



Open Science: Making hand sanitizer using locally available resources in South Sudan in the time of Covid 19.

Abstract

This study examined local methods to produce Ethanol (Suku Suku) which is a key ingredient in hand sanitizers and locally available ingredients to make a hand sanitizer and carryout quality analysis and assurance. Data were collected from 36 residents of Juba who were given the hand sanitizer to use within Juba. Results showed that the product leaves hands moisturized, the smell is good, and majority are willing to pay for the product if the cost is less than one thousand South Sudanese Pounds.

Through a series of different experiments conducted, theoretical and practical implications were discussed.

Introduction

This report looks in to how an effective hand sanitizer (Gosanitize) is made as per World Health Organization (WHO) recommendations using locally available resources in South Sudan in the times of COVID 19.

Executive Summary

South Sudan joined the rest of the world in the fight against COVID19; a virus that was declared as a pandemic by the World Health Organization, WHO and as result, communities have gone into lock-down since it was not business as usual around the world.

As a country that depends on imports from neighboring countries but at a time like that the supply do not meet the demand or the prices for the commodities are so high that they are not affordable for the average South Sudanese. To fight the spread of the disease, some recommendations like washing hands with soap or using an alcohol-based sanitizer have been put in place. However, the supply of these hand sanitizers is low and the ones available in the market are expensive and some do not actually meet the WHO recommendation of at least 65% alcohol content for an effective hand sanitizer giving a false sense of security from COVID19 to those who use them.

Objectives

- To promote local innovation in South Sudan through open science innovation. This objective encourages schools to create alternatives for classroom science experiments using local inexpensive substitute reagents.
- To empower local South Sudanese communities as solution creators and improve their livelihood. This objective seeks to include women in communities who brew alcohol locally so that they can contribute to the fight against COVID19 as suppliers of alcohol that is a key ingredient in hand sanitizers.
- To create an open document science frame work for making effective hand sanitizers locally by communities themselves.

Body

This section includes the activities, procedures and methods used to produce a quality hand sanitizer using locally available sourced resources.

Activity 1

This activity focused on the enlightenment of women brewers on the production of Ethanol (Suk Suk) locally.

The nine local female brewers and GoGirls team exchanged notes on how they could produce the Ethanol (Suk Suk) locally.

The local female brewers shared experiences with the team and concluded on the following ingredients to produce Ethanol such as; Dates (Balah), Oranges, Sugar and Kemira (Yeast) and maximum five days of fermentation and distillation on the 6th day.

To minimize losses and wastage of ingredients, the women agreed on production of 3 Litres each of Ethanol totaling to 27Litres.

The brewers and GoGirls team agreed on 6kgs of sugar, 1kg of Dates, 3 tea cups of Yeast and 15 pieces of oranges to each woman to produce the first sample of 27 Litres of Ethanol.

To make effective hand sanitizers that would meet the WHO recommendations of at least 60% of alcohol, GoGirls team agreed on this quality controls such as;

- Skin burns avoidance -Aloe vera gel and orange peelings were used.
- Allergy Control through masking the alcohol smell.
- Target concentration of 70%.

And checking the alcohol concentration using the boiling point of 78.5%.

Activity 11

This activity focused on the production of the Ethanol, testing it for quality and making of the hand sanitizer.

Phase 1 – Sample trial of 22.5 Litres of Ethanol.

To each of the brewers, 6kgs of sugar, 1kg of Dates, 3 tea cups of yeast and 15 pieces of oranges were dispatched to their different locations to start the fermentation process.

Six of the women fermented the alcohol for 6 days, two for 5 days and one woman for 1 day before distilling it. The Orange epicarps were added on the day of distillation to the crude.

The brewers were followed up through visitation to their homes and teleconference calls to keep track of the fermentation and distillation process.

Within 7 days, 22.5 litres of Ethanol were delivered by the women for quality testing of the samples produced.

Testing process.

Due to the poor infrastructure and lack of accessible laboratories to conduct the alcohol-based testing using alcolizers, a stock solution of 95% Ethanol sample was collected from Comboni Secondary school to compare with the results of the samples distilled by the women.

Method 1

Finding density and Molarity of the 22.5 Litres of distillate compared to Stock Solution.

We purchased two different kitchen weighing scales to compare masses to find the densities of the 22.5 litres of Ethanol in g/cm³ distilled and compared it to the stock solution that was 0.8g/cm³ as labeled on stock bottle and water. The results were compared to the molarity of the stock solution and water to find the exact percentages of the distilled Ethyl alcohol as illustrated in Table 1 and 11.

Observation

- Uniform densities of alcohol brewed by the women.
- To re-affirm the densities and percentages, we conducted another test on this 22.5 Litres and Stock Solution.

Method 2

We conducted combustion analysis on each of the samples and compared the percentages with the 95% Stock solution as illustrated in Table 1 and 11.

Observation

- Varying percentages of the different samples of the Ethanol brewed compared to their densities and Stock Solution.
- As a result, we observed that the kitchen weighing scale was giving us uniform densities meaning quality was compromised.

Lessons from phase 1

- Constant visit to the brewers' home and guidance throughout the fermentation and distillation process was not done thus, Ethanol target concentration of 70% were not achieved by most of the brewers.
- Onsite testing of samples as the women distilled in their homes if we were to achieve the target concentration of 70%.

Phase 11 – Production of the 200 Litres of Ethanol

Based on the lessons learnt from phase 1, the second distribution of ingredients to each of the nine brewers were as follows; 20kilograms of Sugar, 12kilograms of Dates, 15 tea cups of Kemira and 45 oranges as illustrated on table 11.

The Process

From the fermentation to the distillation process, the women were guided and instructed in their homes on how to brew and distill by the Chemistry teachers.

Onsite combustion analysis tests were conducted to approximate the alcohol percentage on each sample distilled by the brewers before they could continue distilling the Ethanol.

Testing Process

The Team acquired another sample of 95% Ethanol from South Sudan Breweries Limited (SSBL) to compare the results of Ethanol distilled by the women by finding their densities and conducting a combustion analysis on each sample.

Observation

- Higher concentrations of the Ethanol distilled, with the highest being 96% and lowest 71% which reflects a tremendous change in the quality of Ethanol compared to phase 1 as illustrated in table 11.

Results

- 90 litres of Ethanol distilled with a target concentration of 70%.

Phase 111

This involved the extraction of the gel to be used as a moisturizer from the Aloe Vera Leaf in the making of the hand sanitizers.

And from this process, we observed that we could only use fresh extracted gel that should be mixed with the Ethanol immediately to reduce the oxidation process of the gel.

Challenge.

- We had mobilized two young women to extract 40 litres of gel from the Aloe Vera Leaf that went bad because it was not kept in a freezer.

Lesson

- For making of hand sanitizers, fresh gel is much needed as the longer the gel stayed exposed, oxidation take place and thus, the gel changes to Orange.

Phase 1V

This involved the mixing of Ethanol and Aloe vera Gel to make the hand sanitizers.

The Ethyl alcohol volumes were all tested, and the average volume of the Ethanol was calculated as 79% and the team used the dilution law to know how much Aloe vera gel to be used in the preparation of the hand sanitizer (Gosanitize) as illustrated in Table 1.

This solution was left for 3 days (72hours) to heal itself from any germs before use as WHO suggests.

Activity 111

The activity focused on getting feedback from Juba residents to understand their views about the hand sanitizer so that the team could be in position to make informed decisions.

The Launch Day

The team presented the hand Sanitizers at Dr. John Garang International school during the Mandela Day celebration to the residents of Juba who used the hand sanitizers, filled in the questionnaires and provided feedback. This section summarized all the activities carried out to make the production of an effective hand Sanitizer.

Data Collection Methods and tools.

For the purposes of this research, questionnaires were used. Customer satisfaction questionnaires were given out and we had an interaction about the hand sanitizers with Juba residents that came for the product launch day at Dr. John Garang International School and Juba Day Secondary School. Sample Questionnaire can be found under the Appendix. This study was conducted to determine if the product met the set quality controls by the team. The main advantage of this is that we can determine the customer satisfaction level with the product. Thirty-six residents of Juba were given the hand sanitizers to use and questionnaires to provide their feedback about the product. This data was analyzed using Microsoft Excel. Results showed that most of the Juba residents agreed that the hand sanitizer leaves their hand moisturized and the smell is good. With majority purchasing their hand sanitizer from supermarkets, they would be willing to pay less than 1000 SSP for the product and that explains why the hand sanitizer packaging and labeling is good as it is portable, communicates a message and is affordable by the community as compared to other hand sanitizers in the market as reflected in appendices 1 and 11(a,b,c,d).

Price Projection

Based on the market survey of the different resources that were needed to produce the hand sanitizer, about 150 litres of the hand sanitizer, costed 1500 US dollars. Through this survey, we identified farmers who would supply lemons and Aloe vera from their farms at an affordable price as compared to the market prices as highlighted in appendix 11.

Outcome

- I. 10 South Sudanese women knew about the importance of the alcohol they brew in the fight against COVID 19.
- II. Chemistry teachers put their theories to practice
- III. An affordable hand sanitizer was made, and laboratory tests run on the product.
- IV. Open documentation and publication of the documents Research.

Challenges

- I. Lack of accessible laboratories and testing equipment prolonged the production phase 11 as we tried out several methods on the 22.5 litres trial sample to ascertain the Ethanol target concentration of 70%. Most of the tests were carried out between Juba Day Secondary School and GoGirls office.
- II. Since the fermentation and distillation process was done by the brewers from their homes, the raw materials were dispatched to each site of the brewers and the constant follow-up onsite on phase 11 throughout the process became costly as we spent a lot on transport from one location to the other.
- III. Lack of packaging containers and kitchen weighing scale locally that we had to be imported from the neighboring country which resulted in delays.
- IV. Being a research phase of a product, several mistakes and errors were made during the experimentation process. The Ethanol samples with less than the target concentration of 70% had to be double distilled to achieve the target thus reduction in quantity of Ethanol though quality high.
- V. Some of the women were reluctant to put into practice the suggestions given to them by the team. This affected the quality of the Ethanol they produced, and it had to be double distilled to achieve the target concentration. Though, this could have been avoided if the women were brewing from a centralized place as monitoring and guiding them becomes easy with the team. But since the team had to move from one location to another, it became very challenging thus, need for space.

Lessons learnt and Recommendations:

- I. Conducting the production in one place would be cost effective thus need for space.
- II. If there are funds, scaling up will not be a challenge as the 9 local brewers are now equipped with skills and knowledge to produce Ethanol of the target concentration of 70%.
- III. This whole process broadened the science knowledge of Chemistry teachers and they put theories to practice.
- IV. Collaborating with the local female brewers and chemistry teachers from the secondary schools was key to the success of this project.
- V. Since the brewers have mastered the skill of making high concentration Ethanol (Suku Suku), this project is easily scalable.
- VI. The team managed to get an empty space where incase, they do get at least two containers that will be turned into a laboratory, packaging and storage place for Gosanitize.

To determine whether this project could be scalable and profitable, let's look in to some of these key aspects such as;

I. Technical Analysis

We assess the details of how we intend to produce the hand sanitizers in large quantities by looking into these specific areas of labor, inputs and facilities and equipment.

Labor

We cannot talk of a business without highlighting the expertise that the team has.

- From the experimental phase, we worked with five chemistry teachers who are experts and understand the details of production from the raw materials to the final product which is the hand sanitizer thus, this readily reduces on the time and cost to get a new team on board.
- The nine local brewers have been trained on how to produce the target concentration of 70% Ethanol. Through the experimentation phase, we also identified two brewers who could train the other local brewers in case we need more brewers to join during the production phase.
- Two chemistry experts will train two people on how to make packaging boxes for the hand sanitizers distribution to the market from recycled A4 paper. Since most businesses or offices throw a way these boxes, the team will collect this boxes from these respective shops and perhaps organizations in the long run to recycle and use them. This will reduce costs incurred in purchasing such containers from the neighboring countries but instead, provide portable storage containers for easy distribution of hand sanitizers and at the same time create an eco-friendly storage thus, creating employment.
- Being a new product in the market, the team is thinking of partnership with MTN e-business to help reach the target market and potential buyers of its product as its market entry point when they start mass production.

2. Facilities and Equipment

- For the start, GoGirls ICT Initiative office will double as Gosanitize office until we can be able to secure a place of its own in the long run.
- During the experimentation phase, the women brewed the Ethy Alcohol from their homes using their available resources, thus, this become cheap as we only paid for labor, water and firewood. We will continue with the same model.
- The Gosanitize team will need to have a mini-lab in place that will double as its production and storage area for the hand sanitizers which is a onetime investment. During the experimentation phase, the team was doing testing, mixing and production of the hand sanitizers between Juba day secondary school and GoGirls Office that became costly in terms of transport because of constant movement between the two places, thus, having a laboratory would equal to reduced transport costs.
- Much as the team identified simple methods to do the production of the hand sanitizers, one-time investment in alcalizers would improve on efficiency.

3. Inputs

- Based on lessons from experimentation phase, local suppliers of raw materials will be identified for example, it's cheaper to purchase lemon straight from the farm than from the market likewise with Aloe Vera. Hence, we will have supplier's terms and conditions to engage with the different farmers to get these raw materials.
- And, we noticed that during seasons where lemons and Aloe vera as in plenty in the market, the demand is low, thus, prices of these raw materials will be cheap, so we could have mass production of hand sanitizers during this time instead.

2. Market Analysis

- Due to the pandemic, there is a still a high demand for hygiene items such as hand sanitizers and disinfectants and hand sanitizers are one of them. The fact that South Sudan depends on imports, the prices of this items are high since they are on demand. The whole production phase, gives us the flexibility to also make other products such as disinfectants, Ethanol for school chemistry practicals and rubbing alcohol which is mainly used in hospitals and clinics. This gives us room to easily diversify our production without incurring extra production costs to create another revenue stream for Gosanitize.
- Through partnership with MTN e-business platform, we can easily reach our target market and customers within South Sudan. This enable us to do direct selling to consumers through personal contact arrangements, selling through intermediaries such as whole sales and retailers to make the product available to the customers.
- To reach out to the online community, we will create a social media platform for Gosanitize. This will give us an opportunity to engage with our customers online through suggestions and discussions. This feedback will also help us to understand further how customers respond to our product.
- As reflected in Appendix 1 and 11 (b), our product is of a lower price compared to the products in the market and meets the WHO recommendations. And cheaper, if a customer brings their container for refilling.
- The fact that production is within, customers will spend less on transport costs as no taxes will be incurred with logistical movements within South Sudan thus, making it cheap.

3. Financial Analysis

Projects how much start-up capital is needed, sources of capital, returns on investment, and other financial considerations. It looks at how much cash is required, where it will come from, and how it will be spent.

Startup and operational Costs.

The startup and operational costs are the expenses incurred during the scalability of this project. This include;

- One-time investment on a mini-lab and alcalizers,
- Allowances for the brewers and chemistry experts.
- Raw materials
- Sales and Marketing Costs
- South Sudan National Bureau of Standards fees once a year.
- Utility costs for the laboratory.
- Logistical costs
- Rental cost for the space where the Laboratory will be.
- At least one container which will be turned into a laboratory (Onetime cost)
- PR materials for the product.
- Professional fees such as for hiring a Sales person, finance, two persons to make packaging boxes, 10 brewers, 5 chemistry teachers and allowance for 3 team members from GoGirls ICT Initiative.
- Packaging containers and Jerrycans.

Financing

Based on our projected cost of production as reflected in Appendix 111, the projected cost of production of 1 Litre of Gosanitize is 21 USD at a projected cost of 3125 US Dollars.

The 200Litres actual cost of production was 7686 USD. The actual cost of production of 1Litre was 38 USD during the experimental phase.

If large mass production is to take place, there will be a tremendous reduction in costs on some of the items since they can be reused and experimental errors as result of all possibilities be tested out during the experimental phase.

4. Schedule

Based on Table 11, we can conclude that within 10 days, we will have our hand sanitizer ready for use.

Conclusion

The goal of this study was to present a systematic procedure for the preparation of an effective hand sanitizer as per WHO recommendations using locally available sourced materials in South Sudan in the times of COVID19.

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Appendix

Table 1: Shows the two methods we used to test the Ethyl alcohol, Addition of Aloe Vera, orange epicarps and preparation of Gosanitze.

<p>1. Analysis of Stock Solution, 95% Ethanol 50cm³ weighed 40grams 1cm³ weighed $1 \times 40/50$ = 0.8g/cm³ as labeled on stock bottles</p>	<p>2. Analysis of SukuSuku 50cm³ weighed 46g 1cm³ weighed $1 \times 46/50$ =0.92/cm³</p>
<p>Questions of focus :</p> <p>(a) What could be the %age of Ethanol in Suku Suku? (b) What could be the density of the Aloe Vera extract? (c) How could we measure the %age of Ethanol after dilution?</p>	
<p>Method 1. Finding the density and Molarity of Ethyl Alcohol sample.</p> <p>Percentage of Ethyl alcohol in Suku Suku Molarity of Stock $= \% \times \text{density} \times 1000/100 \times \text{RMM}$ $= 95 \times 0.8 \times 1000/100 \times 46$ $= 16.5\text{M}$ Molarity of Stock = Molarity of Suku Suku $16.5 = \% \times 0.92 \times 1000/100 \times 46$ =83%</p>	<p>Finding the density of Fresh Aloe Vera Gel: 50cm³ gives 48g 1cm gives x $48 \times 1/50 = x$ x = 0.96gm approx. 1g Density of Aloe Vera Gel = 1g</p> <p>Addition of Aloe Vera Use dilution Law $\%1V1 = \%2V2$ (Density of aloe = density of H₂O)</p>
<p>Method 2. Using Combustion Analysis (CA)</p> <p>Analysis of SSBL Stock of Ethanol: Density= 0.76g/cm³ as labeled on Stock bottles. % Combustion Analysis (CA) =95 Combustion Analysis Method $\% \text{ Volume} = (\text{Initial Volume}) - (\text{Final Volume}) / (\text{Initial Volume}) \times 100\%$ With all the samples, we used the Initial Volume of 20cm³ as a constant volume to reduce errors and wastage to calculate the Ethyl alcohol percentages. N.B Phase 1 – Sample trial of 22.5 Litres of</p>	<p>$83 \times 100 = 70 \times V2$ $V2 = 83 \times 100/70$ $= 118.5\text{cm}^3$ Approx. 119cm³</p> <p>Finding the mass of Orange epicarps (Peelings) 4 orange epicarps gives 190g which is 0.19kgs Approximation 0.2kgs</p>

Ethanol. When carrying out the combustion analysis, we introduced (added) a constant of 7 to all the results obtained to cover any experimental error.

$$\% \text{ Volume} = (\text{Initial Volume}) - (\text{Final Volume}) / (\text{Initial Volume}) * 100\% + 7$$

Phase 11 – Production of the 200 Litres of Ethanol.

The introduced constant of 7 was eliminated as the Ethanol (Suku Suku) concentrations were all high.

$$\% \text{ Volume} = (\text{Initial Volume}) - (\text{Final Volume}) / (\text{Initial Volume}) * 100\%.$$

Preparation of Gosanitizer

$$\text{Volume to be diluted} = \frac{\text{total volume} \times \text{percentage required}}{\text{percentage of stock}}$$

For 20 litres (20000ml)

$$\text{Volume to be diluted} = \frac{20000 \times 70}{79} = 17722 \text{ ml}$$

$$\text{Aloe vol} = 20000 - 17722 = 2278 \text{ ml}$$

Taking proportions;

Total Volume: Alcohol : Aloe

For 20000 : 17722 : 2278

For 22600 ml : 20025 ml : 2575 ml

Table 11: Activity sheet showing the different results of the distilled Ethyl Alcohol, fermentation and distillation process.

Women Brewers Activity Sheet for #GoSanitize Project														
1st Distribution of Raw Materials														
Name of Person	Location	Contact	Items distributed				Start of Fermentation Process		Distillation		Densities of Alc. g/cm ³	% (Tests) Combustion Analysis	Visitation Day	Follow Up
			Sugar (Kgs)	Dates (Balah) / Kgs	Yeast (Kemira) (Cups)	Oranges / Pcs			Litres					
Jesica Pita	Nyakuron (NSS Road)	211,922,683,594	6	1	3	15	Sunday – 21.06.2020	Saturday 27.06.2020	2.5ltrs	0.96	44	Sunday	Yine Beatrice	
Cecilia Jaguru	Nyakuron (Hai Seminary)	211,924,047,862	6	1	3	15	Sunday – 21.06.2020	Saturday 26.06.2020	2.5ltrs	0.96	65	Sunday	Yine Beatrice	
Cecilia Poni	Nyakuron	211,925,636,451	6	1	3	15	Sunday – 21.06.2020	Friday 26.06.2020	2.5ltrs	0.96	36	Sunday	Yine Beatrice	
Diana Achayol/ Amongin	Juba Day Area	211,921,601,963	6	1	3	15	Friday – 19.06.2020	Thursday 25.06.2020	2.5ltrs	0.88	72	Phone calls	Yine Beatrice	
Wilma Poni	Commercial Area	211,929,600,100	6	1	3	15	Friday – 19.06.2020	Thursday 25.06.2020	2.5ltrs	0.92	22	Phone calls	Yine Beatrice	
Achiro Benson	Kator	211,921,709,894	6	1	3	15	Friday – 19.06.2020	Wednesday 24.06.2020	2.5ltrs	0.90	73	Phone calls	Yine Beatrice	
Cecilia Awate	Juba Na Bari	211,921,697,118	6	1	3	15	Friday – 19.06.2020	Tuesday 23.06.2020	2.5ltrs	0.88	68	Friday	Yine Beatrice	
Valeria M. Masiliana	Jebel Yesua	211,921,284,744	6	1	3	15	Friday – 19.06.2020	Thursday 25.06.2020	2.5ltrs	0.93	50	Phone calls	Yine Beatrice	
Lona Alphonse	Commercial Area	211,922,188,164	6	1	3	15	Friday – 19.06.2020	Thursday 25.06.2020	2.5ltrs	0.92	48	Phone calls	Yine Beatrice	
2nd Distribution of Raw Materials														
Jesica Pita	Nyakuron (NSS Road)	211,922,683,594	20	12	15 cups	48	Sunday,5.07.2020	Saturday,11.07.2020	10ltrs	0.88	74	Monday, Wednesday & Saturday	Yine Beatrice & Lukudu Philip	
Cecilia Jaguru	Nyakuron (Hai Seminary)	211,924,047,862	20	12	15 cups	48	Saturday,4.07.2020	Saturday,11.07.2021	10ltrs	0.88	86	Monday, Saturday & phone calls	Yine Beatrice & Lukudu Philip	
Cecilia Poni	Nyakuron	211,925,636,451	20	12	15 cups	48	Saturday,4.07.2020	Friday,10.07.2020	10ltrs	0.88	79	Monday, Friday & phone calls	Yine Beatrice & Lukudu Philip	
Diana Achayol/ Amongin	Juba Day Area	211,921,601,963	20	12	15 cups	48	Monday, 6.07.2020	Sunday, 12.07.2020	10ltrs	0.8	78	Sunday and phone calls	Yine Beatrice & Lukudu Philip	
Wilma Poni	Commercial Area	211,929,600,100	20	12	15 cups	48	Thursday,2.07.2020	Saturday, 11.07.2020	10ltrs	0.88	71	Monday, Wednesday, Saturday & phone calls	Yine Beatrice & Lukudu Philip	
Achiro Benson	Kator	211,921,709,894	20	12	15 cups	48	Thursday,2.07.2020	Wednesday, 8.07.2020	10ltrs	0.88	82	Wednesday & phone calls	Yine Beatrice & Lukudu Philip	
Cecilia Awate (Re-distilled by Jaguru)	Juba Na Bari	211,921,697,118	20	12	15 cups	48	Saturday,4.07.2020	Friday,10.07.2020	10ltrs	0.8	96	Tuesday, Friday & phone calls	Yine Beatrice & Lukudu Philip	
Valeria M. Masiliana	Jebel Yesua	211,921,284,744	20	12	15 cups	48	Saturday,4.07.2020	Friday,10.07.2020	10ltrs	0.8	77	Tuesday, Friday & phone calls	Yine Beatrice & Lukudu Philip	
Lona Alphonse	Commercial Area	211,922,188,164	20	12	15 cups	48	Friday,3.07.2020	Saturday, 11.07.2020	10ltrs	0.88	71	Wednesday, Saturday & phone calls	Yine Beatrice & Lukudu Philip	

Sample Questionnaire

GoSanitize Questionnaire

Introduction

Dear sir/madam, we are the GoGirls ICT team, a technology organisation that creates awareness in technology and STEAM (Science, Technology, Engineering, Art and Mathematics). We have recently developed a product with secondary school chemistry teachers; a hand sanitiser called **GoSanitize** from alcohol distilled by local female South Sudanese, and we would like to get your feedback about the product. We promise to keep you feedback confidential and protect your identity. Thank you

Instructions

Choose all the responses that apply to you.

Demographic question

- (a) Gender: M F
- (b) Age: below 20 below 25 below 30 below 35 above 35
- (c) Location: _____

Questions

1. what do you think of the name of the product (GoSanitize)?

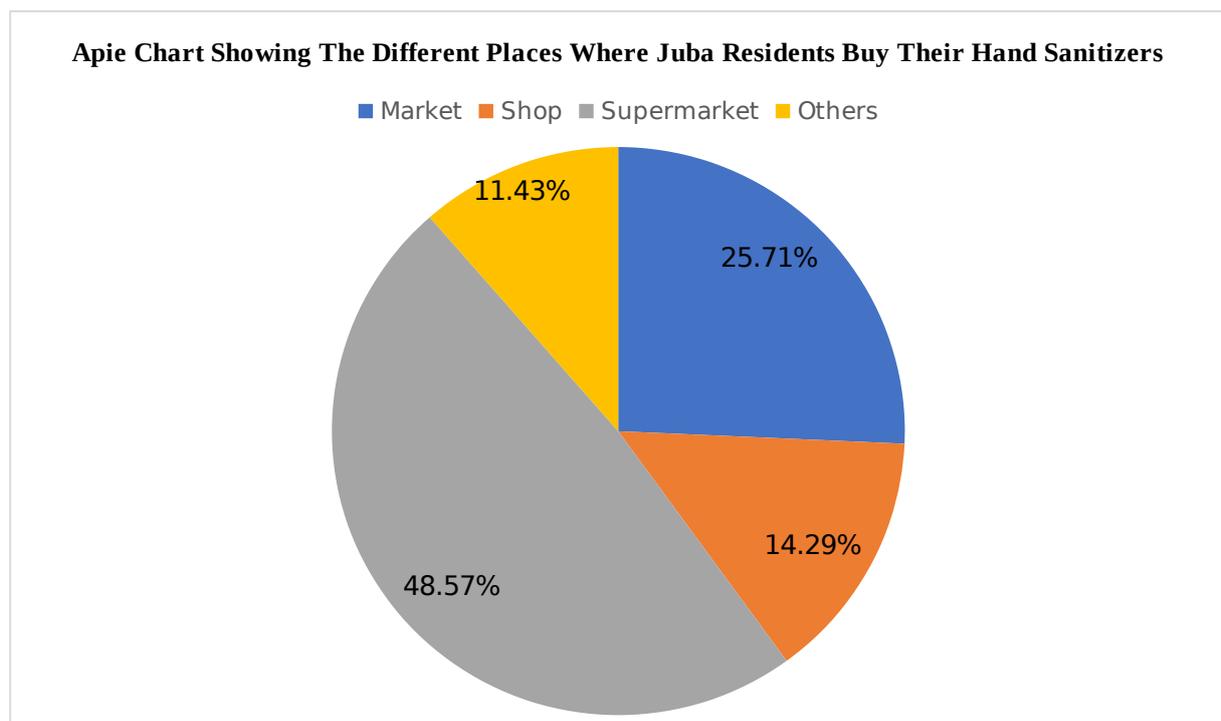
2. What is your opinion on the sanitiser?
 - Dries my hands
 - burns my skin
 - takes long to dry
 - leaves my hands moisturised
 - other (specify) _____
3. How much are you willing to pay for the product?
 - 0 SSP
 - Less than 500 SSP
 - Less than 1000 SSP
 - Not more than 1500 SSP
 - Other (specify) _____
4. where do you always buy your hand sanitizer?
 - Market
 - Shop
 - Supermarket
 - Other (specify) _____
5. What is your opinion on the hand sanitizer packaging and label?

6. What do you think of the smell of the sanitiser?
 - the smell is too strong
 - the smell is good
 - other (specify) _____

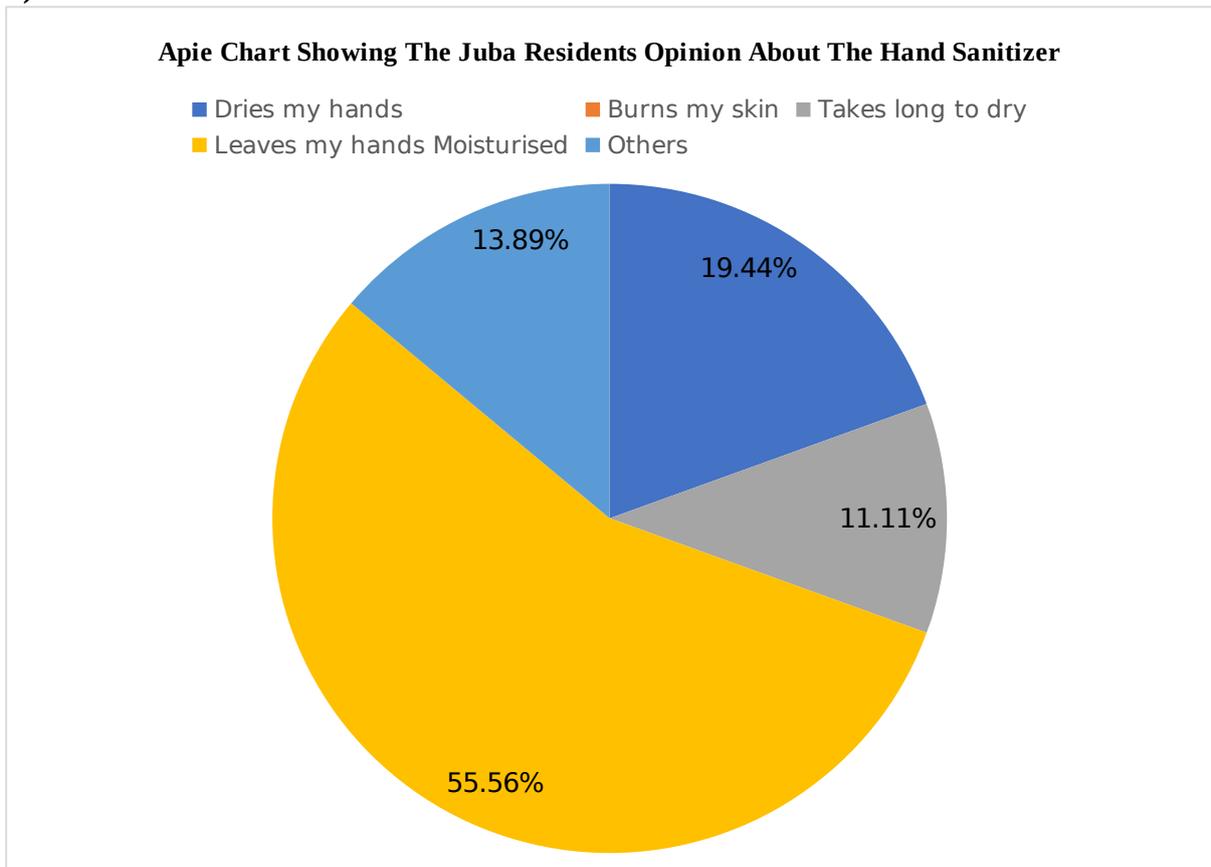
I. Prices of Hand sanitizers.

Phencia Super Market			Gosanitize	
Brand	Mls	Cost (ssp)	Mls	Cost (ssp)
Beautisa	250	2950	250	1600
	60	1450	50	500
Revision	60	950		
	100	1450		
Reborn	50	3200		
	200	1950		
Natural Care	250	2250		

II. Pie charts reflecting Juba residents Feedback related to Gosanitize.
a)

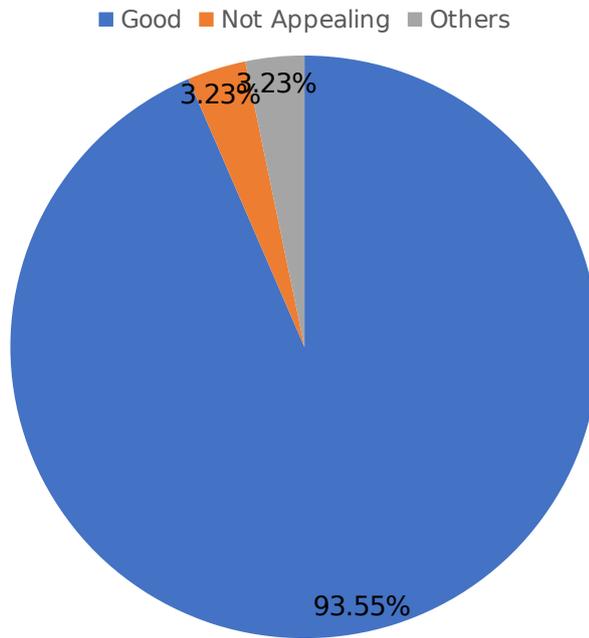


b)



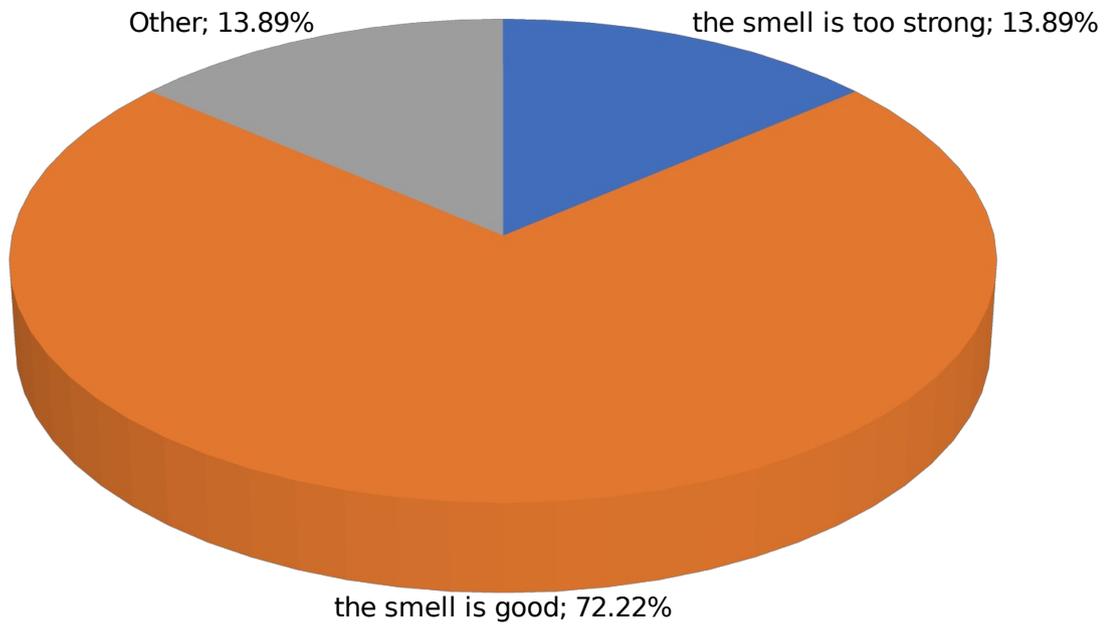
c)

Apie Chart Showing The Opinions Of Different Individuals About The Hand Sanitizer Packaging And Label



d)

Apie Chart Showing The Percentages Of What They Think Of The Smell Of The Sanitizer



III. Price Projection for 150 Litres of Hand Sanitizer

S/No.	Material	Quantity	Unit	Cost (usd)
01	Sugar	250Kgs	kgs	250
02	Dates (Balah)	120kgs	kgs	360
03	Yeast	162	tea cups	50
04	Aloe Vera	1	Sack	50
05	Cost of Production	Wood and water	Pieces & Litres	450
06	Lemon	100	Pieces	20
07	Stamp	Obtained once	Lump sum	80
08	Local transport	Logistics team	Pax	300
09	Aloe vera Extractors	2	Pax	65
10	Labor	10	Pax	1500
Total				3125