; 17, 30.
26. Falk, H., Duerr, S., Hauser, H., Wood, K., Tenger, B., Loertscher, M., & Schuepbach-Regula, G. Illegal import of bushmeat and other meat products into Switzerland on commercial passenger flights. *Revue scientifique et technique (International Office of Epizootics)*. 2013; 32, 727-739.
27. Daszak P, Tabor GM, Kilpatrick A, Epstein J, Plowright R. Conservation medicine and a new agenda for emerging diseases. *Annals of the New York Academy of Sciences*. 2004; 1026, 1-11.