



Evaluation of security and hygiene of workers in open market in Palmas – Tocantins

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As feiras apresentam graves problemas como falta de higiene, má estrutura das barracas, falta de segurança e desorganização. Tais problemas colocam em risco a sobrevivência da feira, uma vez que contrariam a legislação sanitária. O presente trabalho tem como objetivo mapear os riscos ambientais existentes nas feiras livres mais frequentadas na cidade de Palmas – TO, bem como estabelecer as medidas de controle necessárias à manutenção da saúde e segurança dos trabalhadores e consumidores. O trabalho foi realizado em duas feiras, sendo uma na região sul e região norte. Foram realizadas avaliações qualitativas *in loco*, utilizando a avaliação em segurança do trabalho para feiras livres. Para estudo quantitativo procedeu-se a medição do nível de ruído, temperatura e iluminância. Os problemas enfrentados pelos feirantes são as temperaturas elevadas, instalações elétricas de má qualidade, aliados ao cansaço físico, psicológico, estresse por efeito do nível elevado de ruído, dor nas pernas e costas, o que coloca em risco à segurança física e psicológica do trabalhador. Constatando-se a necessidade de investimentos do poder público, direcionados a melhorias na estrutura física das feiras. Como mudança de *layout*, modernização das instalações, agindo na redução de acidentes e incidentes nestes ambientes ocupacionais, e na prevenção de toxinfecções alimentares.

Palavras-chave: feiras livres, *layout*, mapa de risco, riscos ambientais.

Avaliação de segurança e higiene dos trabalhadores das feiras livres em Palmas – Tocantins

Fairs show serious problems in many ways such as poor hygiene, poor structure of tents, disorganization, and lack of security, these problems endanger the survival of the fair, since health legislation is not fulfilled. The goal of this study was to map the environmental risks in the busiest free markets in the city of Palmas – TO, even as determine the control measures necessary to maintain the health and safety of workers and consumers. The work was performed in two fairs, one located in the southern region of Palmas, and the other located in the northwar. Qualitative assessments were performed *in situ* using the assessment in occupational safety to fairs. For quantitative study the level of the noise, temperature and luminance were measured. The major problems faced by stallholders were high temperatures, poor quality electrical installations, together physical fatigue, psychological stress due to action of high levels of noise, pain in legs and back, that endangers physical and psychological security of workers. Besides, was noticed the need of investments from the government, improving the

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physical structure of the fairs. Furthermore, layout changes, upgrading facilities and the application of new technologies will be able to minimize, and may be eliminate hazards and critical control points at the fairs reducing not only accidents as well as to preventing food poisoning.

Key-words: fairs, layout, risk map, environmental risks.

INTRODUCTION

Origin of fairs could be related to an excess of production. Exchange was established from that exceeding first among groups without any kind of place to make this happen. A natural necessity of these fairs that could join all available products changing excess for lack of other products was important. Therefore free fairs are an important mean to supply food for families since ancient times. It is important to know and to support this kind of commercialization structure. This knowledge can provide food security and life quality of population [1].

Free fairs are economic and social phenomena very ancient and were known for Greeks and Romans. Romans had rules for creation and management of these fairs and these rules were established from the estate. Objective of these fairs become really important from commercial revolution. From XI century their number was increased until XIII century [2].

Dolzani and Jesus [3] describe fairs like a microcosm in social and economic and cultural landscape of some cities. Fairs are not only for buying and selling but for meeting and enjoying. It is a social fact with particular characteristics. In these fairs people change information, political articulation or just have fun.

However these fairs have problems with lack of hygiene, bad structure of stalls, commercialization of not allowed products, lack of safety and disorganization. Survival of these fairs are in risk because such problems. These problems are against sanitation laws, compromising quality of products and health of consumers [4].

According to article 10, volume 11, October 2001 from Social Security another important point would be machine operation in these environments that are related to severe and incapacitating work accidents. These problems have impacts on health and welfare of workers and social security. Most of these

accidents could be avoided if these problems were taken place [5].

Number of work accidents achieve 720,1 thousands according Statistical Yearbook of Social Security in 2010 and represents a decrease of 4,3% related to 2009. Medical assistance, temporary incapacity, permanent incapacity and decease reduced respectively 5,8%, 4,1%, 3,5% and 5,9%. Main consequences of work accidents were temporary incapacity with less than 15 days reached 42,5% and with more than 15 days were 41,6% [6].

Risk maps are made to show risk points by graphics of distribution of them in several places of fair using circles in different colors and sizes [7].

So this work has an objective of knowing environmental risks in most visited repeatedly free fairs in Palmas. This work will establish control measures for maintenance of health and security of workers and consumers.

MATERIAL AND METHODS

Quantitative and qualitative analysis

First of all, Municipal Agriculture Secretary and Municipal Sanitation Surveillance of Palmas had a meeting with students to know which free fairs would be an object of this study. Regulatory agencies of fairs suggested two places for this study. One of them was in south region and another on region north of capital of Tocantins. First one was south region and then north region.

Qualitative evaluations were made *in loco* for knowing work process and identifying environmental risks. One of utilized methods was security work inspection. This inspection was made using an application adapted by Montelo *et al.* [4] for free fairs. Main features considered on this security conditions diagnosis (or risks) in work place were specified on Regulatory Patterns.

Quantitative studies were made using level of noisy measure, temperature and lightness. Level of noisy was taken using a digital model of decibel meter MSL-1350. This equipment uses compensation curve “A” and slow response. It was measured 30 strategic points for level of noisy in each fair. This was made for expressing better accuracy of work reality.

Temperature was measured with a digital infrared thermometer trade Text model 805. It was 33 points in both fairs. Lightness was utilized a digital light meter trade Minipa model MLM 1010. In this case 30 points were measured in both fairs.

Elaboration of risk map

After qualitative and quantitative evaluations it was verified main failures and a map of risk was made using Autocad 2012 software and then graphics of risk identification was plotted.

RESULTS AND DISCUSSION

It was observed that fairs do not have gas store and installations so they use gas recipients in both fairs. This is a severe risk to fair workers and consumers including explosions.

Santos ^[4] mentions importance of a good program for prevention fire in places with problems on electric systems, application of inadequate process for escape from gas, inappropriate installations and store of gas, lack of care by using fried equipments and connection of several equipments in one plug.

After analysis of risk maps of two fairs in north region fair a high level of ergonomic risk (Figure 1) was observed. Fair in south region presented a high level of physical risks in agricultural and workmanship risks. Similar results were observed for Montelo *et al.* ^[4].

Figure 1. Risk map fair the region North

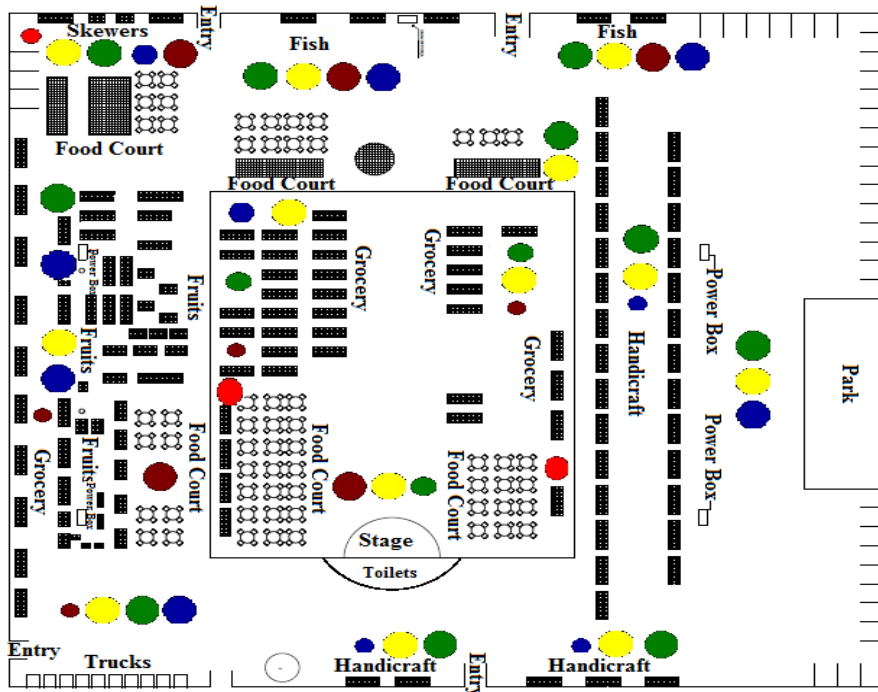
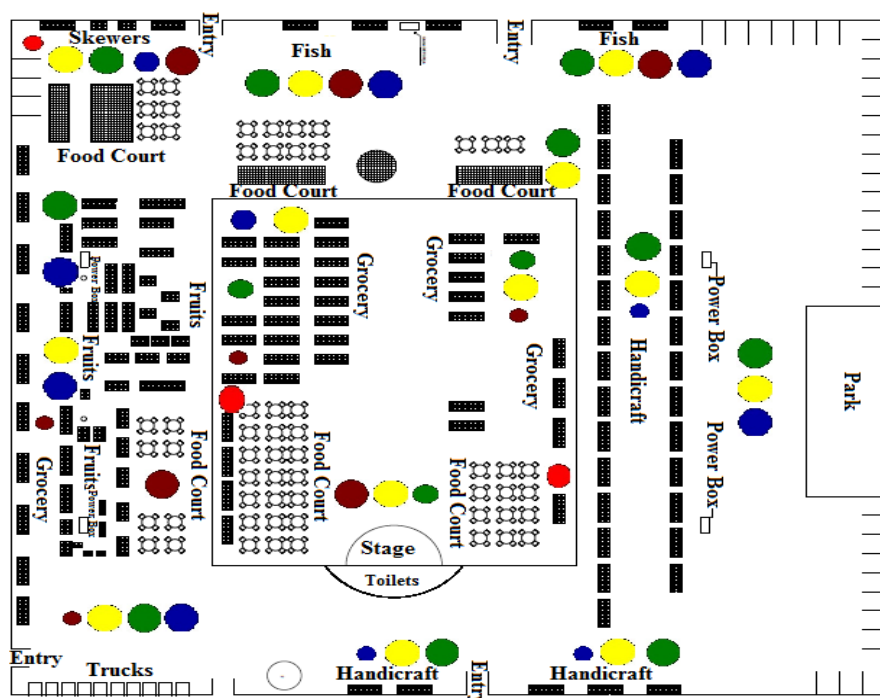


Figure 2. Risk map fair the region South



There are no extinguishers of fire in several points for both fairs that is recommended to Garcia and Cremonesi ^[8]. They point out importance of a good prevention of fire program in places where electric systems are deficient. In both risk maps (Figures 1 and 2) it can be viewed electricity cables on the ground, distribution box of electricity with no protection near agricultural, fishing, workmanship and food places. These areas are identified in green color. Similar results were observed by Monteloet *al.* ^[4]. Authors observed that for food places risks are in elements of work process.

For electric installations it is recommended a distribution box with circuit breakers for each branch. They are dimensioned according to demand. Wires and cables must be protected by electro ducts maintained suspended or underground on intense circulation paths of fair ^[9].

In fairs with provisory installations and totally removable like workers outside of both fairs it is necessary an electrician available to do mounting and dismounting of electrical net.

According to RDC n. 216 resolution of National Agency of Surveillance Sanitation lightning of preparation area must provide a good way for activities with no compromising hygiene and sensorial characteristics of food ^[9].

Toilets in both fairs are in bad conservation. There are no garbage collectors so they stay on the ground which is a biological risk for workers and consumers (Figures 1 and 2).

Containers must be near circulation areas of vehicles and in free access places to facilitate collecting. Collector vehicles must be closed with no hands contact according to RDC n.216 resolution, September 2004. This resolution displays about good practices of food services ^[10].

For garbage collecting Health Ministry ^[9] suggests put individual collectors near access ways that will be collected for municipal collecting service avoiding stink and possible contaminations.

For noisy level almost work areas of south region fair (Table 1) exceed established parameters of Regulatory Pattern 15 about 8 hours of work that has a maximum value of 85 decibels (dB) for insalubrity ^[9]. Except for coffee grinder that achieve 85 dB like described previously and clothes and workmanship areas that presented maximum value of 81,3 dB. These

high levels can result in tiredness, anger, headaches, decrease of hearing, increase of blood pressure, problems of digestive system, tachycardia and risk of heart attack.

Table 1. Noise level evaluation

Areas	Noisy Level (dB)	
	North region	South region
Vegetables and fruits	63.2 – 76.4	75.5 – 89
Coffee grinder	–	85
Sound near stage	63.8 – 80.3	87.9 – 94
External area	–	–
Fishery	74.3 – 74.7	75.6 – 85.6
Cheese	–	78.1 – 90.1
Food Place	74.4 – 78.5	87.6 – 94.2
Clothes and workmanship commercialization area	66.4 – 74.4	77.3 – 81.3

For north region fair it was observed that in all work areas noisy level (Table 1) was according to Regulatory Pattern as mentioned before ^[9].

Temperature level on south region fair (Table 2) was measured and then it was observed an irregular packing of food in inappropriate temperature that can

cause health problems to consumers. Mayonnaise is a typical example that high temperatures (22.4 – 23.3) are good for growth of microorganisms that are responsible for a lot of pathologies ^[11,12].

Table 2. Temperature evaluation

Areas	Temperature Level (°C)	
	North region	South region
Vegetables and fruits	26.8 – 29.8	21.1 – 23.4
Fishery (band saw)	14.4 – 18.1	-0.6 – 12.8
Cheeses	–	15.9 – 22.4
Food Place (Mayonnaise)	26.1 – 33.4	22.4 – 23.3
Meals ready-to-eat (soups)	41.2 – 51.2	–
Metal sheet for frying	120.8	–

In north region fair temperature level (Table 2) shows also an irregular storage of certain food. This can cause health problems in consumers of these products. Fishes are an example that with high temperatures (14.4 – 18.1) they can favor growth of microorganisms that causes several pathologies ^[13]. Comparing temperature of fishes in both fairs it can be noticed that in south region fair this storage is a

little better than in north region fair but has failure in storage yet.

Montelo *et al.* ^[4] and Germano & Germano ^[14] point out that food in free fairs and public markets can be vehicles of contamination by microorganisms causing infections. In these places microorganisms are a potential biological risk for consumers mainly when

foods are exposed in raw form, like they are in these places and in big quantities.

Lightning level found in south region fair (Table 3) shows that the most deficient area is fish

commercialization. This are presented a 20 – 42 lux and this is a unsecure condition according RDC nº 216 [10].

Table 3.Qualitative evaluation of lightning

Areas	Lightninglevel (lux) – Night	
	North region	South region
Vegetables and fruits	21 – 90	15 – 90
External area	–	–
Fishery	21 – 28	20 – 33
Band saw	21 – 28	22 – 42
Fruits commercialization	21 – 90	24 – 35
Food Place	22 – 28	21 – 77
Meals ready-to-eat (soups)	28 – 32	19 – 51
Workmanship	–	19 – 48

In north region fair level of lightning is on Table 3. Lightning level is deficient on fish commercialization too that presented 21 lux. As in south region fair this is an insecure condition. Lack of lightning or less of that can cause visual problems, tiredness and work accidents.

This situation can be worse because of band saw operators in both fairs that do not use gloves of steel mesh, EPI indicated for this activity according to Regulatory Pattern n. 6 of Work Ministry (Brazil, 2007). These gloves are necessary because equipment offer accident risk with partial or total amputation of members. Similar observations were carried out for Montelo *et al.* [4].

CONCLUSION

Obtained results shows us that fair workers have problems with high temperatures, bad quality of electrical installations, physical and psychological tiredness, stress by high level of noisy, pain in legs and backs by standing long time. This is a risk for physical and psychological security of workers.

After analysis it was observed it is necessary government investments in training of professionals and improvement on physical structure of fairs. Layout changes, modern installations, use of new technologies to minimize or eliminate damages and

critical points of control in fairs, since reduction of accidents and incidents in these work places as prevention of food poisoning of those which eat meals prepared in these kitchens.

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