START-UP INVESTMENT FOR A SHEEP WOOL PROCESSING LINE

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Sheep wool has been a resource we had access to for a very long time and it is widely used on large scale. It has remarkable properties of which people can take benefit from in many ways. After processing the sheep wool by using special machinery, it provides various applications in different industries such as pharmaceuticals, cosmetics, textiles, and fabrics. The main objective of this research is the analysis of a sheep wool processing line and the estimated start-up investment for this type of business in Romania. In this paper, the wool processing line was depicted, the necessary equipment was analyzed, and the total cost of investment was calculated, in order to conclude on the feasibility of the investment. The results of this research paper are taking into consideration the full value of the sheep wool and the profit that can be generated by processing it, as well as providing relevant data regarding time and costs of starting a business in Romania, analyzing the sustainability and profitability of the raw material that can be found in Romania. Sheep wool is a high potency raw material for multiple industries, and it can provide a big margin for obtaining profit by processing it.

Keywords: sheep wool processing line, start-up investment, profitability

INTRODUCTION

Sheep wool has various applications in different industries like pharmaceuticals, cosmetics, textiles, fabrics, and so on. Lanolin has a lot of use in the pharmaceutical and cosmetics industry. It states as raw material for some of the products found in these industries. It is also a precursor of vitamin D, which is very important in an equilibrated lifestyle and has a lot of benefits on the human body. Moreover, studies show that Romanians are mostly in a deficit of this vitamin. Wool fibers are used in the textile industry for clothing, decorations, special equipment required for different environmental situations.

Wool, Lanolin and Vitamin D3, Fibers

Wool

Wool is produced by follicles which are small cells located in the skin. These follicles are located in the upper layer of the skin called the epidermis and push down into the second skin layer called the dermis as the wool fibers grow. Follicles can be classed as either primary or secondary follicles. From here on we can talk about the types, quantity, and quality of the wool. Processing the wool includes two main stages:

- Sheep shearing is that the process by which the woollen fleece of a sheep is cut off. After shearing, the wool is separated into four main categories: fleece (which makes up the vast bulk), broken, bellies, and locks. The standard of fleeces is set by a method referred to as wool classing, whereby a professional person called a wool classer groups wool of comparable gradings together to maximize the return for the farmer or sheep owner.
- Before the wool will be used for commercial purposes, it must be scoured, a process of cleaning the greasy wool. Scouring will be done as simple as washing in warm water or as complicated as a process using special detergent and other chemical substances in specialized equipment. Wool straightaway from a sheep will be cataloged as “greasy wool” or “wool in the grease”, deposits a high level of lanolin, also because of

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the sheep's dead skin and sweat residue, and customarily also contains pesticides and matter from the animal's environment. the rest beside the lanolin and clean wool must be eliminated.

Lanolin

Lanolin also called wool wax or wool grease is a wax secreted by the sebaceous glands of wool-bearing animals. The lanolin that can be useful for humans comes from domestic breeds that are raised specifically for their wool. Historically, many pharmacopeias have referred to lanolin as wool fat; however, as lanolin lacks glycerides, it is not a true fat. Lanolin primarily consists of sterol esters instead.

Examples of common applications of lanolin:

- Lanolin and its many derivatives are used extensively in both personal care (e.g., high-value cosmetics, facial cosmetics, lip products) and health care sectors like topical liniments. Lanolin is additionally found in lubricants, rust-preventive coatings, blacking, and other commercial products.
- Lanolin is commonly used as a material for producing vitamin D3 using irradiation. this is often the sole natural source of vitamin D3. The other on the market presents some form of chemical synthetization.

Vitamin D3

Cholecalciferol also referred to as vitamin D3 is a sort of vitamin D that is made by the human skin, found in some foods, and brought as a dietary supplement. It is used to treat and forestall D deficiency and associated diseases, including rickets.

It is produced by the ultraviolet irradiation of 7-dehydrocholesterol extracted from lanolin found in sheep's wool. Cholesterol is extracted from wool fat and wool wax alcohols obtained from the cleaning of wool after shearing. The cholesterol undergoes a four-step process to create 7-dehydrocholesterol, the identical compound that is produced within the skin of animals. The 7-dehydrocholesterol is then irradiated with UV. Some unwanted isomers are formed during irradiation, but these are removed by various techniques, leaving a resin which melts at room temperature and typically includes a potency of 25,000,000 to 30,000,000 International Units per gram.

Wool Fibers

Of the most important apparel fibers, wool is the most reusable and recyclable fiber on Earth. The eco-credentials of wool are enhanced by its long service life and suitability to be recycled to new textiles for clothing, resilient upholstery, or products that call on its natural resistance to fire and temperature extremes. Other than premium next-to-skin apparel, the wool may be utilized in industrial applications like thermal and acoustic insulation or in pads to soak up oil spills.

At the disposal stage, natural fibers like wool reduce the impact of the textile industry on pollution and landfill build-up. In warm, moist conditions like in soil, wool biodegrades rapidly through the action of fungi and bacteria to essential elements (i.e. Nitrogen and Sulphur) for the expansion of organisms as a part of natural carbon and nutrient cycles.

THE MANUFACTURING PROCESS OF WOOL

The process behind the clean wool starts from the raw material and follows the next steps:

1. **Shearing:** Sheep shearing is the process of cutting wool fleece from Sheep. Each sheep is sheared once a year. Sheep are sheared in all seasons, but spring is usually preferred for this process.
2. **Sorting:** In sorting, wool is split into four sections of various quality fibers (fleece, broken, bellies, and locks). the most effective quality of wool comes from the shoulders and side of the sheep which are used for clothing. The lower quality comes from the underside of the legs and is used for carpet making.

Figure 1. Scouring machine

Figure 2. Carding machine

3. **Scouring:** is a process of cleaning the greasy wool because it contains a high level of lanolin, the sheep's dead skin, sweat residue, pesticides, and matter from the animal's environment. It is a water bath contains alkaline, soda ash, and soap. The rollers of the cleaning machines press the surplus water from the wool, but the wool isn't allowed to dry completely. After this process, wool is processed with oil to make it easier to manage.
4. **Carding wool:** At this stage, the fibers are separated then assembled again into a loose rope (sliver) by removing short fibers and replacing them with long parallel fibers. The combing machine consists of one large roller and smaller ones surrounding it. All cylinders are covered with small metal teeth, and when the wool reaches more on the teeth becomes finer.
5. **Spinning:** The thread is made by spinning the fibers together to make the strand. The plexus is woven with two or three other threads. Because the wool fibers hold tight one another, it's easy to expand and spindle the wool into yarns. Woolen yarns are often spun on any number of spinning machines. After this stage, spun threads are wrapped around rollers or commercial drums.
6. **Weaving:** The woolen threads are woven into the material. in this industry, two basic sorts of weaves are used, the plain and also the twill weaves. the foremost common method is the plain weaving which supplies soft surface textiles. The twill method gives more beautiful and more precise wool textiles, but in turn, it's more expensive.

Figure 3. Weaving machine

Figure 4. Spinning machine

7. Finishing: After weaving, wool fabrics are subjected to a series of ultimate processing including Fulling or tucking is a step within the woollen clothing industry that involves cleaning the fabric to eliminate oils, dirt, and other impurities, and make them thicker. Crabbing is a process that ensures that the material expands or is relaxed as necessary and equips the thickness of the material. Cribbing prevents the formation of wrinkles or uneven contraction. Although wool fibers are often dyed before the carding (combing) process, dyeing may be done after weaving the wool into the material.

Figure 5. Sheep wool processing line phases

Increasing demand from the pharmaceuticals and healthcare sectors as a result of the rising preference for non-toxic and chemical-free products will drive the market growth further. The support of local governments through funds and tax exemption for the development of lanolin associated ancillary industries is predicted to enrich the expansion during this sector. The program designed to assist aspiring business owners during the startup and formation stages of their enterprise. The main objective is to significantly reduce the high first-year failure rate of startup businesses in the region. A program like described before in Romania could be the Start-Up Nation.

The program can found your business idea concept, based on analysis of the market, feasibility, chances of success. The budget they can allocate for your idea its 44.000 EUR, non-refundable money with the condition that the organization to work at least 3 years and have the minimum number of employees as established on the project.

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After a short analysis regarding creating a new business in Romania, I evaluated the times required for every step and to count the number of procedures that need to be done. I used very accurate 2020 data and I could extract the steps which would be involved in.

Figure 6. Starting a business in Romania compared to other group members

An overall score of 87.7 out of 100 for starting a business was attributed to Romania. This number is ranking us in the 91st position in the group. It consists of 6 main procedures, 20 days, and has a pretty small cost. The business opportunity, described in a matter of investments and revenues, shows that profit can be obtained in a three-year period.

Table 1. Financial projection and feasibility analysis

Investments	Price (EUR)
Starting the business	5000
Acquisition of machinery and maintenance	84000
Service car	10000
Administrative costs	4700
Total	103700
Revenues (NET)	
Clean wool	40000
Lanolin	40000
Wool fiber	20000
Vitamin d3	10000
Total	110000

CONCLUSIONS

The business plan is projected on a 3 year period. In this time the purpose is to cover all the initial costs. Despite the mean annual growth rate of a company is 10%, this company will have more than that. Responsible for this is the fact that in the second and third years from its beginning the processing line will have one more product as an outcome from the same raw material. The profit is planned to be negative in the first year and start on a positive trend in the second year, respectively the third year.

The results of this research confirm that wool is a very high potential raw material for a lot of industries. Lanolin, vitamin D3, and wool fibers can be obtained by processing sheep wool. Lanolin can be used in the pharmaceutical and cosmetic industry while

vitamin D3, obtained by putting lanolin under UV radiation would have a major benefit for human healthcare. The wool fibers are a premium type of material in the textile industry. Accordingly to the financial prediction, the investment will be returned at the last of the third year. If the business plan is accepted and funded by the start-up program, after the 3-year period, the profit should be around 110000 EUR before taxes.

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