

Production and Marketing of Cocoa Butter and Shea Butter Based Body Pomades as A Small Scale Business in Ghana

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ABSTRACT--- *The purpose of this paper is to assess the pilot-scale production, quality and sale of cocoa butter and shea butter body pomades in Ghana and to highlight the role of regulatory bodies in promoting these products. Cocoa butter- and shea butter-based body pomades were produced and sold to the general public at the Cocoa Research Institute of Ghana to determine their economic feasibility. The quality of the products was assessed by the Ghana Standards Authority and the Food and Drugs Authority as a requirement before putting the products up for sale. Pilot-scale production of the two products was quite profitable and the capital investment put into the business can be paid back after seven years of production, with Benefit Cost Ratio of 1.01 and 14% Internal Rate of Return. Demand for the products was also high due to their good functional properties. Quality assessment of the products showed that they did not contain any harmful materials such as heavy metals and their microbial loads were all below the specification of less than 1.0×10^3 . The results suggested that production of cocoa butter and shea butter body pomades could be taken by entrepreneurs as a small-scale enterprise in Ghana. The findings and issues discussed in the paper will also assist policy makers, development agencies and entrepreneurs to ascertain the appropriate strategy in developing the small and medium-scale enterprise sector for cosmetics in Ghana.*

Keywords--- cocoa butter, shea butter, body pomade, small-scale enterprise, pilot-scale production, regulation, marketing, feasibility

1. INTRODUCTION

One of the fundamental ways in keeping skin healthy is making sure the structure of the epidermis (outer layer of skin) is intact. The components that do this are often called natural moisturizing factors (NMF) or ingredients that mimic the structure and function of healthy skin. While the oil and fat components of skin prevent evaporation and provide lubrication to the surface of skin, it is actually the intercellular matrix, along with the skin's lipid content, that gives skin a good deal of its surface texture and feel. The intercellular matrix is the skin's first line of defense against water loss. When the lipid and NMF content of skin is reduced, it results in skin surface roughness, flaking, fine lines, and a tight, uncomfortable feeling. The longer the skin's surface layer (stratum corneum) is impaired, the less effective the skin's intercellular matrix becomes (Sakai *et al.*, 2000; Rawlings and Harding, 2004) and the skin's healing process is also impaired. Natural moisturizing factors are made up of a large group of components that include amino acids, cholesterol, fatty acids, triglycerides, phospholipids, glycosphingolipids, linoleic acid and glycerin. Ingredients that mimic the lipid content of skin also include apricot oil, canola oil, coconut oil, cocoa butter and, shea butter. These ingredients can be extremely helpful in making dry skin look and feel better.

Cocoa butter is mainly used in the chocolate and confectionery industry. According to ICCO Economic Committee Report (2014), world cocoa products were expected to grow by 3.8% during the 2013/2014 cocoa season to 4.252 million tonnes with strong demand for cocoa butter from confectionery manufacturers. Ghana is also expected to increase cocoa processing marginally by 3,000 tonnes to 28,000 tonnes in 2015 (WCF, 2014). However, the post-processing cocoa products, which include cocoa butter, are mostly exported. Shea butter has also been used for centuries as a skin treatment in Africa, particularly for new-born infants. Although the clinical data often referred to by the cosmetic companies that market shea butter are hard to find, recent studies support its therapeutic value in the treatment of certain skin disorders (Reynolds, 2010). The annual shea nut production in West African is about 600,000 tonnes and this can produce about 200,000 tonnes of shea butter respectively (Reynolds, 2010). Domestic production of shea exceeds domestic demand as more than half of shea harvested is exported mostly as raw nuts and some as butter. Thus, the need for the promotion of the utilization of cocoa and shea butter in Ghana, particularly in the local cosmetic industry cannot be overemphasized. This will in turn help in the development of small- and medium- scale enterprise (SME) in Ghana.

Creating a successful SME has never been easy, but it is more difficult in developing countries such as Ghana. This is largely due to a lack of skill, confidence, education and access to SME capital. Representing more than 90% of all businesses in Ghana, SMEs occupy a central part of the Ghanaian economy (Kayanula and Quartey, 2000). They are essentially the drivers of the Ghanaian economy even though some of them are hardly noticed. The contribution of SMEs to income, employment generation and ultimately economic growth is therefore not in doubt (Tetteh and Frempong, 2010). Though there are many studies on small and medium enterprises in Ghana, the focus of most of the studies were on the financial aspects at the expense of the other equally important aspects. This paper therefore seeks to analyse the production and sale of cocoa butter and shea butter pomades on a pilot-scale and the role of regulatory bodies in ascertaining their qualities.

2. METHODOLOGY

Preparation of body pomades

At the Cocoa Research Institute of Ghana (CRIG), protocols have been developed for the pilot-scale production of cocoa and shea butter body pomades. Cocoa butter used is obtained from the Cocoa Processing Company, Tema and the shea butter is from the shea butter processing unit of CRIG at Bole.

Cocoa and sheabutter body pomades were prepared by melting and mixing either cocoa or shea butter with petroleum-based products and other oils and wax in a melting kettle. Preservatives and fragrance were added to the mixture after cooling to about 60° C. The mixture is then filtered using a white cloth, filled into plastic containers to a known weight, packaged and labelled.

Quality assessment of pomades

Stability of the products was assessed by keeping them on the shelf at ambient temperature for a period of 12 months.

Samples of both products were sent to the Ghana Standards Authority (GSA) for quality assessment. The products were assessed for particulate matter, heavy metals, melting point and microbial loads using analytical methods adopted by the GSA. The microbial tests included total bacterial load, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and coliforms.

Registration of pomades

Certificates of analysis obtained from GSA and product samples were sent to the Food and Drug Authority (FDA) of Ghana for product registration.

Feasibility studies

Marketing studies were conducted on the products by selling these products at CRIG and analysing their production costs for their economic viability using Projected Cash flow Analysis. Some regular customers are sometimes asked to bring back their comments after using the products.

3. RESULTS AND DISCUSSION

In the cosmetic industry, butter from cocoa and shea are used as emollients and they have properties similar to those of other non-fragrant plant oils. They are also a rich source of antioxidants such as polyphenol. In vitro research has shown that cocoa butter helps improve skin elasticity and promote healthy collagen production (Gasser *et al.*, 2008). Contrary to popular belief, topical application of cocoa butter during pregnancy does not prevent or reduce the number of stretch marks (Osman *et al.*, 2008).

After a successful development of cocoa butter and shea butter body pomades at CRIG, the products were produced on a pilot-scale to see how best they would perform on the local market. The products which are being sold at CRIG have been well accepted by consumers who are mostly local and foreign visitors to the Institute. Most of the local visitors have become regular customers of these products. Improvements have been made on these products over time based mainly on feedback from these regular customers. Studies by Theofanides and Kerasidou (2012) have shown that consumers use their senses in every buying process. Touch (texture), smell and sight play a determinant role in buying of products (Lindström, 2005). Based on these stimuli, the consumer evaluates the quality of the product. The consumer also assesses product quality based on its functional properties which include the moisturizing or hydrating effect, ultra-violet (UV) protection, regenerative and anti-wrinkle properties. The two pomades according to the consumers are particularly good for dry skin due to their high moisturizing and good spreading properties. These properties are due to the chemical composition of cocoa butter and shea butter. They both contain many different plant chemicals such as polyphenols

(Maranz and Wiesman, 2004; Gasser *et al.*, 2008) that are beneficial to the skin and they also have similar fatty acid compositions (Table 1). These fatty acids are what make both shea and cocoa butter superior moisturizers. However, there are some subtle differences between cocoa and shea butter, and these may make one better than the other depending on one's needs.

The pomades have also been found to be highly shelf stable with no changes occurring in their physical and chemical states during storage, transport and handling. This is due the nature and quality of the raw materials used in their production. Apart from the preservatives added to the products, cocoa butter and shea butter, contain natural antioxidants which prevent autoxidation. The petroleum-based ingredients used do not contain any double bonds or reactive functional groups (Castro, 2012) that would cause reactions such as autoxidation. The waxes used also thicken the products and make them solid at ambient temperature thereby preventing any form of damage. It has been reported by the Scientific Committee on Consumer Safety of the European Union (SCCS, 2012) that exposure of cosmetic products to changing temperatures, humidity, UV light, mechanical stress could reduce their intended quality and safety for the consumer.

Table 1: Fatty acid composition of cocoa and shea butter

Fatty acid	Type	Shea butter*	Cocoa butter**
Oleic acid	Unsaturated	46.4%	22.78%
Stearic acid	Saturated	41.5%	21.53%
Linoleic acid	Unsaturated	6.6%	4.88%
Palmitic acid	Saturated	4.0%	28.16%

*Israel, 2014

**Zzamanet *al.*, 2014

Currently, producing high quality cosmetic and personal care products in line with reinforced regulations are very important to the consumer. The regulation requires that every cosmetic product placed on the market is safe to use and producers must ensure that their products undergo safety assessment before they are put out for sale. Every country has a regulatory body which is in charge of reviewing the safety assessments and checking products already on the market. In Ghana, the agencies responsible for the maintenance of acceptable standards for products and services are the Ghana Standards Authority (GSA) and the Food and Drug Authority (FDA). In the U.S., cosmetic products and ingredients do not need FDA approval before they go on the market (Ross, 2004). However, companies and individuals who produce and market cosmetics have a legal responsibility to ensure the safety of their products. In order to take action for safety reasons against a cosmetic on the U.S. market, there must be reliable information showing that it is unsafe when consumers use it in the expected way.

Samples of cocoa butter and shea butter pomades sent to the GSA passed all the quality tests. They were found to contain no heavy metals such as lead, cadmium and chromium. These metals which are naturally occurring substances in the environment at low levels can be toxic to human health at higher concentrations. Long-term exposure may result in slowly progressive physical, muscular and neurological degenerative diseases (International Occupational Safety and Health Information Centre, 1999). However, some studies have shown that some pomades on the Ghanaian market contain different levels of these heavy metals (Amartey *et al.*, 2011). The levels were significantly higher than the permissible limits in cosmetics. Another study conducted in Pakistan revealed that some cosmetic products on the Pakistani market have some level of heavy metals in them (Ullah *et al.*, 2013).

Microbiological analysis showed that both pomades had some levels of microorganisms. They had the same levels of total bacterial load, *Pseudomonas aeruginosa* and *Staphylococcus aureus* (Table 2) but these levels were within the specification for cosmetics in Ghana. However, coliforms were not detected in both products. The low levels of microbiological contamination may be due to hygienic conditions under which these products were made. Ingredients, packaging containers and their covers can be a potential source of contamination. If these are not kept clean, microorganisms can develop in them, and once enhanced, they can infect and multiply within the product itself. One particularly important source of *Pseudomonas* and other gram-negative bacteria is water. Therefore, avoiding water contamination can be effected by factory hygiene such as using hot water, detergent and other treatments in the cleaning of equipment, tanks, filters, etc. In other words, good general cleanliness in production systems is important in controlling microbiological contamination. Spillage of products mixed with dust, dirt and moisture provide a suitable medium for the development of microorganisms. Regardless of hygienic manufacturing methods, a poorly preserved preparation provides many opportunities for microbial infection. However, preservation should not be expected to compensate for insanitary or careless manufacturing or packaging processes.

Table 2: Microbiological data on both cocoa and shea butter pomades

Test conducted	Unit	Results	Test methods	Specification
APC/30° C/72hr/PCA	cfu/g	<1.0 x 10 ¹	ISO 4833 2003	<1.0 x 10 ³
<i>Pseudomonas aeruginosa</i> /37° C/24hr/PsAB	cfu/g	<1.0 x 10 ²	ISO 13720 1995	
<i>Staphylococcus aureus</i> /37° C/48hr/BPA (RPF)	cfu/g	<1.0 x 10 ¹	ISO6888 pt 2 1999	
Coliforms/37° C/48hr/LTB	MPN/g	Not detected	ISO 4831 2006	

By 2020, the cosmetic and personal care market is likely to go up to \$543 million (Utroske, 2015). Factors that may cause this growth include demographic and climatic dynamics, regional consumer variations and global regulation challenges. Climatic and environmental challenges such as exposure to the sun and pollution have resulted in more consumers going for skin care products. The changing perception towards grooming by the youth as well as the aging population may also contribute to the growth of the personal care market (McDougal, 2015). The growing awareness of skin diseases is also boosting this market. Currently, the cocoa and shea butter body pomades produced at CRIG are becoming very popular and their demand is increasing by the day due to their healing and moisturizing properties. The production of cocoa butter body pomade increased by 41% from 2013 to 2014 and that of shea butter body pomade by over 100% from 2014 to 2015 (Table 3). This confirms the report by Kranton, (2003) that consumers are willing to pay for high quality products. However, some consumers have targeted cosmetics as possible human health threats, claiming that they contain carcinogenic chemicals and other toxic agents. Quality assessments of the cocoa butter and shea butter body pomades showed no such results and for that matter have been registered with the FDA in Ghana. Profits made on the two products are quite marginal and this is because their selling prices do not represent the actual price of similar products on the market. These similar products are being sold at higher prices on the market and it will take an entrepreneur with good commercial skills to do more to enhance the profitability of these products. Secondly, the low levels of production incurred high production costs and this can be explained by the economies of scale concept which describes a situation where the marginal cost of making a product falls as a company makes more of the product. In other words, the cost of producing a product is lower per unit if it is produced in large quantities.

Table 3: Production and sales of cocoa and shea butter body pomades

Year	Product	Quantity(kg)	EPC (Gh¢)	ELC (Gh¢)	Revenue (Gh¢)
2013	Cocoa butter pomade	1,980	19,272.68	-	32,174.40
	Shea butter pomade	-	-	-	-
	<i>Sub total</i>		19,272.68		32,174.40
2014	Cocoa butter pomade	2,789	31,630.75	10,765.54	45,571.20
	Shea butter pomade	373	4,230.29	1,438.38	5,968.00
	<i>Sub total</i>		35,861.04	12,203.92	51,539.20
2015	Cocoa butter pomade	2,228	27,716.32	8,600.08	42,836.00
	Shea butter pomade	825	10,263.00	3,184.50	15,924.00
	<i>Sub total</i>		37,979.32	11,784.58	58,760.00

EPC - Estimated production cost ELC - Estimated labour cost Gh¢4.00 = \$1.00

A projected cash flow statement is used to evaluate cash inflows and outflows to determine when, how much, and for how long cash deficits or surpluses will exist for a business during an upcoming time period (Frey and Klinefelter, 1980). That information can then be used to justify loan requests, determine repayment schedules, and plan for short-term investments. The projected cash flow analysis for the production of cocoa and shea butter pomades have shown that they are economically viable (Table 4). Assuming production fixed capital is obtained in year 0 and actual production begins in year 1, by the seventh year, a positive Net Present Value will be realised and capital investment will be paid back, with Benefit Cost Ratio of 1.01 and 14% Internal Rate of Return. It would take that much time to pay for capital investment because the low levels of production.

Table 4: Projected Cash Flow Analysis for Cocoa and Shea Butter Pomade

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Fixed Capital	34025.00									
Operating Cost (Cocoa butter pomade)		42396.29	36316.40	36316.40	36316.40	36316.40	36316.40	36316.40	36316.40	36316.40
Operating Cost (Shea butter pomade)		5668.67	13447.50	13447.50	13447.50	13447.50	13447.50	13447.50	13447.50	13447.50
Total cost	34025.00	48064.96	49763.90	49763.90	49763.90	49763.90	49763.90	49763.90	49763.90	49763.90
Quantity Produced (Kg) (Cocoa butter pomade)		2789.00	2228.00	2228.00	2228.00	2228.00	2228.00	2228.00	2228.00	2228.00
Quantity Produced (Kg) (Shea butter pomade)		373.00	825.00	825.00	825.00	825.00	825.00	825.00	825.00	825.00
Revenue (Cocoa butter pomade)		45571.20	42836.00	42836.00	42836.00	42836.00	42836.00	42836.00	42836.00	42836.00
Revenue (Shea butter pomade)		5968.00	15924.00	15924.00	15924.00	15924.00	15924.00	15924.00	15924.00	15924.00
Estimated Total Revenue		51539.20	58760.00	58760.00	58760.00	58760.00	58760.00	58760.00	58760.00	58760.00
Net Cash Flow (NCF)	-34025.00	3474.24	8996.10	8996.10	8996.10	8996.10	8996.10	8996.10	8996.10	8996.10
Cumulative Net Cash Flow	-34025.00	-30550.8	-21554.66	-12558.6	-3562.46	5433.64	14429.74	23425.84	32421.94	41418.04
Net Present Value (NPV)							-1968.60	2100.78	5734.15	8978.24
Benefit Cost Ratio (BCR)							0.99	1.01	1.02	1.03
Internal Rate of Return (IRR)					-4%	5%	10%	14%	16%	18%

4. CONCLUSION

Developing the small-scale sector in the cosmetics industry requires entrepreneurs who know how to relate technology to the desires or needs of the consumer. Access to proven technologies is very crucial for creativity, competitiveness and innovations and CRIG has developed the technology for the production of cocoa butter and shea butter pomades. This technology has been proven through the pilot-scale production of these products which has also shown that for a small-scale business to survive and grow, it must apply technical knowledge in fulfilling the needs of consumers and their desire for quality products at affordable prices. The business does not always have to resort to radical technological innovations but gradual improvements in the quality of the products can contribute to its growth. It also has to fulfil regulatory requirements to ensure good quality products and it is important that it provides what the market demands. It is also important that SMEs have access to research and development institutions because this will aid in the acquisition of new skills, as well as gaining deeper knowledge about the market and its intricacies. Government can also provide technical support in the form of dissemination and technology transfer.

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