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Food Handler's Perception of Fresh Cut Products

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Abstract: The use of Fresh Cut Products (FCP) allows food service units to offer a greater variety of menus, reducing costs and minimizing cross contamination. Few food units in Portugal are adopting FCP, since these products are viewed as being more expensive and are regarded as less natural and easily perishable.The present study aims to identify and analyze the level of awareness of food service operators in respect to FCP. Approximately 90% of food handlers referred the use of FCP at their workplace, pointing as the main advantages for using them the less time spent on preparation (58.6%), the variety (55.9%) and the convenience (55.9%). Reasons for not using them were doubtful origin (91.7%), price (66.7%) and being a possible threat to their jobs (58.3%). In spite of recognizing the advantages of using FCP, most of food handlers (77.2%) prefer traditional products. Traditional products were preferred by food handlers with lower educational level, working at schools and performing functions of kitchen helper. FCP were chosen by younger food handlers, with higher educational level. It seems necessary to promote a demystification of this category of products near food service managers and employees, explaining the best way and advantages of using FCP at institutional food services in terms of safety, cost and quality.

Key words: Fresh cut products, food services, food handlers, perception.

1. Introduction

In the last decades it has been observed an increasing interest on health related items. The benefits of fruits and vegetables are widely known and accepted by the scientific community and consumers [1-4]. International organizations such as Food and Agriculture Organization and United States Department of Agriculture recommend a daily intake of about 400 g of fruits and vegetables [5, 6]. Several policies and food programs have been developed to promote consumption of this food group [7-11]. Nevertheless, the consumption remains bellow recommendations [12, 13].

Food patterns have been changing following modern family life styles. Food consumption out of home become increasingly common due to the increase of women on labor force, distance between home and workplace as well as the increase on the number of working and leisure time [14, 15]. This scenario created an opportunity for a new category of products: fresh cut fruits and vegetables. These products are submitted to minimal processing, namely physical changes such as selection, washing, peeling, cutting or slicing and are presented to consumer in appropriate packages, showing characteristics of fresh products and ready to be consumed [16]. The production of high quality goods, convenient, minimally processed must be the aim of producers and the food industry [17].

A considerable number of fruits and vegetables are already on the market playing an important role on the nutrient intake of an increasing number of consumers. Minimally processed products are one of the major growing segments in food retail establishments [17]. Fresh Cut Products (FCP) attain several advantages, namely the reduction of residues formation, increase of

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sanitary quality enabling improvement of safety by reducing risks of cross contamination [18].

Today, consumer demand is a governing force of agricultural production and the agri-food industry. They demand an increasingly varied range of high quality food together with food safety assurance, and at the same time they require that food should be quick and easy to prepare [19]. Newer methods of marketing fresh produce, such as pre cut vegetables or salad bars present promising alternatives for informed and concerned consumers looking for those characteristics associated with convenience.

Most of developed studies found non-significant impact of minimal processing operations on the nutritional quality of fruits and vegetables indicating this category of goods as a promising alternative to improve quality on diet on the XXI century' consumers [20-23]. The use of Fresh Cut Products (FCP) is still relatively low in Portugal, nevertheless it presents a huge potential of growth due to savings on time and work, convenience and increased safety [24-25].

The modern consumer search for high nutritional value products, with high sensorial quality and that are safe for consumption. Additionally the increase on the number of food services, such as restaurants, hotels and canteens also contributed to the increase on FCP market search, since they offer several advantages, namely wastage control, rationalization of resources, increased menus variety and avoid seasonality [26].

Socio economical changes occurred in the last decades determining important changes on food patterns, making food service units an important actor of modern life. Consumers have less time to prepare meals; the number of women in labor market has been increasing drastically what determined an increased search for convenience products, namely FCP as well as on the number of meals made away from home, by attending to catering/food service units either at work, schools and restaurants or snack bars [27].

FCP attain several advantages for food service units, namely by reducing waste, improving sanitary quality, allowing meals standardization, reducing costs associated with facilities, equipment, labor force, energy and water consumption as well as reducing time spent with food preparation steps [28]. Additionally they minimize the problem of seasonality improving diversity of menus; on the other hand minimizing the risks of cross contamination they contribute to prevent food related diseases [29].

Potentially the use of FCP would please both food handlers and consumers. Nevertheless, in Portugal few food service units use regularly this kind of products, since apparent costs are higher than traditional fresh products and usually they are faced by food handlers as less fresh and natural, easily perishable and above of all they find them a possible threat to their jobs [28]. Food handler's approval of FCP may potentiate their use at food service units.

The aim of the present work was to contribute to understand food handler's attitudes concerning FCP by identifying the level of perception and the barriers for not using them at food service units.

2. Materials and Methods

A convenience sample of 16 food service units located in the north of Portugal, close to each other, was used for developing this work. At each unit, food handlers were randomly selected to participate in the study, taking into account the following criteria: units with less than 10 workers all participated, units with 11 to 20 workers 75% of workers participated, units with 21 to 30 workers 50% participated and units with more than 31 workers 25% of workers participated. Data collection was performed between October and December 2010. Unless food workers demonstrated illiteracy, questionnaires were distributed and filled individually. A response rate of 100% was obtained corresponding to 142 food workers respondents; nevertheless 19 questionnaires were not considered, due to incomplete or incorrect filling. Final sample included 123 valid questionnaires.

The questionnaire included close ended questions and it was organized in three parts; the first one characterize the food unit, type, location, food production system, number of meals and workers; the second part characterize the food handler, school level, age and gender; and the third part intended to identify knowledge and the reasons for using or not FCP. A pilot study was performed with 16 food operators to check the questionnaire. Statistical analysis was performed by SPSS, version 17.0 for Microsoft Windows.

3. Results and Discussion

There were included 16 food units on this study. These units were mostly located at schools (31.2%), hospitals (31.2%) and resting houses (25.0%), with a cook and serve production system (81.3% direct method and 18.7% transported meals), serving between 50 and 800 meals per day. The majority of food units (68.9%) have 10 or less food handlers.

A total of 123 food handlers were interviewed: 108 women and 15 men, aged between 21-62 years old. School level was quite low, corresponding to 6 years at school (2nd cycle of elementary education).The majority of food handlers (68.3%) had a permanent labor contract, only 7.3% had a temporary position. Most of respondents work as cookers or kitchen helpers (29.3%).

A total of 90.2% of food operators referred the use of FCP at their working places, namely vegetables (52.2%), fruits (3.6%), roots and tubers (54%). The main reasons for using these products were saving time (58.6%), variety (57.5%) and convenience (45%).

Operators that referred not using FCP pointed as the main reasons: not knowing the products origin (91.7%), the price (66.7%) and the job position threat (58.3%).

When faced to the scenario of being responsible for choosing FCP or not for the unit, the majority of food workers would prefer traditional food products, pointing as main reasons for their option: higher number of workers needed to prepare them (63.2%), freshness (49.5%) and sensory quality (49.5%). Food handlers who choose FCP pointed less wastage (75%), less preparation time (64.3%) and price/quality relationship (50%) as the main reasons for their option (Table 1).

A significant relationship was found between choosing traditional food products and belonging to school food units ($P = 0.002$). A correlation was found between choosing FCP and work at food service units that produce lower number of meals, nevertheless this difference was not statistically significant.The percentage of food handlers that choose FCP seems to increase according to ratio number of workers/number of meals produced, nevertheless no statistical significance was found ($P > 0.05$) (Table 2).

No influence was found between gender and choosing FCP instead traditional food products. Younger food operators choose mostly FCP nevertheless differences were not statistically significant ($P > 0.05$). Preferences for FCP were more

Table 1 Food handlers' reasons for choosing traditional products vs FCP.

Characteristic	n	Categories	Frequency	
			n	%
Option	123	Traditionalproducts	95	77.2
		FCP	28	22.8
Reasons to choose traditional products*	95	Price	17	17.9
		Freshness (quality)	47	49.5
		Ration price/quality	23	24.2
		Sensory quality	47	49.5
		Origin	30	31.6
		Higher number of workers	60	63.2
Reasons for choosing FCP *	28	Price	5	17.9
		Freshness (quality)	12	42.9
		Ratio price/quality	14	50.0
		Preparation time	18	64.3
		Low wastage production	21	75.0
		Lower number of workers	11	39.3

* Sum of item may be higher than 100%, since it was possible to choose more than one option.

Table 2 Option between traditional products and FCP according to food unit characteristics.

Characteristics	TFP	FCP	*P*
	n (%)		
Type of unit			
Schools	26 (27.4)	2 (7.1)	
Hospitals	43 (45.3)	12 (42.9)	0.002
Resting houses	22 (23.2)	7 (25.0)	
Others	4 (4.2)	7 (25.0)	
Nr. of meals			
≤ 150	25 (26.3)	3 (10.7)	0.011
151 a 300	10 (10.5)	9 (32.1)	
≥ 301	60 (63.2)	16 (57.1)	
Ratio nr employees/nr meals			
≤ 3/100	30 (31.6)	6 (21.4)	0.163
4 a 6/100	32 (33.7)	15 (53.6)	
≥ 7/100	33 (34.7)	7 (25.0)	

Table 3 Option between traditional products and FCP according to food handlers' socio demographical characteristics.

Characteristics	TFP	FCP	*P*
	n (%)		
Gender			
Female	84 (88.4)	24 (85.7)	0.745
Male	11 (11.6)	4 (14.3)	
Age (years)			
≤ 30	21 (22.1)	8 (28.6)	
31 a 40	35 (36.8)	7 (25.0)	0.324
41 a 50	29 (30.5)	7 (25.0)	
≥ 51	10 (10.5)	6 (21.4)	
School level			
≤ 2nd cycle of elementary education	57 (60.0)	10 (35.7)	0.044
≤ 3rd cycle of elementary education	26 (27.4)	10 (35.7)	
≥ Secondary level	12 (12.6)	28 (22.8)	

frequent by food operators with higher school levels. Traditional food products were preferred by food operators working as kitchen helpers either at preparation activities ($P = 0.04$) (Table 3).

Main limitations of this study were related with the use of a convenience sample and to the small size of the sample. The majority of food units included in this study had 10 operators or less, and served between 50 and 800 meals a day, results consistent with those reported by Rocha et al. that found a ratio of 1 food operators for each 20 meals [26].

In Portugal, the majority of food operators belong to the female gender situation confirmed in this study. The group of food operators included in this study aged 31 to 50 year old, data consistent with that reported by Joshua et al and Malhotra et al. [28-29]. School level was found to be very low when compared to that reported in literature, probably because this is not a criterion at admission process for food service workers in Portugal.

In spite of recognizing the advantages of using FCP most of food handlers (77.2%) prefer traditional products, highlighting as the main reasons for this choice freshness (49.5%), sensory quality (49.5%) and the fact that more operators are needed to prepare them (63.2%).

4. Conclusion

Traditional products were preferred by food handlers with lower educational level, working in schools and performing functions of kitchen helper or food preparers. On the other hand, FCP were chosen by younger food handlers, with higher educational level.

According to the results it seems necessary to promote a demystification of this category of products near to food service managers and employees, explaining the best way of using FCP and showing the advantages of their use at institutional food services in terms of safety, cost and quality.

References

[1] R.W.V.Peter, D. Frank, D. Johan, Consumer perception and choice of minimally processed vegetables and packaged fruits, Food Quality and Preference 15 (2004) 259-270.

[2] O.C. Rosa, Características Microbiológicas de Frutos e Hortaliças Minimamente Processadas, Boletim SBCTA, Campinas, 2002, pp. 84-92.

[3] D.N. Cox, A.S. Anderson, J. Reynolds, S. McKellar, M.E.J. Lean, D.J. Mela, Take five, a nutrition education intervention to increase fruit and vegetable intakes: impact on consumer choice and nutrient intakes, British Journal of Nutrition 80 (2) (1998) 123-131.

[4] IFIC, International food information council functional foods attitudinal research, 2000, http://www.ific.org. (accessed December 2010).

[5] IFIC, International Food Information Council Functional Foods Attitudinal Research, Functional foods: Can they Reduce Your Risk of Cancer?, Food Insight, 2001.

[6] World Health Organization Study Group, Diet, Nutrition and the Prevention of Chronic Disease, World Health Organization Technical Report Series 797, World Health Organization, Geneva, 1990.

[7] Centre for Disease Control, National 5 A Day Partnership Plan 2001-2004, Atlanta (GA), National Center for Chronic Disease Prevention and Health Promotion, USA, 2002, http://www.cdc.gov/nccdphp/dnpa/5aday/. (accessed December 2010).

[8] World Health Organization, Fruit and vegetable promotion initiative, 2003, http://www.who.int/hpr/NPH/fruit_and_vegetables/fruit_and_vegetable_report.pdf. (accessed December 2010).

[9] World Health Organization, WHO and FAO announce a unified approach to promote fruit and vegetable consumption, 2003, http://www.who.int/hpr/. (accessed December 2010).

[10] World Health Organization, Fifty-seventh World Health Assembly, Agenda item 12.6, Global Strategy on Diet, Physical Activity and Health, 2004, http://www.who.int/gb/ebwha/pdf_files/WHA57/A57_R17-en.pdf. (accessed December 2010).

[11] World Health Organization, The world health report 2002—Reducing risks, promoting healthy life, 2002, http://www.who.int/whr/2002/en/whr02_en.pdf. (accessed December 2010)

[12] INE, Instituto nacional de estatística—Portugal, as causas de morte em Portugal, 2002, http://www.ine.pt. (accessed December 2010)

[13] A.C. Nielsen, The future of health & wellness, consumer insights, 2006, http://pt.nielsen.com/trends/tr_0607_ConsumerInsights_Q0206.pdf. (accessed December 2010)

[14] A.C. Nielsen, Consumers and ready-to-eat meals, a global ACNielsen report, 2006, http://pt.nielsen.com/trends/tr_GlobalRTEReportDec06.pdf. (accessed December 2010)

[15] W. Verbeke, Impact of communication on consumers' food choices, The Proceedings of the Nutrition Society 67 (3) (2008) 281-288.

[16] F. Yildiz, Initial preparation, handling and distribution of minimally processed refrigerated fruits and vegetables, in: R.C. Wiley (Ed.), Minimally Processed Refrigerated Fruits and Vegetables, Chapman and Hall, New York, NY, USA, 1994, p.15.

[17] R.C. Soliva-Fortuny, O. Marti-Bellos, New advances in extending the shelf-life of fresh-cut fruits: A review, Trends in Food Science & Technology 14 (2003) 341-353.

[18] R. Proença, Inovação tecnológica na produção de alimentação colectiva, Florianópolis: Insular, 2000.

[19] B. Duquesne, S. Mantendo, Ph. Lebailly, Profiling food consumption: Comparison between USA and EU, Food Consumption Observatory, 2005, pp. 1-11.

[20] C. Alasalvar, M. Al-Farsi, P.C. Quantick, F. Shahidi, R. Wiktorowicz, Effect of chill storage and modified atmosphere packaging on antioxidant activity, anthocyanins, carotenoids, phenolics and sensory quality of ready-to-eat shredded orange and purple carrots, Food Chemistry 89 (2005) 69-76.

[21] A. Rocha, C. Mota, A.M.M.B. Morais, Physico-chemical qualities of minimally processed carrot stored under vacuum, Journal of Food Service 18 (2007) 23-30.

[22] A. Rocha, F.F.C. Ferreira, A.M.M. Silva, G.N. Almeida, A.M.M.B. Morais, Quality of grated carrot (*var. Nantes*) packed under vacuum, Journal of Science of Food and Agriculture 87 (3) (2007) 447-451.

[23] A. Rocha, A.M.M.B. Morais, Polyphenoloxidase activity of minimally processed "Jonagored" apples (Malusdomestica), Journal of Food Processing and Preservation 29 (2005) 8-19.

[24] M. Rodriguez, Hygienic conditions and microbiological status of chilled ready-to-eat products served in Southern Spanish Hospitals, Food Control 22 (2011) 874-882.

[25] M.M. Hanashiro, Relações de coordenação entre agricultura, indústria e distribuiçãonacadeiaprodutiva dos produtos minimamente processados, Dissertação (Mestrado em Desenvolvimento Econômico, Espaço e Meio Ambiente), Instituto de Economia da Universidade Estadual de Campinas, 2003.

[26] A. Rocha, Attitudes related to minimally processed fruit and vegetables use/consumption by food service elderly institutions, Culinary Arts and Sciences VI (2007) 388-393.

[27] T.F. Jones, B.I. Pavlin, B.J. LaFleur, L.A. Ingram, W. Schaffner, Restaurant inspection scores and foodborne disease, Emerging Infect Diseases 10 (4) (2004) 688-692.

[28] I.A. Joshua, Profile and knowledge of food hygiene and safety of food handlers in a university campus, Journal of Pure and Applied Microbiology 3 (2) (2009) 489-493.

[29] R. Malhotra, Profile of food handlers working in food service establishments located within the premises of a medical college in Delhi, India Public Health 121 (6) (2007) 455-461.