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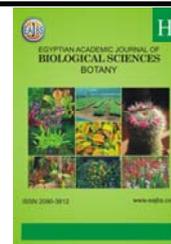
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**Sorghum flour marketing mix (4Ps) in Khartoum state with emphasis on product**

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**ABSTRACT**

Five samples of sorghum flour packages were collected from supermarkets and customer mills in Khartoum state, three were representing customer mills, one representing medium scale mills and the third was from industrial scale. The three packages were subjected to market mix study (4Ps). Product: moisture content of both customer and mid scale mills were close while the moisture content of industrial scale was higher. The industrial scale showed the best quality among the investigated flour samples in terms of color, fineness (granularity) and texture followed by customer mills and mid-scale mills respectively. The packing material varied between paper, white and transparent plastic bags for industrial, mid-scale and customer mills respectively. Price was almost the same for customer mill and industrial scale flours, mid-scale flour package was 20% higher in price. Place the survey showed that the industrial and mid-scale mills flour is not available at the out skirts of the town where the population most depending on sorghum flour as a main stable food, the customer mills have a credit of their availability near the public transport stations. There was no clear promotion targeting the out skirts population for both mid and industrial scale flours. The customer mills depend on their strategic locations and millers also attract customers by good and kind dealing. The study put some recommendations on the marketing mix elements, especially for industrial scale mills.

**Keywords:** Sorghum flour , Khartoum state , marketing mix

**INTRODUCTION**

Sorghum bicolor (L.) Moench, is widely consumed in Africa and Asia and is among the world's major cereal crops, (Dura) ranks as the first cereal been consumed in the Sudan. It is an important element to Sudanese diet as a source of calories and proteins. The Sudan is considered as one of the major sorghum producers; the grain and its flour is used in preparing different types of solid and liquid foods and beverages; sorghum flour is even used in cosmetics and body care (Dilka and Lakhokha). The sorghum crop production contributes approximately 45 per cent of the GDP originating in agriculture, and cereals alone provide nearly 53% of the daily energy supply to the population (FAO and SIFSIA, Sudan Integrated Food Security

Information for Action 2010). Most of This sorghum is milled on stone mills; decorticated or whole depending on consumer preference, since most of the stone mills are operated as customer mills. In the capital and big towns most of the sorghum is decorticated. Little sorghum is milled on commercial mills. Very little sorghum is milled by traditional decortication and saddle stones (Abdelrahim and Mudawi, 2014). The history of sorghum milling in Sudan can be briefed as: Traditional saddle stone milling (Murhaka) with or without decortication (Fandaka), diesel power stone mills, and electromechanical stone mills (Mustafa, 2002). Then in the early 80<sup>th</sup> of the last century, the FAO erected a pilot sorghum milling unit in the food research center. At that time tow major advances of the trade showed up, one was introduction of mechanical decortication units been used with stone milling units. Three or more Dura commercial mills of intermediate capacities were erected at different towns in Sudan. The revolution of sorghum milling technology was introduced by Sayga Flour Mills, one of the leading food companies of the Sudanese private sector. They have high capacity and production under hygiene and scientific conditions.

Sorghum flour market in the Sudan can be divided into three categories. The small units of stone mills equipped with decorticators; working as sorghum flour sellers and service mills as well; this sector is milling the majority of the sorghum grain Fig. 1. The second sector is the intermediate scale which consists of multi stone milling units that doesn't offer milling service; batch mills the grains, packs and sells for whole sale and retailers Fig. 2. The third sector is the large and industry scale represented by Sayga flour mills which have a very advanced system of production and distribution Fig. 3.



Fig. 1: Customer mill.



Fig. 2: Mid scale mill.

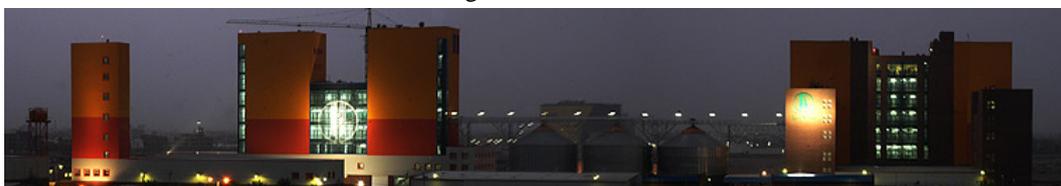


Fig. 3: Industrial scale mill.

The marketing mix is a model of creating and implementing marketing strategies. It stresses the blending of various factors in such a way that both organizational and consumer objectives are attained. (Ai Ling, 2007)

The factors include four elements: product, place, price and promotion, which are referred to as the "Four Ps" or market mix elements (Goi, 2009). The interrelation between market mix elements and consumer is illustrated in Fig. 4. Product as a market mix element includes: product quality, packaging and labeling, and developing new products when necessary. Products presentation style appeals and attracts consumers, (De Silva, 2011). Place as marketing mix element is referred to as availability of the product or service at the market place. Price includes the customer price sensitive, discounts offered to trade customers and the price compared to the competitors. Promotion is how to send your product messages, what media will you use, and how do you attract the consumer to buy your product; another critical point was mentioned by (Smart draw.com) is how do your competitors do their promotions.



Fig. 4: Marketing mix.

The interrelation between the 4Ps of marketing, or market mix is the key of successful marketing strategy. The P4s like a cake, all cakes need 4 ingredients: flour, egg, sugar, milk. However, you can play with the flavor of your cake by changing the ingredients slightly. (Wee and Chan, 1989) found that the pricing strategies and advertising appeals must also be adapted to suit the consumer's needs. (Ai Ling, 2007) studied retail markets and came up with the facts that price is the most motivating factor (61.3%) followed by promotions (21.0%), place/distribution (17.6%) and last but not least product (14.5%). It simply means that customer perceive value of price is the highest factor which drive them to shop at the respective retail store followed by promotions, place/distribution and product (Ai Ling, 2007). (Rohrbach and J A B Kiriwaggulu, 2007) A substantial opportunity clearly exists for the production and sale of sorghum and pearl millet meal. Market development activities should include efforts to promote the production and delivery of high quality grain. And the price sensitivity of consumer demand needs to be evaluated. The objectives of this paper were: to evaluate the sorghum flour market mix in Khartoum state, with emphasis on product, and to recommend some marketing solutions for sorghum flour produced by the industry scale.

## MATERIALS AND METHODS

### Materials

Flour samples were collected from three customer mills in Khartoum state; two packages 1Kg were collected from local supermarket one is produced by industrial

scale mill branded (Zadna) and the other was from medium scale branded (Wad Elmustafa).

The samples were then kept for analysis.

## Methods

### Moisture content

Perten NIR flour analyzer type 8600/01 calibrated for sorghum flour was used to determine moisture content.

### Color

Pekar Flour Color Test was used to evaluate flour color, or "slick" test, it involves placing a small sample of the test flour on a paddle or other flat surface so that one edge forms a straight line next to a similarly placed sample of a standard flour. Both samples are then slicked with an edge to form a smooth surface that exhibits a distinct line of demarcation between the two flours so that any difference in their color becomes evident. (Baking Business, 2014).

### Texture

Flour texture was tested by hand feeling by gently pressing some flour between fingers.

### Granularity through 212 microns

A laboratory sifter (Antriebstechnik type KM10/80-4EVB5S) equipped with sieve of 220 micron were used for granulation test. The sample size was 70 gm; the sifting time was 7 minutes, the overtails were weighed and percent throughs were calculated as performed by (Abdelrahim, 2002).

### Package weight

Scale was used to determine package weight.

### Survey

Some small groceries were visited and asked about the availability of sorghum flour and the type of sorghum flour they have. The small groceries were chosen for this study were located at the out skirts of the town.

### Statistical analysis

Simple mean of three tests were calculated to present any tested category.

## RESULTS AND DISCUSSION

### Product

product quality parameters tested were moisture, granularity and fineness, color and texture, results are illustrated in Table1. The moisture content of flours was found to be 6.5, 6.3 and 9.6% for customer mills, mid scale and industrial scale mills respectively. The moisture of the customer mills and mid scale mills were comparable may be due to the same milling techniques used, and the customer mill flour moisture is little bit higher because it is more freshly milled than the mid scale flour, which is subjected to handling and may be to storage.

Table 1: Flour quality

	Color	Texture	Fineness % through 212	Moisture
Small mills	Less dark	Gritty/ very gritty	98.4	6.5
Mid scale mills	Dark	Very gritty	88.8	6.3
Industry scale	Relatively white	Soft	100	9.6

However these values are within the range of 5.7-10.4 reported by (Yousif and Magboul 1972) for Sudanese sorghum. While the color of the industrial scale flour gave the best result among the evaluated samples followed by customer mills. The

granularity test results are exhibited in Table 1. Industrial scale flour gave the best fineness result followed by customer mills and mid scale mill. There is a great variation between mid scale mill flour (88% through 220micron) compared to 100%, 98.4 of industrial scale and customer mill flours respectively. This could be attributed to stones condition of the mill or improper decortication. These variations are also reflected on the flours texture.

The packing material used by customer mills is transparent hand tightened plastic bag average weighing 518 gm exhibited on shelf inside or at the front of the mill. While the mid scale mills uses sealed white plastic bag weighing 1 Kg. The industrial scale mills are using paper bag of 1Kg (Table 2).

Table 2: package

	Average weight gms	Packing material
Small mills	518	Transparent plastic bag
Mid scale mills	1000	White plastic bag
Industry scale	1000	Paper bag

Both the intermediate and industry scale have an added value by printing labels illustrating the expert date and the logo and the contents; this category is not available with customer mill.

### Price

Price is the most motivating factor which drives people to shop, the prices are presented in Table 3; there is no difference between flour produced by customer mills and industry scale. The mid scale is 20% higher in price. This difference will affect the demand especially in the small groceries at the out skirts of the town where the Survey of availability was performed.

Table 3: Price

	Price per Kg SDG
Small mills	1.93
Mid scale mills	2.5
Industry scale	2

### Place

Place is strongly connected to availability of the product, easy layout and near to public transport. The conducted survey showed that there is no sorghum flour of any type at the small groceries at the out skirts of Khartoum, residents of these areas are from up country and these are the real consumers of sorghum flour. They bring their sorghum flour from customer mills which are located very near to the public transport and this is an added value to their business.

### Promotion

There is no clear promotion strategy for mid scale and customer mill. Customer mills depend on their location and the millers deal with their customers very kindly. Though the industry scale has very big and professional promotion team it did not reach the out skirts as if the small groceries are not one of their target market. However this sector has a great opportunity sell their product at these areas.

## RECOMMENDATIONS

- 1- A 500gm package of sorghum flour can be packed for special customer of the outskirts of towns same as the package offered by customer mills, there is a great room for open and active market.

- 2- Distribution of sorghum flour could be expanded to reach the outskirts of towns small groceries.
- 3- The price as figured out by this paper is almost same as the customer mills, and 20% less in price than the mid scale mills , with a reasonable promotion the large scale mill product can compete and find new markets.
- 4- A target group promotion is required for the out skirts of the towns; this will help marketing in this important area, where the sorghum flour is daily consumed.

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