DESIGN AND FABRICATION OF SESAME SEED SORTING MACHINE

A PROJECT REPORT

Submitted by

GOKULNATH K

GUNA VISHAL G

RAGUL S

VIGNESH DHIVYA DHARSHAN K

in partial fulfilment for the award of the degree

of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY

(An Autonomous Institution, affiliated to Anna University Chennai and Approved by AICTE, New Delhi)

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(AUTONOMOUS)

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BONAFIDE CERTIFICATE

Certified that this project report titled "**DESIGN AND FABRICATION OF SESAME SEEED SORTING MACHINE"** is the bonafide work **OF GOKULNATH K (811722114015), GUNAVISHAL G (811722114016), RAGUL S (811722114033), RAGUL S (811722114033), VIGNESH DIVYA DHARSHAN K (811722114048)** who carried out the project under my supervision. Certified further, that to the best of my knowledge the work reported here in does not form part of any other project report or dissertation on the basis of which a degree or award was inferred on an earlier occasion on this or any other candidate.

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Submitted for the viva-voice examination held on ………………

INTERNAL EXAMINER **EXTERNAL EXAMINER**

DECLARATION

We jointly declare that the project report on **"DESIGN AND FABRICATION OF SESAME SEED SORTING MACHINE "** is the result of original work done by us and best of our knowledge, similar work has not been submitted to **"K.RAMAKRISHNAN COLLEGE OF TECHNOLOGY"** for the requirement of Degree of **BACHELOR OF ENGINEERING**. This project report is submitted on the partial fulfilment of the requirement of the award of Degree of **BACHELOR OF ENGINEERING**.

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Place: Samayapuram

Date :

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ABSTRACT

Our project deals with Sesame seeds are an essential agricultural commodity, widely used in various food products and for oil extraction. The quality of sesame seeds, including factors such as size, shape, and cleanliness, plays a critical role in determining the final product's value. Manual sorting and grading of sesame seeds can be time-consuming, inconsistent, and labour-intensive, leading to inefficiencies in the processing industry. To address these challenges, the development of a mechanized sesame sorting and grading machine is proposed. This machine utilizes advanced technologies, including vibratory sieves, and air classifiers, to sort sesame seeds based on their physical characteristics such as size, weight,. By automating the sorting and grading process, the machine aims to improve processing efficiency, ensure consistent product quality, reduce human labour, and minimize the risk of contamination. The design of the system focuses on scalability, ease of operation, and energy efficiency, making it suitable for small-scale to large-scale sesame processing units. Experimental results show that the proposed machine achieves high sorting accuracy, reduces sorting time significantly, and enhances the overall productivity of sesame seed processing operations. This technology is expected to support the growth of the sesame industry by providing cost-effective and reliable solutions for quality control and product uniformity.

Keywords : Sorting, Grading, Compactness, Efficiency, Innovation, Sustainability

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CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION TO SESAME

Sesame seeds are among the oldest cultivated crops in the world, with a history dating back thousands of years. These tiny, oil-rich seeds have been an integral part of human diets and traditional medicine across various cultures, from ancient Mesopotamia and Egypt to modern Asia and Africa. Known for their rich nutty flavor and high nutritional value, sesame seeds are not only a culinary staple but also a valuable agricultural commodity with significant economic importance. Scientifically known as Sesamum indicum, sesame seeds are derived from the sesame plant, a flowering species that thrives in tropical and subtropical regions.

The seeds come in a variety of colors, including white, black, brown, and red, each with its unique characteristics and uses. White sesame seeds are commonly used in bakery products, while black sesame seeds are prized for their stronger flavour and medicinal properties.

Figure 1.1 Sesame seeds

Sesame seeds are renowned for their exceptional nutritional profile. They are an excellent source of healthy fats, particularly polyunsaturated and monounsaturated fatty acids. Rich in protein, dietary fiber, vitamins (such as B-complex vitamins), and minerals like calcium, magnesium, zinc, and iron, sesame seeds contribute to numerous health benefits. Additionally, they contain powerful antioxidants such as sesamin and sesamol, which are associated with anti-inflammatory and anti-cancer properties.

In culinary traditions worldwide, sesame seeds play a versatile role. They are often used as toppings for bread, bagels, and pastries, or ground into pastes like tahini—a key ingredient in Middle Eastern dishes such as hummus and baba ghanoush. In Asian cuisines, sesame oil, extracted from the seeds, is a staple ingredient that enhances the flavor of various dishes. Roasted sesame seeds are also sprinkled on salads, noodles, and sushi for added taste and texture.Beyond their culinary applications, sesame seeds hold cultural and medicinal significance. In traditional Chinese medicine, they are used to improve liver and kidney health, nourish the skin, and boost energy levels. In Ayurveda, sesame oil is revered for its detoxifying and healing properties, often used in massage therapies and as a base for herbal preparations. The seeds also symbolize prosperity and good fortune in several cultures, often featured in celebratory foods and rituals.

Figure 1.2 Sesame plant

On the economic front, sesame seeds are a vital cash crop for many developing countries, particularly in Africa and Asia. Their resilience to harsh climatic conditions makes them an important crop in arid and semi-arid regions. Major producers include India, Sudan, Myanmar, and Nigeria, with significant demand in markets like China, Japan, and the United States. In summary, sesame seeds are a small but mighty food, celebrated for their rich history, nutritional benefits, and diverse applications. Whether as a superfood, a cooking essential, or a symbol of cultural heritage, these seeds continue to hold a prominent place in human life. Their versatility and enduring appeal make sesame seeds an indispensable part of global agriculture, cuisine, and wellness.

1.2 HISTORY OF SESAME

Sesame seeds (Sesamum indicum), one of the oldest cultivated crops in human history, have played a significant role in agriculture, cuisine, and culture for thousands of years. Known as the "queen of oil seeds," their cultivation and use date back to ancient civilizations, showcasing their enduring importance and versatility.

1.2.1 Origins and Early Cultivation

The history of sesame seeds can be traced back over 3,000 years to the Indian subcontinent and Africa, where the wild varieties of the sesame plant are believed to have originated. From these regions, the seeds gradually spread to Mesopotamia, the cradle of civilization, where they were highly valued for their oil content. Sesame is mentioned in ancient texts, including Assyrian cuneiform tablets, which describe the extraction and use of sesame oil. It is also referenced in the ancient Vedas of India, where it was regarded as a sacred crop used in religious rituals and offerings. The resilience of the sesame plant contributed to its widespread adoption. Its ability to thrive in harsh, arid climates made it a reliable crop for early farmers, particularly in areas with unpredictable rainfall. This adaptability allowed sesame seeds to spread across the Middle East, Africa, and Asia, becoming an integral part of local diets and economies.

1.2.2 Sesame in Ancient Civilizations

In ancient Egypt, sesame seeds were a prized commodity. Historical records indicate that sesame oil was used for cooking, medicinal purposes, and as a base for cosmetics. The seeds were considered a source of energy for workers, including those who built the pyramids. Egyptian tomb paintings and inscriptions further highlight the significance of sesame in daily life and trade. The seeds also held a prominent place in Babylonian and Assyrian cultures.

1.2.3 Ancient Origins in China

Sesame seeds were valued for their medicinal properties and culinary uses. Chinese texts from as early as the Han dynasty (206 BCE – 220 CE) mention sesame oil as a key ingredient in herbal remedies and cooking. Similarly, in ancient India, sesame seeds were a symbol of immortality and fertility, widely used in religious ceremonies, Ayurvedic medicine, and traditional cooking.

Global Spread and Modern Importance

The spread of sesame seeds to Europe and the Americas occurred through trade and exploration. Arab traders introduced sesame to the Mediterranean region, where it became a staple in Greek and Roman cuisine.

The seeds were also brought to the Americas by African slaves during the transatlantic slave trade, where they were known as "benne" seeds in the southern United States. Today, sesame seeds are cultivated worldwide, with major producers including India, Sudan, Myanmar, and Nigeria. Their uses have expanded beyond traditional cuisines to include modern food products, cosmetics, and pharmaceuticals. Sesame oil remains a vital ingredient in global culinary practices, while the seeds continue to be a symbol of health and prosperity.

1.3 PURPOSE OF SESAME SEEDS

Sesame seeds, derived from the plant Sesamum indicum, are among the oldest oilseed crops known to humanity, dating back over 3,000 years. Despite their small size, these seeds hold immense significance across various aspects of human life, including nutrition, health, cultural practices, and economic value. This essay explores the multifaceted purpose of sesame seeds, delving into their nutritional benefits, medicinal applications, culinary versatility, cultural significance, and their role in agriculture and trade.

1.3.1 Nutritional Benefits of Sesame Seeds

One of the primary purposes of sesame seeds lies in their rich nutritional profile. They are packed with essential nutrients, including healthy fats, protein, vitamins, and minerals. Sesame seeds are an excellent source of dietary fiber, aiding in digestion and promoting gut health. Sesame seeds are also a significant source of calcium, making them beneficial for bone health, especially for individuals who follow plant-based diets. Other minerals, such as magnesium, phosphorus, and iron, contribute to cardiovascular health, muscle function, and oxygen transportation in the blood. The versatility of sesame seeds makes them an accessible nutritional supplement. They can be consumed raw, roasted, ground, or as an oil, ensuring their widespread incorporation into various diets around the world.

1.3.2 Medicinal Applications

Sesame seeds have been a cornerstone of traditional medicine in numerous cultures for centuries. In Ayurveda, sesame is considered a warming food with properties that balance vata dosha and support overall vitality. The oil extracted from sesame seeds is often used in Ayurvedic massages and therapies due to its ability to penetrate deeply into the skin, providing nourishment and aiding in the removal of toxins.

Culinary Versatility

Sesame oil, extracted from the seeds, is a cornerstone of many culinary traditions. It is used as a cooking oil, flavoring agent, and finishing oil. The dark, roasted sesame oil is particularly valued for its rich, toasty flavor. This culinary adaptability ensures that sesame seeds continue to play an essential role in global food culture.

Cultural and Symbolic Significance

In many cultures, sesame seeds are used in rituals and celebrations. For instance, in Indian weddings and religious ceremonies, sesame seeds are offered as a symbol of prosperity and spiritual purification. In Chinese culture, sesame seeds are associated with fertility and longevity, often used in desserts served during festive occasions. These seeds also play a role in agricultural traditions. As one of the first domesticated oilseed crops, sesame represents resilience and sustenance, especially in arid and marginal agricultural regions where few other crops can thrive.

1.3.3 Agricultural and Economic Importance

The cultivation of sesame seeds is integral to the agricultural economies of many countries. India, China, Myanmar, Sudan, and Tanzania are among the top producers of sesame seeds. The crop’s adaptability to different climates and resistance to drought make it a valuable agricultural resource, especially in regions prone to water scarcity. Economically, sesame seeds are a significant export commodity. Their global demand is fueled by their culinary uses, health benefits, and industrial applications. Sesame oil, for example, is used not only in food production but also in cosmetics, pharmaceuticals, and manufacturing industries. The seeds' byproducts, such as the meal left after oil extraction, are used as animal feed, adding further value to the crop. For smallholder farmers in developing countries, sesame cultivation provides a vital source of income. The relatively low input costs and high market value of sesame seeds make them an attractive option for sustainable farming practices.

1.3.4 Environmental Impact and Sustainability

Sesame seeds also serve a purpose in promoting sustainable agriculture. As a hardy crop, sesame requires minimal water and can grow in poor soil conditions. This makes it an ideal choice for regions facing the challenges of climate change and water scarcity. Moreover, sesame farming often involves intercropping, which can enhance soil fertility and reduce the risk of pests and diseases. The seed's long shelf life and low post-harvest loss further contribute to its sustainability. By cultivating sesame, farmers can diversify their agricultural systems, reducing dependency on more resource-intensive crops and contributing to global food security.

1.4 TYPES FO SESAME SEEDS

1.4.1 Black Sesame Seeds

From the sesame plant (Sesamum indicum), black sesame seeds are tiny, flat, and black. They are used in many different culinary applications, especially in Asian and Middle Eastern cuisines, and have a rich, somewhat nutty flavour. Compared to their white cousins, black sesame seeds have a somewhat stronger, deeper flavour. It has a sweet, nutty, and occasionally bitter flavour. When raw, they are crisp, but when roasted, they can acquire more scent.

Figure 1.3 Black Sesame Seeds

Protein, calcium, magnesium, iron, vitamins (particularly B vitamins), and beneficial fats can all be found in black sesame seeds. They have antioxidants that can aid in lowering inflammation and oxidative stress. It is thought that black sesame seeds promote bone health because of their high calcium content. Additionally, the seeds include a lot of fibre, which supports a healthy digestive system.

1.4.2 White Sesame Seeds

White sesame seeds are tiny, oval-shaped seeds that come from the sesame plant (Sesamum indicum). After being hulled, or having the outer shell removed, they frequently have a lighter colour. They are extensively utilised in many different types of cuisines worldwide, especially in Asian, Mediterranean, and Middle Eastern cookery. Sesame seeds are frequently linked to promoting bone health and avoiding osteoporosis because of their high calcium content. Lower cholesterol and better cardiovascular health may result from the good fats found in sesame seeds, especially lignans like sesame. Sesame seeds' high fibre content facilitates digestion and supports gut health by encouraging regular bowel movements

Figure 1.4 White Sesame Seeds

1.4.3 Brown Sesame Seeds

Harvested from the sesame plant (Sesamum indicum), brown sesame seeds are light brown or golden-brown in colour because they have kept their natural outer shell. Brown sesame seeds are used in many different cuisines, particularly in Middle Eastern, Asian, and African cookery, and have a little stronger, more robust flavour than white sesame seeds, which have been hulled (the outer shell removed).

Figure 1.5 Brown Sesame Seeds

Calcium, magnesium, and phosphorus—all of which support strong bones and may help stave off osteoporosis—are abundant in brown sesame seeds. Together with lignans, the unsaturated fats can lower bad cholesterol and improve cardiovascular health. Brown sesame seeds promote regular bowel movements and healthy digestion because of their high fibre content. Sesame seeds' lignans may also have hormone-regulating qualities, which would make them good for hormonal health in general.

1.4.4 Golden Sesame Seeds

The seeds of the golden sesame variety are usually light in colour, with a range of pale yellow to golden beige. Despite being grown from the same sesame plant (Sesamum indicum) as other types, their main differences are in appearance, with minor variances also occurring in flavour and texture. Because they are both light in colour, golden and white sesame seeds are frequently confused; however, their flavours and culinary applications differ slightly.

Figure 1.6 Golden Sesame Seeds

The calcium, magnesium, and phosphorus included in golden sesame seeds help build strong bones and may help ward off diseases like osteoporosis. Sesame seeds, especially golden sesame seeds, contain antioxidants and unsaturated fats that can lower cholesterol, lower the risk of heart disease, and improve cardiovascular health in general. Golden sesame seeds' high fibre content helps to maintain regular bowel motions, encourage healthy digestion, and maybe ward against constipation. Sesame seeds' lignans may have hormone-regulating qualities that support hormonal well-being in general.

1.5 FOOD INDUSTRY

The food sector uses sesame seeds extensively because of their nutritional worth and adaptability. They are frequently used to lend a crunchy texture and nutty flavour to baked products including breads, crackers, and cookies. Sesame seeds improve the flavour and look of salads, stir-fries, and garnishes. They are ground into tahini, which is a staple in Mediterranean and Middle Eastern recipes like dips and hummus. Additionally, sesame seeds are used to manufacture sesame oil, a well-liked cooking oil with a high smoking point and a mild, nutty flavour. They are also present in plant-based foods, energy bites, granola, and snack bars, where they contribute to healthy fats and protein. Sesame seeds are also processed to produce butter, flour, and protein isolates that are utilised in gluten-free and plant-based food products, increasing their appeal in health-conscious markets. A vast variety of food dishes from many different cuisines include sesame seeds because of their extraordinary versatility. In addition to being a common garnish for bread, bagels, and buns, sesame seeds are also used to add a tasty crunch and visual appeal to crackers, almonds, and vegetables to coat them. In Middle Eastern and Mediterranean cooking, they are a staple ingredient. They are processed into tahini, a smooth, creamy paste, which is used in desserts like halva or in hummus, dips, and sauces. Because of its mild flavour and high smoke point, sesame oil which is made from the seeds is prized for its ability to be used in stir-frying, sautéing, and salad dressing. The seeds' high protein, fibre, and healthy fat content also makes them a popular ingredient in plant-based protein products, granola bars, and energy bites. Grinded sesame seeds are used to make sesame flour or sesame protein isolates, which are being utilised more and more in vegan and gluten-free products. Sesame seeds are also a worldwide favourite since they are frequently roasted or utilised in their natural state to improve the taste and texture of foods like sushi, salads, and soups.

1.6 SESAME SORTING MACHINES

1.6.1 Large Sesame Sorting Machine

This machine is for large scale Sorting is Established in the year 2019, we "Shree Adesh Engineering" are the leading Manufacture of a wide range of Semi-Automatic Painted Grain Vibro Separator, Vibro Classifier Machine, Groundnut Decorticator Plant Etc. Large sesame sorting machines are industrial systems designed for processing and quality grading of sesame seeds. They are widely used in food processing facilities to improve the efficiency of cleaning, sorting, and preparing sesame seeds for packaging or further processing.

This plant handles large-scale sesame processing, including cleaning, destoning, gravity separation, and optical sorting. It offers high peeling efficiency (up to 99%) and a fully automated workflow. The system also includes features for washing and drying, ensuring the final product meets high-quality standards. It is suitable for both white and black sesame seeds and focuses on energy efficiency and ease of maintenance.

Figure 1.7 Large Sesame Sorting Machine

1.6.2 Manual Sesame Sorting Machine

Figure 1.8 Manual Sesame Sorting Machine

A manual sesame sorting machine is a more traditional and straightforward option for cleaning and sorting sesame seeds, ideal for smaller-scale operations or those with limited access to power or automation technology. These machines typically focus on simplicity, efficiency, and low maintenance**.**
Useful for separating seeds by density and size, suitable for low-output environments. For modernized manual solutions that still prioritize low energy use and cost-effectiveness, companies like Sanli Machinery and similar manufacturers offer versatile seed cleaning machines adaptable for sesame and other grains.

1.6.3 High- Performance Sesame Sorting Machine

Advanced optical and artificial intelligence technologies are used by high-performance sesame sorting machines to separate impurities, flaws, and foreign materials from sesame seeds with exceptional precision and efficiency. This optical sorter employs state-of-the-art Swiss and British engineering to precisely identify and eliminate faulty or discoloured sesame seeds as well as other contaminants. Pre-Cleaner Hulled Sesame Seed Sorter Machine, For Grains, Capacity: 4 Tons/ Hr. It provides flexibility for different seed shapes and sizes, guaranteeing constant quality and satisfying strict food safety requirements. For accurate sorting, these devices use full-color sensors with a 0.04mm resolution and chutes that may be customised. Additionally, they have sophisticated functions like infrared detection for alien objects like glass or stones. High efficiency and minimal operating costs are guaranteed by remote maintenance and monitoring.

Figure 1.9 High Performance Sesame Seed Sorting Machine

1.6.4 Automated Sesame Sorting Machine

Automated sesame sorting machines are designed to enhance efficiency, precision, and throughput in processing sesame seeds by leveraging advanced technology. These systems are typically equipped with features such as high-resolution cameras, machine learning algorithms, and intelligent tracking software to sort sesame seeds based on size, color, and quality while removing foreign particles and defective seeds.

Automated sesame sorting machines are widely used in food processing plants, especially for exporting sesame seeds where high quality and compliance with international standards are critical. Automation reduces reliance on manual sorting, increasing efficiency.

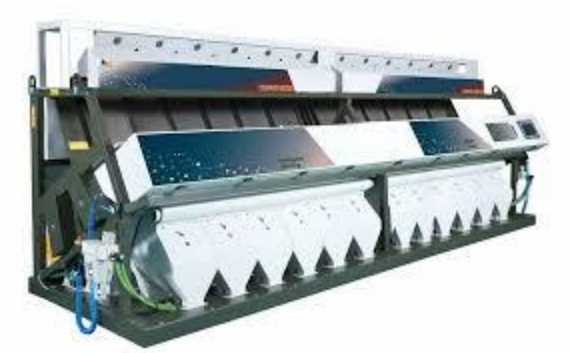


Figure 1.10 Automated Sesame Sorting Machine

1.7 IMPORTANCE OF SESAME SEED SORTING

Sesame seed sorting is critical to maintaining product quality, consistency, and market competitiveness. Proper sorting eliminates contaminants such as stones, dirt, broken seeds, and foreign elements, ensuring that only high-quality seeds reach consumers. This technique improves the nutritional value and safety of the finished product by ensuring that the seeds are clean and contamination free. Sorting is also important for consistency since it separates seeds according to size, shape, and colour, resulting in a consistent product that matches industry requirements. Furthermore, effective sorting increases processing efficiency, eliminates waste, and extends the shelf life of sesame goods. Sorting is critical for producers and processors to maximise earnings since it guarantees that only the best-quality seeds are sold, which helps to meet consumer needs.

In addition to assuring product quality, sesame seed sorting provides several additional significant benefits. First, it improves marketability by allowing producers to deliver uniform and visually pleasing sesame seeds, which buyers and consumers want. Buyers in the food business frequently prioritise consistency in size and appearance, especially in items such as sesame oil, tahini, and snacks, where quality and presentation are important. Sorting enhances processing efficiency.

Sorting, which separates seeds based on specified qualities such as size or weight, enables for more efficient downstream processing, such as roasting, grinding, or packing. This can save equipment wear and tear while also decreasing the likelihood of machine jams or failures caused by foreign objects or unequal seed sizes. Furthermore, accurate sorting improves production by identifying and isolating defective or undeveloped seeds from those of the highest quality. This guarantees that those seeds with the highest potential for oil extraction or consumption are processed, resulting in increased overall yield and product quality.

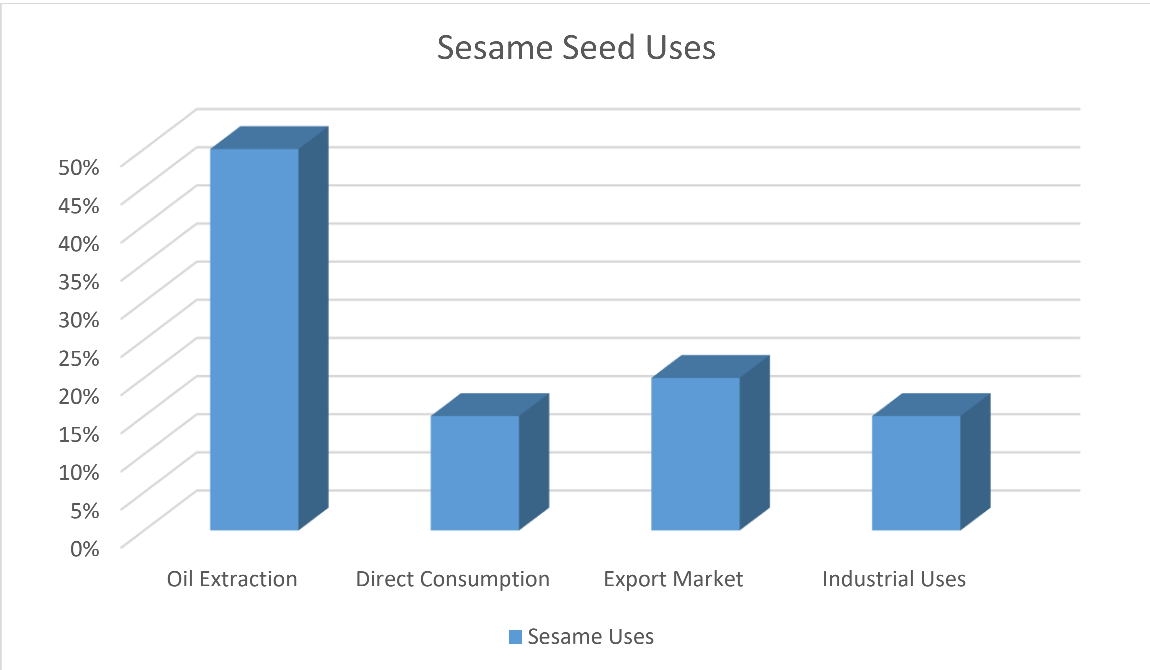


Figure 1.11 Importance of Sesame Seed Sorting

1.8 GENERAL SESAME SEED SORTING STATISTICS

Modern sesame seed sorting machines may process 1 to 10 tons of seeds per hour, depending on the machine and technology. Smaller-scale machines may process 1-2 tons per hour, whilst bigger industrial ones can handle 10 tons or more. Modern sesame seed sorting machines may process 1 to 10 tons of seeds per hour, depending on the machine and technology. Smaller-scale machines may process 1-2 tons per hour, whilst bigger industrial ones can handle 10 tons or more. Sorting machines are typically intended to remove a wide range of impurities, including broken seeds, foreign material (stones, dirt, etc.), and seeds of undesirable size. Depending on the technology used (vibrating screens, air jets, optical sorters), these devices can remove undesirable particles and flaws with separation efficiency ranging from 95% to 99%. Effective sesame seed sorting can reduce waste disposal expenses and increase sesame growers' profitability. Sorting machines, by enhancing seed quality and reducing waste, can boost sesame enterprises' total profitability by 5% to 10% by increasing product quality and yields. Sesame seed output worldwide is projected to be 5 million to 6 million metric tons per year, with major producers including India, China, Sudan, and Ethiopia. Sorting is especially important in international trade, because sesame is frequently sent from high-producing regions to worldwide markets with strict quality standards.

For example, India is a major exporter of sesame seeds, accounting for 30% to 35% of global sesame exports. Sorting is critical to meeting the quality requirements required by international markets, increasing the export potential of sesame from these locations. Sesame seed sorting is a key process that ensures high-quality products and reduces waste. The general statistics show that sorting machines can significantly improve the quality and efficiency of sesame processing. Modern sorting technologies—ranging from mechanical sieving to advanced optical sorting—offer precision and consistency, meeting both domestic and international market demands. With benefits such as improved yield, higher oil extraction rates, and compliance with export standards, sorting sesame seeds plays a vital role in ensuring product quality, maximizing profits, and maintaining food safety.

1.9 SESAME SEED SORTING IN INDIA

India exports nearly 50-60% of its sesame production, and sorted seeds are required to meet the stringent quality standards of global markets such as the U.S., EU, and Japan. Proper sorting ensures that 80-90% of exported seeds meet the desired quality, oil content, and purity requirements. Proper sorting reduces the number of defective or damaged seeds, improving processing efficiency and increasing the yield. By removing seeds with impurities, damaged seeds, or foreign matter, up to 70-80% of the seeds are preserved for oil extraction or consumption.

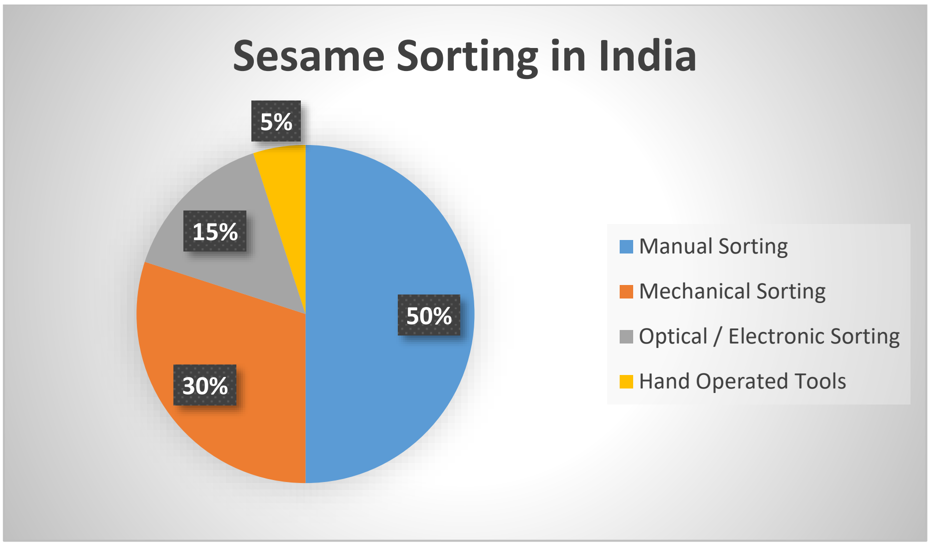


Figure 1.12 Sesame Sorting in India

Sesame seed sorting in India is an important phase in the processing chain since it improves product quality, meets export criteria, and increases market value. India is one of the world's major producers and exporters of sesame seeds, and sorting is vital to preserving its competitiveness. In India, the sorting process often entails eliminating contaminants like as stones, dust, broken seeds, and foreign particles, ensuring that only clean and uniform seeds make it to market.

CHAPTER 2

LITERATURE SURVEY

2.1 LITERATURE REVIEW

Baskar S, et.al2019 [1], the primary purpose of the natural crop sesame is to extract oil. The manual winnowing technique is used to separate sesame seeds from dust, stones, and sand particles. More labor hours are used in this procedure, which results in a reduced seed separation rate—roughly five bags per person per day—and greater labor costs. Therefore, it is necessary to create a machine that separates sesame seeds while offering ideas for enhancements. A CAD model for a sesame seed separator is created using the functional specifications that were derived, as illustrated in Using a double-layered filter, blower arrangement, and hopper, the prototype model of a sesame seed separator can remove dust particles from the seeds. The vibrator setup (sieve) is used to feed the dirty seeds that need to be separated. The stone filter and the sesame filter are the two filters (sieve) that make up the vibrator. With the use of a motor and pulley system, the filter's reciprocating action eliminates the sand and stone particles found in the seeds. An Arduino controller interfaced with a proximity sensor is used in the sesame seed separating process. Above the filter arrangement, the proximity sensor is positioned to identify the presence of unclean seeds.

P. Dhananchezhiyan, et.al2020 [1] One of the crucial processes that requires more work, time, and money is the threshing of sesame seeds from the harvested capsules. Therefore, the creation of a portable, power-operated sesame thresher is urgently needed by small farmers. To create a portable, power-operated sesame thresher, researchers looked at the physical characteristics of sesame seeds, including their size, number of seeds per capsule, 1000 grain weight, and capsule length and thickness. TMV 7 is the most widely utilized type in Tamil Nadu. The capsules' average dimensions were found to be 35 mm in measures 3 x 1.8 x 0.9 mm. Based on these findings, a portable sesame thresher was constructed using a double roller mechanism (two rollers rotating in opposite directions). Its overall dimensions were 1392 × 700 × 1170 mm, and its performance was evaluated in terms of threshing efficiency, output capacity, time and cost savings, and comparison with traditional manual threshing methods. After field testing, the produced portable power sesame thresher demonstrated 96.7% threshing efficiency and 18.2 kg h-1 seed production capacity. When compared to the traditional hand threshing process, the savings in time and money were 72% and 92%, respectively.

M.V. Reshma, et.al2010 [3] Sesame oil (Sesamum indicum Linn.) is used extensively in tropical and subtropical countries and stands out from all other vegetable oils due to its strong nutritional and medicinal qualities. The two largest producers of sesame seeds, China and India, account for over 70% of the global production, which is around 1.2 million metric tons (MMT). Indian traditional medicine makes extensive use of sesame seeds, which produce 45–50% by weight of highly stable oil with a distinct flavor. Traditional Chinese and Indian medical writings make reference to "Ayurveda" and its therapeutic uses. Cattle feed is the primary usage for deoiled meal, while sesame oil (SO) is also used in cooking.

Devanand Gojiya, et.al2022 [4] The goal of the study was to optimize the dehulling process and create a low-cost sesame dehuller. To optimize its performance during the study, the sesame seed dehulling machine was conceived, produced, and assessed using three independent parameters: soaking time, dehuller speed, and dehulling time. Response parameters were significantly impacted by the process factors, whereas the aggregate effect was not significant. The findings demonstrated that when dehuller speed, soaking duration, and dehulling time rise, so does the dehulling efficiency. The goal of the study was to optimize the dehulling process and create a low-cost sesame dehuller. To optimize its performance during the study, the sesame seed dehulling machine was conceived, produced, and assessed using three independent parameters: soaking time, dehuller speed, and dehulling time. Response parameters were significantly impacted by the process factors, whereas the aggregate effect was not significant. The findings demonstrated that when dehuller speed, soaking duration, and dehulling time rise, so does the dehulling efficiency.

Ayat B. EL-Sayed, et.al2023 [5] Cleaning seeds is one of the most important agricultural procedures. The Air-Screen approach, which was employed in this investigation, was one of several techniques for seed employed in this investigation. Clover and sesame seeds, which are used in regrowth as well as the culinary, chemical, and pharmaceutical sectors, were selected for this investigation. According to Hanna et al. (2010) and Mohamed (2013), when seed is gathered from the field, it contains inert materials such stems, leaves, broken seed, soil, and weed and other crop seeds. The primary characteristics used to create separations include size, shape, density, surface roughness, terminal velocity, electrical conductivity, color, and durability. According to Shetty et al. (2017), the machine used and the location of the seeds in a processing line are influenced by the seed being cleaned, the number of seeds and other pollutants in the combination, and the purity requirements that must be met. In assessing the performance efficiency of the intended grain cleaning machine, the impact of air velocity and its optimization were also deemed to be highly beneficial (Afolabi et al., 2019).

D. Yilmaz, et.al2008 [6] Separation parameters are critical while developing a new separation system. Sieves New facilities and threshing units require careful consideration when selecting separating systems.This study examined how threshing characteristics including drum speed, feed rate, and concave open affect sesame. Using the greatest drum speed resulted in effective separation of straw sizes across all sieves. A drum speed of 900 min-1 is recommended for separating sesame stalks using a sieve. The lowest feed rate outperformed other rates due to the tiny size of the unit and the pressing of materials in the threshing unit. Straw sizes may simply be separated without pressing the material together.Grain and stalk separation performance is impacted by the threshing section of a combine harvester or thresher machine. This study examined the effects of a few threshing factors on closed capsule sesame straw sieve in a constructed threshing machine, including drum speed, feed rate, and concave open. The findings indicate that the best results for sesame straw separation were obtained at maximum drum speeds.

Kunnayut Eiamsa-arda,b et.al2021 [7] To demonstrate the theoretical foundation for the proposed design of a sesame seed cleaning device, a preliminary prototype was created. The study specifically addressed the practical issue of dried, uncleaned sesame seeds being added to the water tank's top and not all of them sinking uniformly through the water, preventing the sand grains from being fully separated from the sesame seeds. Using a laboratory-scale prototype, two new components were added in the current work: 1) a perforated dual-disc check valve was inserted between the old tank and the new extension tank, and 2) a new extension tank was placed on top of the original water tank. Because of these changes, the total amount of time needed to wash seven kilogrammes of uncleaned sesame seeds was decreased by 61% compared to a common manual method used by Thai farmers. Furthermore, the amount of water used in the cleaning process was reduced by 74%.

Abbas akbarnia, et.al2018 [8] One of the most significant and traditional oily seeds still used in many different sectors today is sesame seeds. Because it contains a lot of protein, sesame oil is regarded as a high-quality and valuable oil. In this study, the quality of extracted sesame oil was examined by examining the effects of two angular velocity factors on three levels of 3500, 4500, and 5500 rpm and two levels of radius, 175 and 125 mm. The cylinder's time in this experiment was set at five minutes to ensure a consistent test. A pectometer method was used to assess the device's oil output quality, and the findings were examined. At a velocity of 3500 rpm with a cylinder radius of 125 mm and 5500 rpm with a cylinder radius of 175 mm, respectively, the lowest and maximum amounts of suspended solids were achieved. Repetition had little effect on the refined oil's gross particles, but the cylinder's angular momentum and rotational radius had a substantial impact at the 1% level. Furthermore, there is no discernible relationship between the cylinder's radius and angular velocity.

Jianxin Wu, et.al2021 [9] For the propagation of pure male sterile seeds, the weight-based seed sorting method clearly outperforms the RFP-based method in terms of accuracy, efficiency, and cost. These features will greatly raise the third-generation hybrid rice technology's worth and transgenic safety.Here, we used endosperm-specific expression of artificial microRNAs (amiRNAs) to silence the genes encoding ADP-glucose pyrophosphorylase (AGP), which is necessary for endosperm starch biosynthesis, in order to create a weight-based seed sorting system for the third-generation hybrid rice technology. The maintenance seeds in this system are lightweight and have shrunken endosperms, whereas the NMS seeds are hefty and have normal endosperm. There are pure and fully filled NMS seeds available since weight-sorting devices can quickly and precisely separate the maintainer seeds from the NMS seeds.

Yubo Feng et.al2024 [10] Using machine-vision technology and the lightweight, an intelligent seed sorter was created in this work to address the present problems of poor intelligence and accuracy in seed-sorting devices. The machine was made up of a seed screening system, feeding system, transmission system, and image acquisition system. In order to increase feature extraction efficiency, detection accuracy, and reduce redundancy, a lightweight YOLOv5n model called FS-YOLOv5n was trained using 4756 photos. This model incorporates FasterNet, Local Convolution (PConv), and a squeeze-and-excitation (SE) attention mechanism. Utilising the FS-YOLOv5n model, a quality identification and seed sorting test was carried out on six test groups, each including 1000 seeds, using "Zhengdan 958" maize seeds as the research object. In comparison to baseline models, the machine demonstrated an 81% reduction in parameters and floating-point operations after lightweight enhancements. The intelligent seed sorter achieved an average sorting rate of 90.76%, effectively satisfying the seed-sorting requirements.

Costin Mircea et.al2023 [11] One of the most crucial steps in the preparation and storage of grains is seed cleaning. Many studies have been conducted on the classification and cleaning of grains. From the time of harvest, the grain seeds are typically contaminated by other plant seeds, other materials (such as dirt or plant waste), or even their own deteriorated seeds. It is challenging to sort them mechanically because they are all the same weight and size. After mechanical sorting and dedusting, optical sorting can greatly improve the degree of seed purity. Using photoelectric sensors, which are sensitive to variations in the strength of the reflected light beam, it is possible to separate seed mixtures by colour by sending out pulses that carry out commands to separate the This article emphasizes the importance of introducing new or innovative methods in the seed separation process, especially optical systems. Various ways of sorting were discussed, the design of super interesting sorting systems.

Avazbek Obidov, et.al2021 [12] By developing a sorting apparatus for spun seeds, which separates them into fractions based on geometric dimensions, and re-ginning, which separates those with long fibres, the study presented in this paper aims to increase the amount of fibre generated in the enterprise. Using mathematical modelling, a novel model was created for the geometric sorting of cotton seeds during harvest, and experiments were conducted to ascertain its efficacy and the ideal values of the variables influencing it. Graphs showing how various parameters affect device efficiency and performance were created based on the study's findings.

Ai-Guo OuYang, et.al2010 [13] The use of machine vision technology to automatically identify various rice seed varieties was studied, and a detection system including an image processing unit and an automatic inspection machine was created. Each rice seed picture could be singularised from the background by the system, which could continuously display matrix-positioned rice seeds to CCD cameras. A continuous conveyer belt with carrying holes for the rice seed, a parallel discharging mechanism, a photography station, and scattering and positioning devices made up the inspection machine. A single chip-controlled gadget continuously created the image of the rice seeds. The gadget hung the line once every second, and the camera captured pictures of the seeds at those intervals. Visual C++ 6.0 was used to analyse the images. Five different types of rice had the following accurate classification rates. Based on the findings, it was determined that the method was sufficient for examining various rice seed kinds according to their visual characteristics.

Hua-Min Liu, et.al2021 [14] The current study aimed to identify the physicochemical and functional properties of pectic polysaccharides that were extracted from the hull of sesame seeds. After being extracted with HCl, the pectic polysaccharides in the seed hull were gathered at three different ethanol concentrations: 30% (SSP30), 50% (SSP50), and 90% (SSP90). We discovered that SSP30, which had several HG domains and few short side chains in the RG-I domains, made up 75.6% of the total polysaccharides and contained 76.39% galacturonic acid. Of the three fractions, SSP30 had the highest hydroxyl radical scavenging activity and superior emulsion stabilisation capabilities. These findings offer crucial information on the structure and functional properties of sesame hull polysaccharides, which can aid in the future development of sesame hull polysaccharides for industrial applications. Initially, higher Mw pectic polysaccharides precipitated at lower ethanol concentrations, and the Mw of the precipitated pectic polysaccharides decreased with increasing ethanol concentration.

CA Atinga, er.al2021 [15] One of the most significant and ancient oil seed plants in the world, sesame offers people a variety of nutrients. One of the easiest foods to digest is honey, which also contains a number of vital nutritional balance aspects. In Ghana, peanuts, butter, and jam are the most common spreads.

Nevertheless, the use of sesame in the creation of spreads has received less attention despite its nutritional and physiological advantages. A study was carried out with the goal of creating a recipe for spreads using a sesame and honey blend. Standard techniques were used to measure the following: water, ash, protein, fat, fibre, carbs, free fatty acids, and total sugar. Analysis of shelf life and sensory evaluation were also established. Five distinct iterations of the sesame honey blend were developed for this investigation. The study's findings indicate that the spread sample's moisture content varied between 3.64 + 0.01 and 6.87 + 0.12. The spread samples have an ash concentration ranging from 2.42 + 0.09 to 4.63 + 0.29 g/ml. The range of the protein content is 9.64 + 0.04 to 16.47 + 1.60 g/ml. It was discovered that the spread's fat content ranged from 39.9 + 0.19 to 66.87 + 0.51 g/ml. The spread samples used in this investigation had fibre contents ranging from 4.40 + 0.54 to 5.78 + 1.39 g/ml. According to studies, the range of the carbohydrate content is 2.61 + 0.85 to 39.9 + 0.20 g/ml.Samples ABC and EFG showed the greatest levels of free fatty acids and total sugars, respectively. In terms of convenience of use, the HIZ sample (60g sesame seeds, 40g honey, and 15 minutes of baking) received the highest rating. The spreadability rating for BDD (80g sesame seeds, 20g honey, and 15 minutes of roasting) is the highest. The top ratings for aroma, texture, smoothness, and overall acceptability are given to CFG (70g sesame seeds, 30g honey, and 15-minute roast). The samples did not include any Salmonella typhi, E. coli, or Esure reis. Nevertheless, after eight weeks of storage, there were more total viable counts, total coliform counts, fermentation, and mould. Compared to samples kept at room temperature, those kept in a refrigerator contained less microorganisms.

Jesse Edward Harmond, et.al2002 [16] With the crucial responsibility of feeding the expaiuliii, "world population," seed processing is a iii (e< ii-: il component of tlie vast, agricultural industry). The purpose of this handhook is to serve as a guide for the selection, use, and ari-ani-einent of seed-cleaning equations. Ijest is best suited for certain process demands. Typical process flow charts for a number of seed crops are included, along with descriptions of various seed cleaner types and separation principles for both commercial and experimental equipment. Associated elements, which Cooking causes sesame seeds to become brittle and not harden. This could suggest that the surface is new. Sesame peeling methods in Ghana and Africa often involve soaking the sesame in water for a while, let it to dry, and then rubbing it against a hard surface. The Winnower exhausts the insulating frame. For making little amounts, this method is reasonable but laborious. Thus far, inflating and spraying with 3% NaCl (salt) has produced an increasingly successful exfoliation technique (Chemonics, 2002)

Leonard M Klein, et.al2015 [17] Seed is never pure when it comes from a field. Weed and other plant seeds are mixed in with it. To obtain pure, viable crop seeds for replanting, they must be separated after harvest. Each crop's seed is essentially distinct from the others in terms of physical characteristics, making it simple to identify. Mechanical devices known as separators can detect or sense the variations in size, shape, weight, surface area, specific gravity, colour, electrical characteristics, texture, stickiness, and pubescence. These machines separate undesirable seeds from desired ones on the The primary purpose of preparing sesame is to remove the oil from the seeds by peeling them. Peeling and peeling, peeling and drying, and peeling and drying and oil grinding are some of the unusual ways that sesame can be prepared.The primary method of dispersing sesame seeds is by cooking them. Roasting sesame enhances its flavour, colour, and surface changes, which eventually improves the product's overall flavour. A variety of temperatures and roasting times are taken into account when making sesame paste. In order to spread sesame seeds with the correct colour and texture, it is best to roast them for 20–40 minutes at 120–140° C (Mijena, 2015).

Sevim Kaya, et.al2006 [18] Sesame seed can be stored and processed within main three forms; whole sesame seed, dehulled sesame seed, and dehulled-roasted sesame seed. In this study, the effects of dehulling and roasting process on the moisture adsorption isotherms and thermodynamic properties of sesame seed were investigated. The moisture adsorption isotherms of sesame seed were determined using gravimetric static method at 15, 25, and 35°C. The isotherms exhibited Type II behavior. Though the trend of sorption isotherms of the samples were similar, equilibrium moisture content was decreased with dehulling and roasting process at a certain water activity. The Guggenheim–Anderson–de Boer (GAB) and Halsey models were found to adequately describe the sorption characteristics. Thermodynamic properties (net isosteric heat, differential entropy, spreading pressure, net integral enthalpy and net integral entropy) were calculated to determine the properties of water and energy requirements associated with the adsorption data. The net isosteric heat of adsorption and differential entropy decreased with increasing moisture content. The values of the net isosteric heat of adsorption and differential entropy decreased with application of dehulling and roasting process. The changes in the net isosteric heat of adsorption and differential entropy with moisture content were sufficiently described by power-law model. The net integral enthalpy increased with moisture content to a maximum and then decreased, while the integral entropy decreased to a minimum and then increased with increasing moisture content. The order in the magnitude of integral enthalpy was found as whole sesame (WS)>dehulled-roasted sesame (DRS)>dehulled sesame (DS).

R Akinoso, et.al2010 [19] A necessary step in the food preparation process is cleaning. It involves getting rid of things that aren't needed. Given that it is the final operation in the primary process line, it must be carried out carefully (Fellow and Hampton, 2003). Operational inefficiencies are reflected in the finished product. As a result, any technique used needs to be effective and prevent additional material damage. Traditionally, the harvested crop is spread thinly on the threshing floor to remove pollutants, and a rake is used to remove the larger contaminants, which are primarily straw fragments. Light contaminants are eliminated by tossing the seed into the wind, which lifted the contaminant and ensured partial removal, while the remaining particles larger than the grains are removed with a broom or goose wings. This manual procedure often takes a lot of time and energy, and the separation efficiency is poor. Due to these characteristics, mechanical cleaning equipment were created, whose main function is to remove non-edible contaminants from seeds, such as lumps, stuck straw, trapped irons, and rubble. However, due to their small size, the majority of these devices are ineffective at cleaning beniseed. A better cleaning technique that satisfies customer demands while cutting costs is preferred. The goal of this experiment was to develop an efficient cleaner for Nigerian beniseed varieties.

Yue Wang, et.al2022 [20] Magnetic surface molecularly imprinted polymers (SMIPs) are acknowledged as crucial systems for the control of antibiotic residues because they enable customised adsorption, separation, and recovery of these contaminants. Nevertheless, the adsorption capacity per unit mass of the adsorbent is not influenced by the hefty inner carriers found in conventional SMIPs. Environmental contamination is also encouraged by the fact that the majority of SMIPs are made with organic chemicals, laborious operating procedures, or unfriendly circumstances. This work uses green and sustainable chemistry to build lightweight hollow double-layer hybrid magnetic molecularly imprinted polymers (HD-MMIPs) to address these issues with current SMIPs. The unique sesame ball-like shapes increase the adsorption capacity ($Q = 70.23$ mg g^{-1}) and the chances that tetracycline (TC) will reach the imprinted sites through the inner and outer layers. The separation process is greatly aided by the Fe_3O_4 nanoparticles, which are implanted like sesame seeds. Furthermore, our HD-MMIPs are produced using water, a solvent that is safe for the environment, resulting in a molecular imprinting method that is more sustainable. Additionally, the HD-MMIPs were demonstrated to specifically identify and adsorb trace TC from milk samples using HPLC analysis. The suggested method exhibits a high TC recovery (94.8 to 98.5%) and a lower LOD (0.83 ng mL^{-1}), indicating great potential for monitoring and controlling TC contamination in actual samples. The framework for creating environmentally friendly adsorbents for particular small molecule contaminants is established by this work.

2.2 LITERATURE SUMMARY

Based on the literature, the following key points can be summarized

- The research on sesame seed processing, cleaning, and separation technologies has evolved significantly, with a primary focus on improving efficiency, reducing labor, and enhancing the quality of the processed product. One notable area of development is the creation of mechanical devices for separating sesame seeds from contaminants like stones, dust, and sand. Baskar et al. (2019) highlighted the inefficiency of manual winnowing, which results in low seed separation rates and higher labor costs. They proposed a prototype sesame seed separator utilizing a double-layered filter, a blower system, and a vibrator sieve to efficiently separate contaminants. The inclusion of an Arduino controller and proximity sensor further optimized the cleaning process by detecting unclean seeds (Baskar et al., 2019).
- Further advances in sesame processing include the development of portable, power-operated threshers. Dhananchezhiyan et al. (2020) constructed a portable sesame thresher using a double-roller mechanism, improving threshing efficiency, output capacity, and cost-effectiveness. Their device demonstrated an impressive 96.7% threshing efficiency and reduced time and cost by 72% and 92%, respectively, when compared to traditional manual methods.
- Other studies have also focused on innovative methods for seed sorting and cleaning. For instance, Kunnayut Eiamsa-arda et al. (2021) designed a water-based cleaning system with a perforated dual-disc valve that improved the uniformity of seed sinking and reduced cleaning time and water usage by 61% and 74%, respectively. Additionally, advancements in machine vision technology for seed sorting, as demonstrated by Yubo Feng et al. (2024), have resulted in intelligent seed sorting systems with enhanced accuracy, achieving a sorting rate of over 90%.
- The use of machine vision, air velocity optimization, and mechanical devices to separate contaminants has been pivotal in enhancing the

efficiency of sesame seed processing. These innovations have significantly reduced the reliance on labor-intensive, manual processes, improved product purity, and contributed to cost savings in sesame seed production. With the continued development of these technologies, the future of sesame seed processing appears to be increasingly automated and efficient, offering improved quality and sustainability for both farmers and producers.

2.3 PROBLEM IDENTIFICATION

- The common major problem that is found in every sorting machine is, the sorted seeds are impure, the seeds that are obtained after grading is contained with dust and immature seeds.
- Some of the Machines Need a Larger area for the Sorting and Cleaning Process of the Sesame Seeds
- The cost of the machine is found to be very high and unaffordable.

2.4 OBJECTIVES

- To design a sesame grading machine which produces only mature and clean sesame seeds without any dust in an efficient way
- To design a compact and small size sesame seed grading machine.
- To design an efficient sesame seed grading machine which sorts and separates seeds and dust from the raw material.

CHAPTER 3

DESIGN OF PAPER RECYLING MACHINE

3.1 METHODOLOGY

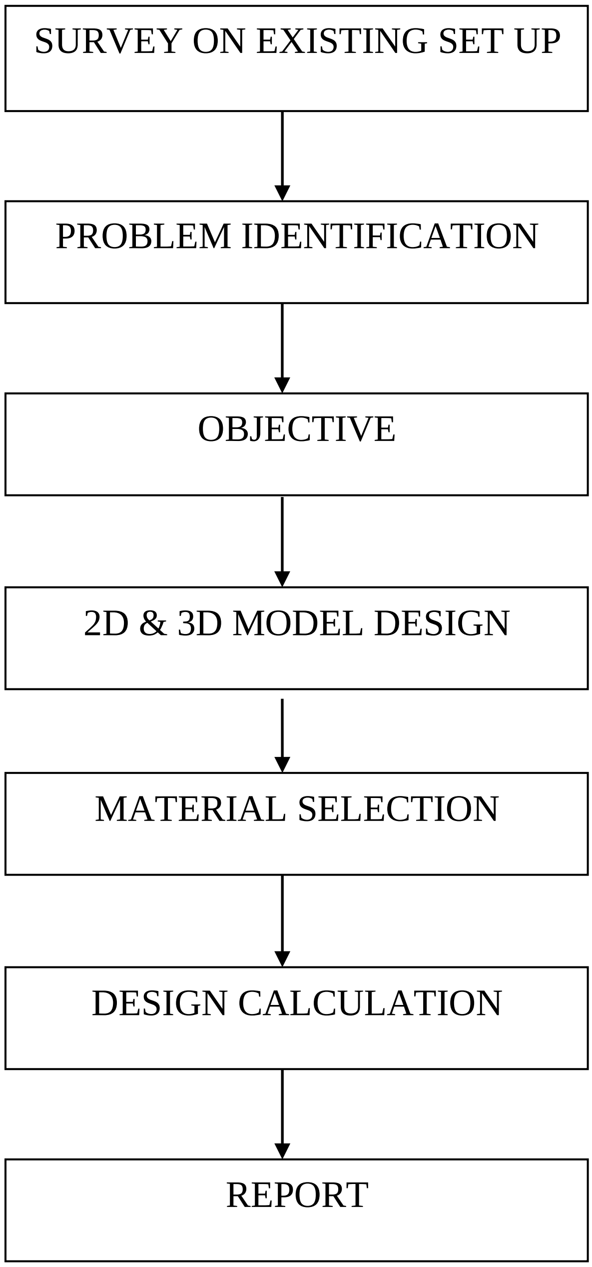


Figure 3.1 Methodology

3.2 2D DRAWING

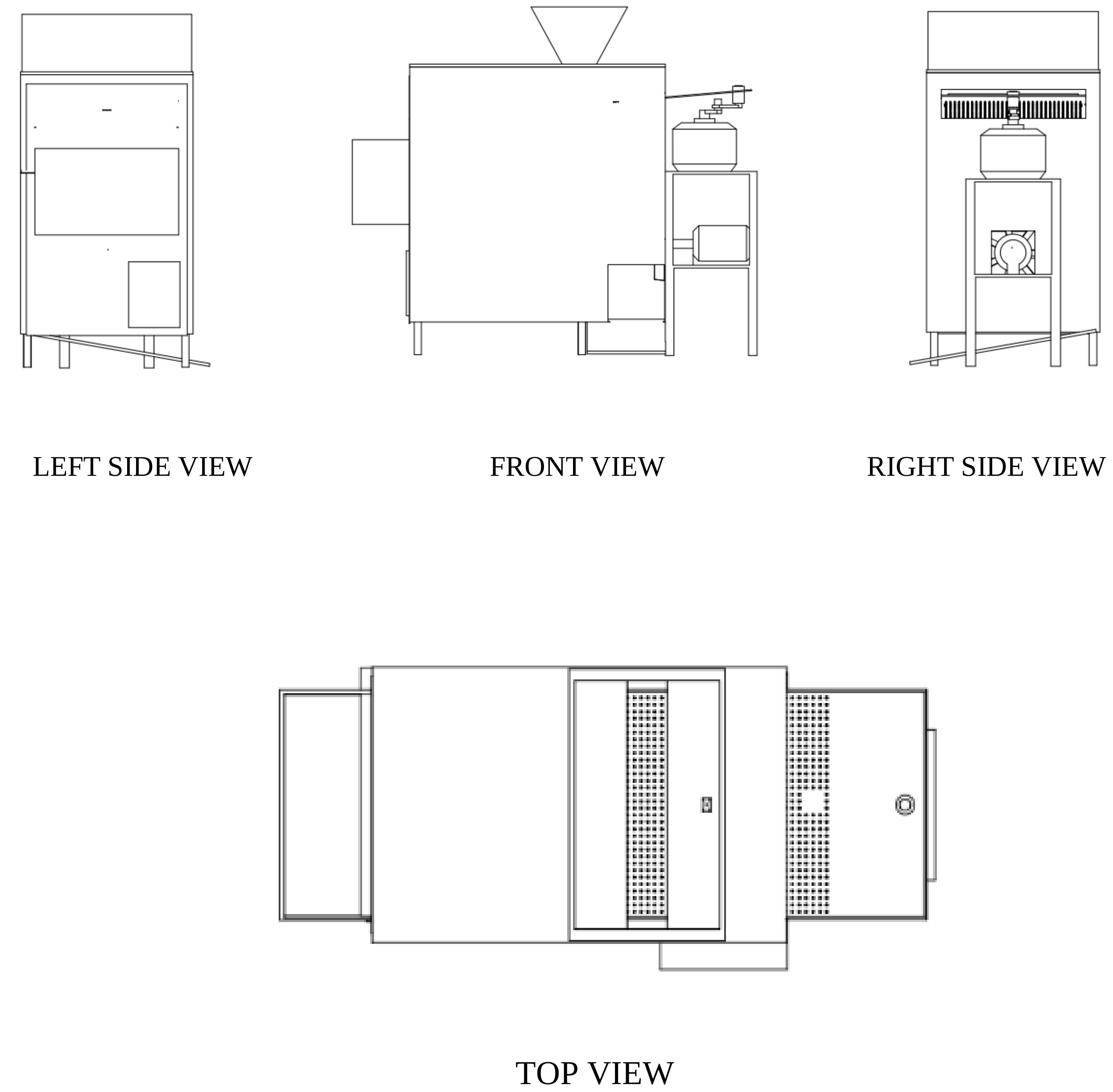
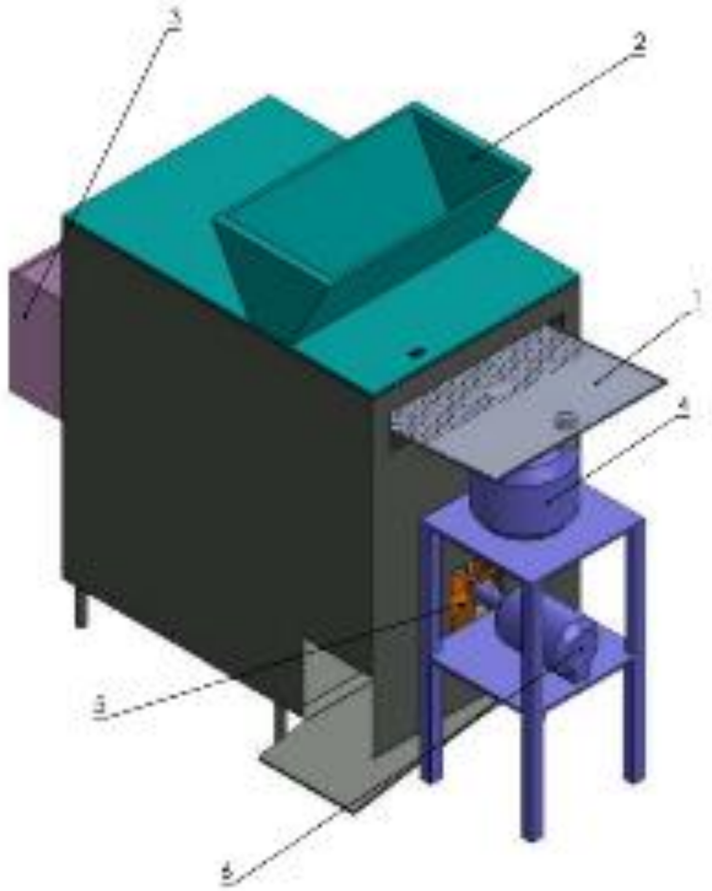


Figure 3.2 2D Drawing

3.3 3D DRAWING



1	SIEVING TRAY
2	HOPPER
3	WASTE COLLECTING BIN
4	MOTOR - 1
5	PROPELLER
6	MOTOR – 2

Figure 3.3 3D Drawing

3.4 BILL OF MATERIALS

- Motor
- MS Pipe
- Aluminium Sheet
- Propeller
- Aluminium Pipe
- Speed Controller
- Sieving Screen
- Connecting Rod
- Holding Rod
- Hopper
- Collecting Bin
- Coupling

CHAPTER 4

DESIGN CALCULATION

4.1 SPECIFICATIONS OF MOTOR

Motor 1
Voltage = 220 v
Horsepower = 0.5 Hp
Material = copper
Watts = 370, volts = 230v

Torque $\tau = P/2\pi N$
τ=370/2π x 300
τ=17,675
Torque τ = 17,675 NmM

Frequency = Speed/60
Speed = Frequency x 60
F = 6 Hz
Speed = 6 x 60
Speed = 360 rpm

Motor 2
Watts = 186, Volts = 230v
Horsepower = 0.25 Hp
Material = Copper

CFM = 150
RPM = CFM/d^3
=150/0.4^3
=375
Speed = 375 rpm

4.2 SPECIFICATION OF MS PIPE

Size = 20 x 20 mm
Type = Square
Length = 900 x 900 x 600 = 12 meter

4.3 SPECIFICATION OF ALUMINIUM SHEET

Thickness = 0.5 to 1 mm
Size = 1200mm x 4000 mm
Height = 900 mm
Length = 4500 mm
Area = 900x4500 = 4050 m^2

4.4 SPECIFICATION OF PROPELLOR

Material = Aluminium
Type = 4 Blade Propellor

4.5 SPECIFICATION OF ALUMINIUM PIPE

Size = 20 x 20 mm
Type = Square
Length = 500 x 850 = 3.5 meter

4.6 SPECIFICATION OF CONNECTING ROD

Length = 250 mm
Diameter = 20 mm
Material = Mild Steel

4.7 SPECIFICATION OF WASTE COLLECTING BIN

Height = 300 mm
Length =200 mm
Width = 165 mm
Material = Aluminium

4.8 SPECIFICATION OF SIEVING SCREEN

Size = 500mm x 900mm
Hole Size = 0.5 mm
Type = 40 Mesh (40 Holes per inch)
Material = Stainless Steel
Shape = Rectangular

4.9 SPECIFICATION OF HOLDING ROD

Diameter = 10 mm
Material = Mild Steel
Length = 150 mm

4.10 SPECIFICATION OF HOPPER

Hieght = 200 mm
Length = 300 mm
Width = 200 mm
Thickness = 1 mm
Material – Aluminium

CHAPTER 5
COST ESTIMATION

Table 5.1 Cost Estimation

SL No	Items	Quantity	Unit Cost (Rs)	Estimated Cost (Rs)
1	Motor	2(Nos)	2000	4000
2	MS Pipe 20x20 mm (Square)	12 meters	90	1080
3	Aluminium Sheet	900x4500mm	1400	1400
4	Propeller	1 (Nos)	250	250
5	Aluminium Pipe 20x20 mm (Square)	3 meter	350	1050
6	Connecting Rod	1(Nos)	100	100
7	Sieving Screen	1 mtr	2500	2500
8	Speed Controller	2 (Nos)	600	1200
9	Holding Rod	4(Nos)	50	200
10	Bolt,Nuts,Washers	30(Nos)	10	300
11	Coupling	2(Nos)	100	200
12	Fabrication Cost	-	1000	1000
TOTAL COST				**13,280**

CHAPTER 6
CONCLUSION

In conclusion, the development of a compact and cost-effective sesame sorting machine offers significant benefits in terms of efficiency, accessibility, and affordability for small to medium-scale sesame producers. By leveraging advanced sorting technology, such a machine can ensure uniform quality, reduce labour costs, and improve overall productivity. Its compact design makes it suitable for various production environments, including smaller farms and processing units, where space may be limited. Additionally, the cost-effectiveness of the machine allows for wider adoption, supporting the growth of the sesame industry, and enhancing the competitiveness of producers in the global market. Overall, this innovation represents a valuable tool for improving sesame sorting processes, driving both economic and operational gains.

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