

Assessment of Storage Practices in Warehousing Companies of Groundnut Export in North Kordofan State with Reference to GSP (WHO, 2019)

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ABSTRACT: *This study was conducted in all groundnut export warehousing Companies namely: (A, B, C, D, E and F) in EL Obied Town of North Kordofan State during the season 2023. The objective of the study to assessment of storage practices of export Groundnut (*Arachis hypogaea*) and compare with reference to Good Storage Practices (WHO, 2019). The data were collected by audit checklist prepared by WHO, 2019. The data were statistically analyzed by using Likert- five scale points and the significant different between means obtained by LSD at level of significant 0.05%. The result revealed that the general arithmetic mean of the three categories; (organization and management), (Quality system & traceability of food products) and (Vehicles and equipment) were score higher than 4.2 points in warehousing Companies A, B, D, and F these result refilled that full compliance, while the rest Companies were scored ranged between 3.4.- 4.1 points incomes minor deficiency. Also The result revealed that the general arithmetic mean of the five categories; (Personnel), (Shipping containers and container labeling), (Dispatch and receipt), (Documentation) and (Self-inspections) were score higher than 4.2 points in all warehousing Companies these result approved full compliance. Moreover, the result revealed that the general arithmetic mean of the two categories; (Complaints) and (Recalls) were scoring 4 points in all warehousing Companies these result agreed full compliance. The result concluded that the obtained total score (out of 345 points) of storage practices for warehousing Companies A, B, C, and E were 261,260, 221 and 249 points respectively these result finding indicting classified unsatisfactory due to ($\leq 80\%$). while the warehousing Company D was score 276 points these outcome indicting classified standard due to ($\geq 80 \leq 84\%$) and the warehousing Company F was score 297 points these conclusion indicting classified good due to ($\geq 85 \leq 89\%$) according to Global Food Safety(GFS,2013). The study recommended that the warehousing companies require to application Total Quality Management system (TQM) to ensure food safety and food quality of their raw material and end products as well as increase the power competitive on global level.*

KEY WORD: assessment, GSP, Groundnuts, companies, North, Kordofan, State

INTRODUCTION

Good Storage Practices (GSP) means that part of quality assurance which ensures that the quality of a food product is maintained through adequate control the storage, (WHO, 2010). The food warehousing management is a key function of the supply chain, (UNCoLSC,2016). And this to maintain the original quality of foods in the warehousing every activity should be carried out in accordance with Good Storage Practices system (MoH, 2014). The key functions of warehousing include: the receiving and storing, stock inventory management and issue management (dispatch), (Ministry of Health and Population, 2004). For an appropriate food warehousing, different parameters have to be considered. Among others warehouse infrastructures, sufficient and qualified human resources and a strong governance organization system that allow smooth operations management and easy monitoring of performance. A lack of appropriate resources lead to stock outs, overstocks and wastages of products. (Emelda K. Motlanthe, 2010). For a sustainable warehouse management, the record of operations is a crucial element of success with which the flow in and out of products are monitored, as well as the quality and safety of both products and handlers, (USAID, 2010). Related to these good storage practices, appropriate warehousing should consider the safety of both the products and the staff who work in the warehouse. There should be adequate lighting, temperature, and humidity control (MoH, 2014). The warehouse should have adequate, clearly visible, and functioning fire extinguishers with clear instructions for their use. There should be adequate and clearly labeled emergency exits. Warehouse employees should wear appropriate protective clothing, such as overalls, safety helmets, boots, and hi-visibility clothing, such as reflective jackets, USAID, 2014). The warehouse should be kept clean and dry. Inventory should be stored according to the principles of “first expired, first out.” There should be regular inspection so that damaged or expired stock is disposed of safely. Disposal policies should be present and properly adhered to, (UNCoLSC, 2016 and Ministry of Health and Population, 2004). Products should be kept off the floor on pallets or shelving that maximizes the use of space. Careful consideration should be given to how products are arranged and labeled in the zone to maximize space utilization (MoH, 2014). Numbering every pallet location in the warehouse allows for the reorganization of the warehouse based on volume dispatched criteria (MoH, 2014).

MATERIALS AND METHODS

Materials:

This study was conducted in all groundnut export warehousing Companies in EL Obied Town of North Kordofan State during season at 2023. Groundnut export warehousing Companies, which namely: (Africorp, Dall, Eltgaria medium, Ellee, Elarbia seeds and Warm seas).

Methods

Audit Checklist

The data was collected by audit checklist prepared by WHO, 2019. The data was collected throughout observation as well as direct interview with personnel responsible from food safety or production managers in groundnut export warehousing Companies. After that the data was statistically analyzed by using Likert- five scale points to obtain arithmetic means and different separation

Content of Audit Checklist

The checklist of GSP requirement includes fifteen main categories which include ; organization and management, Personnel, Quality system & traceability of food products, Premises, warehousing and storage , Vehicles and equipment, Shipping containers and container labeling, Dispatch and receipt, Documentation, Repacking and relabeling, Complaints, Recalls, Contract activities, Internal quality audit, and Measurement analysis (WHO,2019).

Scoring System

Scoring system will use to evaluate the implementation of Good Storage Practices System as follow in tables 1 and 2 according to Likert Five-Point Scales.

Table 1: show scoring system for questions of Food Safety Management System

Possible answer				
Full Compliance	Minor Deficiency	Major Deficiency	Non-compliance	Not applicable
Possible Points for the question				
Score = 5	Score = 4	Score = 3	Score = 2	Score = 1
Points	Points	Points	Points	Points

Source: Sorrel Brown, 2010

Table 2: Audit scoring summary criteria in case of mean and percentage

How to explain meaning of arithmetic mean and percentage			
How to explain meaning of arithmetic mean		How to explain meaning of percentage %	
Numerical	Views	Numerical	Views
$M < 1.8$	Not applicable	$P < 36\%$	Not applicable
$1.8 \leq M < 2.6$	Non-compliance	$36\% \leq M < 52\%$	Non-compliance
$2.6 \leq M < 3.4$	Major Deficiency	$52\% \leq M < 68\%$	Major Deficiency
$3.4 \leq M < 4.2$	Minor Deficiency	$68\% \leq M < 84\%$	Minor Deficiency
$4.2 \leq M \leq 5$	Total Compliance	$84\% \leq M \leq 100\%$	Total Compliance

Source: Sorrel Brown, 2010

Table 3: Compliance for questions in Food Safety Management System

Answer	Criteria used
Full Compliance	To meet the question and/or compliance criteria in full.
Minor Deficiency	To have minor deficiencies against the question or compliance criteria. To have covered most of the question compliance criteria, but not all.
Major Deficiency	To have major deficiencies against the question or compliance criteria. To has covered some of the question compliance criteria, but not most of it.
Non-compliance	To have not met the question and/or compliance criteria requirements at all. Having systematic deficiencies against the question and/or compliance criteria (severe or Non-severe issue).
Not applicable	The requirement described in the question is not applicable for the operation being Audited.

Source: Sorrel Brown (2010)

Classification of warehouses companies

The classification of warehouses companies through to the relationship between Total score and Percentage % as the flowing equation

$$\text{Percentage \%} = \frac{\text{the obtained score}}{\text{total score (345)}} \times 100 \dots \dots \dots \mathbf{1}$$

Statistical analysis

The data was statistically analyzed by using Likert five scale points to obtain the arithmetic means and verbal approval, while the significant different between means obtained by LSD at level of significant 0.05%.

Documentation of observations

Camera Nikon digital size 16 was used for Documentation of observations during audit operation.

RESULTS AND DISCUSSION

Assessment of storage practices in warehousing Companies of Groundnut export in North Kordofan State with reference to GSP (WHO, 2019). The result concluded that the General arithmetic mean of GSP category of organization and management in warehousing Companies were score 4.7,4.6,4.2 and 4.2 points in four Companies refilled that full compliance and the two Companies were scored 4.1 and 3.8 points means minor deficiency. Concerning the category of Personnel the result concluded that the general arithmetic means were scored higher than 4.3 points corresponding full compliance in all companies Furthermore the quality system & traceability of food products general means were scored ranged between 4.3, 4.6 in companies F,A ,B and D this results means a full compliance while the warehouses companies C and E were scored 3.4 this results means minor deficiency. Furthermore the general means of GSP, category of premises, warehousing and storage were scored 4.6, 4.6, 4.3 in companies D, F and B this results means a full compliance. Warehouses Company E scored 4.1 is result imply there is minor deficiency. While the rest of warehouses companies A and C were scored 3.2 and 2.9 respectively implying that, there is a major deficiency.

Moreover, the general means of GSP, category vehicles and equipment were scored 4.9, 4.3, 4, 3 and 4.2 in companies F, A, B and D respectively this results indicates a full compliance while the remaining companies' C and E were scored 4.1 this results submits Minor deficiency. Beside the general means of GSP, category of shipping containers and container labeling were scored ranged between 4.6 and 5 in all companies this results indicate a full compliance in all companies. Also the general means of GSP, category of dispatch and receipt, the all warehousing Companies were scored 4.5 indicate a full compliance. Additionally, the general means of GSP, category of documentation the all warehousing Companies were scored 4.2 indicate a full compliance. Furthermore the general means of GSP, category of repacking and relabeling were scored 5 , 4.6 in companies A and B this results means a full compliance, for the remaining companies A, C, D and E were scored 4 this results certainly indicates a (Minor deficiency). Concerning the general means of GSP, category of complaints, the all warehousing companies were scored 4 points these finding indicate a Minor deficiency. Regarding to the general means of GSP, category of recalls, the all warehousing companies were scored 4 points these finding indicate a Minor deficiency. About to the general means of GSP, category of contract activities, three warehousing companies were scored 5 points these outcomes indicate a full compliance. Three warehousing companies were scored 1 implying with not applicable. Around The general means of GSP, category of internal quality audit, two warehousing companies A and F were scored 4.5 indicating a full compliance. Company D scored 4 proposes a minor deficiency. Two companies B and E scored 3 referring to major deficiency. The only C Company scored 1 implying not applicable. Everywhere the general means of GSP, category of self-inspection, the all warehousing companies were scored 4.3 points these discoveries indicate a full compliance. And the general means of GSP, category of measurement, analysis and improvement, three warehousing companies B, D and F were scored

4 points these detections indicate a Minor deficiency and other three companies A, C and E scored 3 points these catch referring to major deficiency.

Table 4: summary Assessment of caps and weak points of each category in warehousing Companies of Groundnut export in North Kordofan State with reference to GSP (WHO, 2019)

Categories of good storage practices	Companies					
	A	B	C	D	E	F
1. Organization and management	(4.2) ^a ±0.8	(4.2) ^a ±0.8	(4.1) ^b ±1.1	(4.6) ^a ±0.5	(3.8) ^b ±0.9	(4.7) ^a ±0.5
2. Personnel	(4.7) ^a ±0.8	(4.3) ^a ±0.8	(4.2) ^a ±1.0	(4.5) ^a ±0.8	(4.3) ^a ±0.8	(4.7) ^a ±0.8
3. Quality system & traceability of food products	(4.6) ^a ±0.5	(4.6) ^a ±0.5	(3.4) ^b ±1.2	(4.6) ^a ±0.5	(3.4) ^b ±0.5	(5.0) ^a ±0.0
4. Premises, warehousing and storage	(3.2) ^c ±1.1	(4.3) ^a ±1.2	(2.9) ^c ±1.0	(4.6) ^a ±1.2	(4.1) ^b ±1.2	(4.6) ^a ±1.1
5. Vehicles and equipment	(4.3) ^a ±1.2	(4.3) ^a ±1.2	(4.1) ^b ±1.5	(4.2) ^a ±0.7	(4.1) ^b ±1.5	(4.9) ^a ±0.7
6. Shipping containers and container labeling	(4.6) ^a ±0.4	(4.6) ^a ±0.4	(4.6) ^a ±0.4	(4.6) ^a ±0.4	(4.6) ^a ±0.4	(4.6) ^a ±0.4
7. Dispatch and receipt	(4.5) ^a ±0.5	(4.5) ^a ±0.5	(4.5) ^a ±0.5	(4.5) ^a ±0.5	(4.5) ^a ±0.5	(4.5) ^a ±0.5
8. Documentation	(4.2) ^a ±0.4	(4.2) ^a ±0.4	(4.2) ^a ±0.4	(4.2) ^a ±0.4	(4.2) ^a ±0.4	(4.2) ^a ±0.4
9. Repacking and relabeling	(4.0) ^b ±0.0	(4.6) ^a ±0.5	(4.0) ^b ±0.0	(4.0) ^b ±0.0	(4.0) ^b ±0.0	(5.0) ^a ±0.0
10. Complaints	(4.0) ^b ±0.0	(4.0) ^b ±0.0	(4.0) ^b ±0.0	(4.0) ^b ±0.0	(4.0) ^b ±0.0	(4.0) ^b ±0.0
11. Recalls	(4.0) ^b ±0.0	(4.0) ^b ±0.0	(4.0) ^b ±0.0	(4.0) ^b ±0.0	(4.0) ^b ±0.0	(4.0) ^b ±0.0
12. Contract Activities	(5.0) ^a ±0.0	(1.0) ^d ±0.0	(1.0) ^d ±0.0	(1.0) ^d ±0.0	(5.0) ^a ±0.0	(5.0) ^a ±0.0

13.Internal quality audit	(4.5) ^a ±0.5	(3.0) ^c ±0.0	(1.0) ^d ±0.0	(4.0) ^b ±0.0	(3.0) ^c ±0.0	(4.5) ^a ±0.5
14.Self-inspections	(4.3) ^a ±0.9	(4.3) ^a ±0.9	(4.3) ^a ±0.9	(4.3) ^a ±0.9	(4.3) ^a ±0.9	(4.3) ^a ±0.9
15. Measurement, Analysis and Improvement	(3.0) ^c ±0.0	(4.0) ^b ±0.0	(2.6) ^c ±0.5	(4.0) ^b ±0.0	(3.0) ^c ±0.0	(4.0) ^b ±0.0

*The same letter funds there no significant different between means in the same row at significant level 0.5%, while the different letter means there is significant different between means in the same row at same of significant different.

* Capital letters means code of warehousing companies

Classification the warehousing Companies of Groundnut export according to Global Food Safety (GFS, 2013)

The result concluded that the obtained total score of storage practices for warehousing Companies A, B, C, and E were 261,260, 221 and 249 points respectively complying with Percentage 76%,75%, 64% and 72% respectively these result finding indicting classified Unsatisfactory outstanding to ($\leq 80\%$). while the warehousing Company D was score 276 points complying with Percentage 83% these outcome indicting classified standard due to ($\geq 80 \leq 84\%$) and the warehousing Company F was score 297 points complying with Percentage 86% these conclusion indicting classified good due to ($\geq 85 \leq 89\%$) according to global food safety.

Table 5: Classification the warehousing Companies of Groundnut export according to Global Food Safety (GFS, 2013)

Code of Companies	Obtained (out of 345 point)	Percentage %	Classification
A	261	76	Unsatisfactory
B	260	75	Unsatisfactory
C	221	64	Unsatisfactory
D	276	83	Standard
E	249	72	Unsatisfactory
F	297	86	Good

$\leq 80\%$ Unsatisfactory, $\geq 80 \leq 84\%$ Standard, $\geq 85 \leq 89\%$ Good, $\geq 90 \leq 94\%$, Excellent, $\geq 95 \leq 100\%$ Superior.

* Capital letters means code of warehousing companies

CONCLUSION AND RECOMMENDATIONS

Conclusion

- Five categories had score full compliance in all warehousing Company compare with GSP of WHO, 2019
- Two categories had score minor deficiency in all warehousing Company compare with GSP of WHO, 2019
- Eighteen categories had score varied between minor deficiency, major deficiency, non compliance and not applicable in warehousing Company compare with GSP of WHO, 2019
- The Warehousing Companies A, B, C, and E were classified Unsatisfactory outstanding, while the warehousing Company D was classified standard and the warehousing Company F was classified good according to global food safety.

Recommendations

All warehousing companies needed to complete system for controlling of temperature and humidity to maintaining raw material and their end products.

The study recommended that the warehousing companies require to application Total Quality Management system (TQM) to ensure food safety and food quality of their raw material and end products as well as increase the power competitive on global level.

- More studies of GSP were needed in other crops export warehousing companies like Gum Arabic and hibiscus, etc. and compare with recommended limit export.
- More research need in all groundnut export of warehousing companies like SOP, GMP, HACCPs and other food safety.
- More studies were needed in all groundnut export of warehousing companies like physical and chemical proprieties and microbiology and compare with recommended limit of groundnut export.

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