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# ASSESSMENT INTO THE TYPES OF EXTRACTOR USED IN JUICE EXTRACTING FACTORIES

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***Abstract***
*A survey was conducted on an assessment into the level of mechanization in juice extracting factories in Southwestern states of Nigeria. This project work adopted the use of a well-structured questionnaire which sought for information related to the objective of the study. Additional information was gathered while administering the questionnaire. The factories were categorized according to extraction methods used in the production of juice. The findings showed that some of the factories in Southwestern Nigeria used natural fruits while others used concentrates for producing juice. It was observed that most of the factories used imported extractors and not locally fabricated ones for producing their juice. It was observed that juice extraction had gone beyond manual to semi- or fully-mechanized operation.*

***Keywords:*** *Mechanization, Juice Extraction, Extractors, Questionnaire, Fruits*

## 1.0 Introduction

### 1.1 Background to the Study

Fruit can be defined as a ripened ovary of a plant containing the seed (Srivastava, 2007). They are valuable sources of vitamin C. These are natural fruit components able to prevent oxidative stress, thus enhancing human health, and should be considered as a key quality attribute of fruits and their products. Due to the high nutritive value of fruits, it makes a significant nutritional contribution to human well-being (Oliveira *et al.*, 2012). Fruits remain one of the most consumed seasonal agricultural produce whose formation is mainly from developed ovary of seed plants. Various fruits such as orange, pineapple, pawpaw and mango are grown in Sub-Saharan parts of Africa. Fruits are good sources of nutrients such as vitamins and minerals (Aremu and Ogunlade, 2016). Fleshy parts of fruits contain high content of water, sugar and dietary fibre which are beneficial to human medicinally (Bates and Crandall, 2001) and have low calorific values (Oguntuyi, 2013). Fruit juice extraction is the process of squeezing the liquid content out of fruits to ease effective processing and storage thereby preventing unnecessary wastage. Some of the unit operations involved in fruit juice extraction are: sorting, grading, rinsing, peeling, cutting, juice formulation, clarification, storage and packaging (Abulude *et al.*, 2007). Extraction can be done manually or mechanically. Recently, different types of juicers have been effectively used for extraction purpose. The common ones are the manual juicers, simple juicers and automatic juicers (masticating juicers and continuous juicers) (Olaniyan, 2010).

Most fruits contain significant quantities of sugars, vitamin A and C which are not abundant in the staple foods of many tropical areas. Apart from their role in human diet, fruits are susceptible to spoilage due to their high moisture content. Losses due to postharvest spoilage in these products can


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occur through infections that occur in the field, during harvest, storage or distribution. These losses can be averted if early processing of these products can be carried out. Lack of low cost and efficient means of processing the product, poor marketing and transport system as well as fruit perishability contribute to more post-harvest losses. Lack of local and simple mechanical means for fruit processing into juice often results in limitation on fruit utilization and thus more post-harvest losses. Juice extraction helps to reduce fruit spoilage (Banji, 2002).

Nigeria is endowed with many indigenous tropical fruits, such as orange, mango, pineapple, guava and cashew. They have great potential for commercial juice production**.** Despite the perishable nature of juices, there are many practical reasons for their manufacture, processing and increased consumption. For instance, the more delicate soft fruits are, the higher the chances of their spoilage when kept over a long period. Hence, juicing is the logical alternative. (Ayandiji and Omotola, 2009). Modern processing, packaging technology and distribution system ensure safe, stable and appealing juice and beverage product (William, 2003). The equipment in fruit processing industries are imported at exorbitant prices which is beyond the reach of the subsistence farmers. Spare parts of these imported extractors are not readily available which has led to the obtaining of data through questionnaires and structured interviews.

## 2.0 Methodology

### 2.1 The Study Area

The study covered extracting factories in Southwestern Nigeria consisted of six (6) states which are: Lagos, Ogun, Ekiti, Ondo, Osun and Oyo states. The study focused on two (2) states within the zone which included Lagos and Oyo.


**Fig 1:** Map showing Lagos and Oyo states in the south western region of Nigeria.



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## 2.2 Sampling techniques

In collecting of samples, two states were visited which are Lagos and Oyo states. The juice processing factories visited in the two states included the followings:

i. Chivita limited
ii. Dansa Food limited
iii. Dean Fruit Drinks Nigeria limited
iv. HDA Fresh Fruit Drinks juice
v. Scubed 100 Fruit Juice
vi. Nigeria Bottling Company (coca-cola)
vii. Vital Product PLC

During the course of administering the questionnaire, permission was not granted to gain access into the production room but only few companies granted us access into their factories with the exception of taking photograph or to see the machine used. These restricted us from getting some vital information on various machines used in the juice production. Also it was noted that not all the factories use natural fruit because of cost and consistence of supply.

i. Most of the factories used imported concentrates in producing the juice.

## 2.3 Research Instrument

The research instrument used for collection of data during the course of this research work was questionnaire, other instrument included: personal observation and oral interview. The total number of questionnaires administered were seventy but only thirty-nine were considered. This was because the remaining thirty-one questionnaire, refused to give information about their factories

### 2.3.1 Questionnaire design

A structured questionnaire was used to obtain information from fruit extracting industries. The information obtained included the name and location of the industry, the year it was established, the type of juice they produce, imported or locally made extractors, the type of maintenance carried out on the extractors

### 2.3.2 Personal observation and oral interview

These were employed to compliment other techniques in providing information on missing links in the volume of the data obtained from the other sources. A total of Seventy workers were interviewed to know the stages in which juice undergoes before it is being produced and also factories which uses concentrates were also interviewed to know how it is being processed to juice form. But only thirty-nine worker gave concrete information on their factories.

## 2.4 Statistical Analysis

The data obtained from the questionnaire were subjected to analyzed using graphs including the use of pie chart and bar chart to show the respective percentages representing the respondents view on each question.

## 3.0 Results and Discussions

### 3.1 Results

During the course of administering the questionnaire, the following observations were realized.

### 3.1.1 Types of extractor used in fruit juice factories

The graph in Figure 1 shows the types of extractors used in the fruit juice factories. The graph indicated that all 39 questionnaires that were sampled imported their extractors into the country for extracting juice while there were no locally fabricated machine for the extraction of juice.

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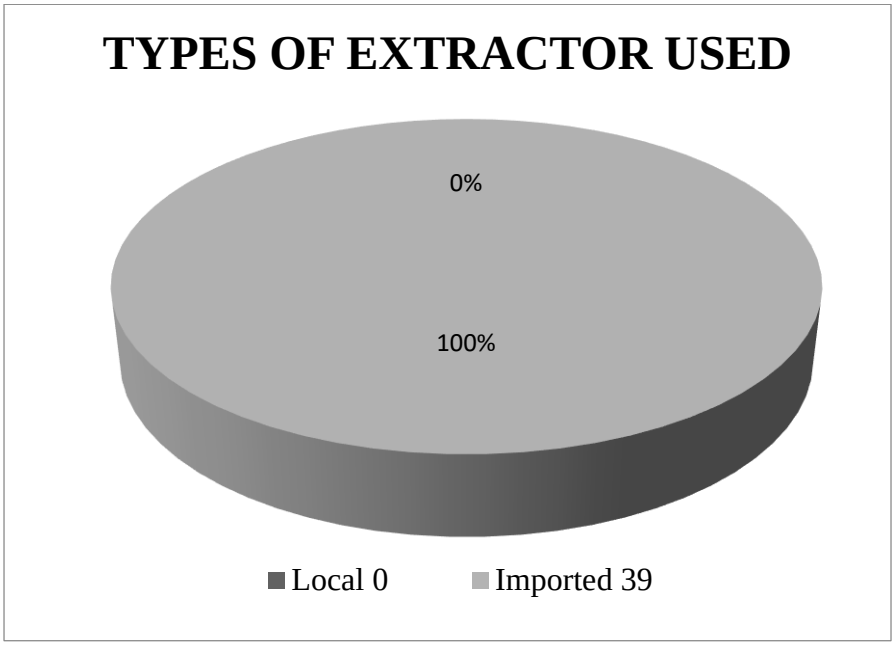


**Fig 2:** Types of Extractor used in Fruit Juice Factories

### 3.1.2 Repair of Machine

The pie chart in Figure 2 shows that most of the factories have maintenance unit and some of them use temporary staff to repair their machine.

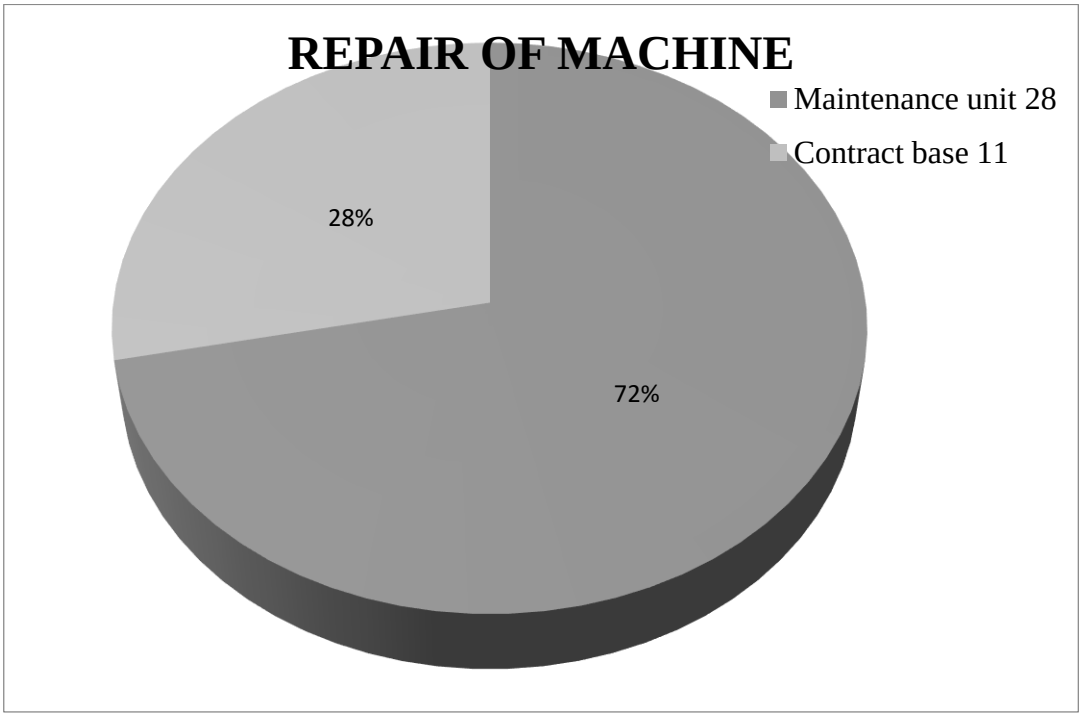


**Figure 3:** Repair of Machine.

### 3.1.3 Type of Extractor used

Figure 3 below shows the type of extractor in which the factory mostly used which indicate that the squeezer type extractor is used by the factories using fruit in the production of juice.



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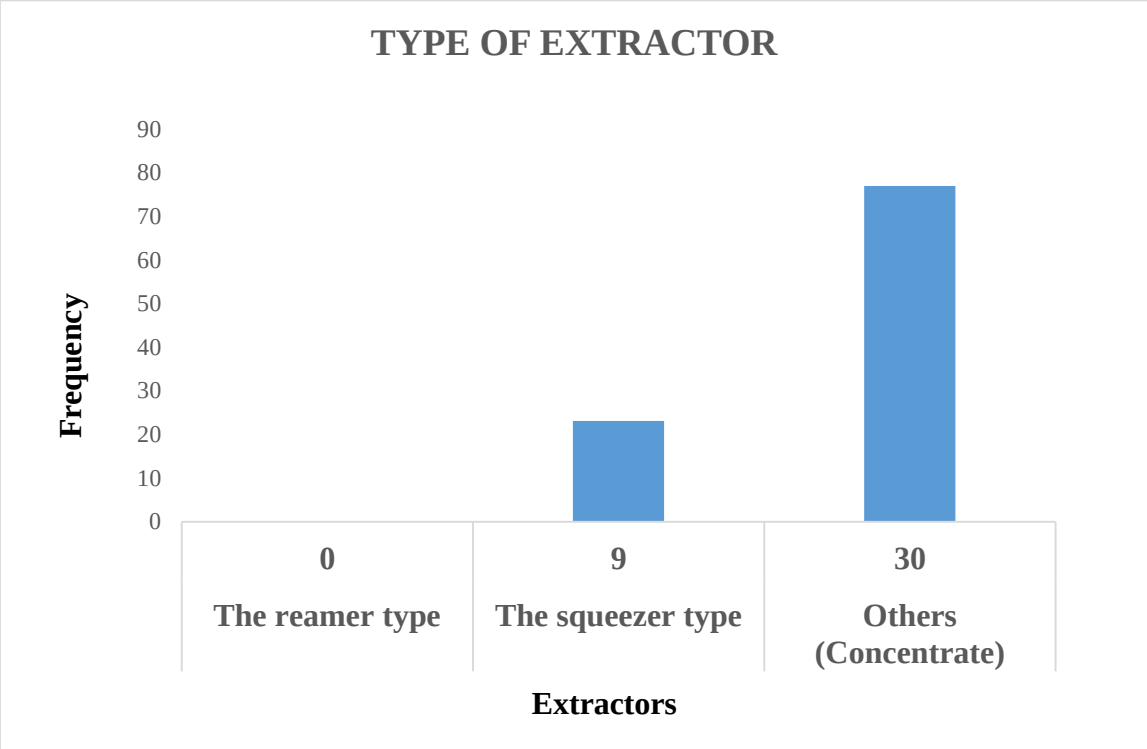


**Figure 4:** Types of Extractor used in the Production of Juice

## 4.0 Discussion

The map shown in Figure 1 showed that Lagos and Oyo states in the south western region of Nigeria were visited to carry out the research while Figure 2 shows the types of extractor used in fruit juice factories in which the factory used in production of juice. The graph shows the number of local extractor and the imported extractor used. As indicated in the graph it shows that all the factories used imported extractors and none of them used local extractors. From Figure 3 above, the factories had maintenance unit in which some of them used contracted based staff to repair their machine. This is because most of these fruit juice extractors are imported and need trained personnel to help in maintaining these extractors for its smooth running. From the graph, it implied that 11 out of the 39 factories sampled, made use of contract staff to carry out maintenance routine on the extractors while the remaining 28 factories made use of 28 trained personnel in the maintenance unit. As a result of contract staff from other countries in maintaining these fruit extractors, the cost of production of fruit juice would adversely be affected leading to the high cost of fruit juice in the market.

Figure 4 shows the types of extractor used in the production of juice which is the Reamer type extractor and the Squeezer type extractor. According to the graph it can be seen that 9 factories used the squeezer type extractor in producing juice while the other 30 factories used concentrates in the production of their juice using an automated machine.

## 5.0 Conclusion and Recommendations

### 5.1 Conclusion

An assessment into the types extractor used in juice extracting factories in south western states was conducted in which, the case study was Lagos and Oyo state. It was deduced that most of the factories used imported (automated) machines which increased the cost of production in the factories and also led to expensive fruit juice in the market. Lastly, staffs that temporarily employed were used in



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maintaining these imported machine. As a result of these, concrete information was not supplied. Also, strict rules were given not to bring cameras to take photographs.

### 5.2 Recommendation

Based on the research conducted, the following recommendations were made:

(i) Local fabrication of fruit juice extractors and other machines used in fruit juice production should be encouraged to reduce the high cost of producing juice.

(ii) More staff should be trained on how to maintain both imported and locally fabricated machines as this would help to reduce the cost of production of fruit juice.

(iii) Government should formulate policies that will enable people to access juice producing companies.

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