

Risk Management in the Moringa Tea Production Process at the Teuku Umar University Technology Business Incubator

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ABSTRACT

Introduction: Current industrial processes encourage development in various sectors by applying technology and various media or materials used. In every production activity, of course, there are risks, both positive and negative. Therefore, it is necessary to make efforts to reduce these risks by implementing good risk management.

Material and Methods: This research method is descriptive qualitative, namely by identifying risks using Job Hazard Analysis (JHA), then analysis using qualitative risk analysis methods based on Australian Standard/New Zealand Standard (AS/NZS) 4360: 2004.

Result: Based on the results of the study, it was found that of the 11 identified risks, there were 6 risks with a level of high risk, 3 risks with a level medium of risk and 2 risks with a level of low risk. Furthermore, control is carried out using the OHSAS 18001:2007 Risk Control Hierarchy.

Conclusion: Of the 6 stages of the Moringa tea production process, 11 risks were identified with 5 risks including physical hazards, 2 risks being ergonomic hazards and 4 other risks being environmental hazards, chemical hazards, electrical hazards and mechanical hazards. Meanwhile, for the high risk category, there are 6 risks, the category is medium risk 3 risks and the category is low risk 2 risks. Risk control is focused on risks that have a category of high risk. The recommended risk control is risk control by means of elimination, administration and personal protective equipment.

Keywords: Australian Standard/New Zealand Standard (AS/NZS) 4360: 2004, Job Hazard Analysis, Risk Management, Moringa Tea

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I.

II. INTRODUCTION

Along with the times, the trend of using modern food products derived from herbs has increased. According to Jayani et al., 2020, herbal tea is a term that is often used for beverage products that are not derived from the tea plant (*Camellia sinensis*) [1]. Moringa tea is one of the processed food products made from herbs, which is made from Moringa leaves. The process of making herbal tea begins with harvesting, washing, withering/drying at room temperature (30-35°C), leaf sorting, reducing the size of dry leaves (*simplicia*) and packaging. [1]. Teuku Umar University Technology

Business Incubator (IBT UTU) is an entrepreneurship support institution in the West-South Aceh region that produces Moringa tea [2].

Industrial processes are currently driving developments in various sectors by applying technology and various media or materials used. The development of this industry can have an impact on the workforce. Efforts that can be made to reduce the risk of work accidents are the need for the application of occupational safety and health in the workplace [3].

In every production activity there must be a risk, either positive or negative. One way that can be done in minimizing these risks is by implementing good risk

management [4]. Risk management is a structured process carried out to manage risk in each activity to prevent potential adverse impacts [5].

Data from the International Labor Organization (ILO) in 2013 estimates that one worker in the world dies every 15 seconds due to a work accident, on April 26, 2013, in the context of World Occupational Health and Safety Day, occupational diseases are estimated to cause around 160 million cases and around 2, 02 million deaths per year. A population study conducted by the ILO in 2005 estimated that 8% of deaths were due to cancer, 7.5% cardiovascular and cerebrovascular disease, 10% chronic respiratory disease, and 100% work-related pneumoconiosis [6].

In the production process, Moringa tea has agricultural activities ranging from plantations to the processing stage, activities involving labor, tools, methods, funds and materials as well as a lot of time [7]. This work has the possibility of danger and risk, even work accidents. According to Nuryono (2020: 66) if you look at the type of work that involves many workers/humans, the possible dangers and exposures can interfere with human health [7].

The same research was also conducted by Ningsih Marpaung et al., 2016, in his research using qualitative research methods with risk identification using JSA (Job Safety Analysis) and risk assessment using semi-quantitative methods based on AS/NZS 4360:2004 standards. The results showed that there were 5 highest risks in generator assembly activities, including the risk of respiratory and lung problems, eyes being exposed to iron powder, being hit by heavy materials, loose cranes and broken fingers [8].

This study and research on risk management is focused on the six stages of the Moringa tea production process, namely, harvesting, washing, withering/drying, leaf sorting, grinding and packaging. The purpose of this study is to identify risks in each Moringa tea production process, analyze the level of risk and determine control strategies to minimize risks in each Moringa tea production process at the Technology Business Incubator at Teuku Umar University.

III. MATERIAL AND METHODS

Type of research is descriptive research, the risk assessment in this study refers to AS/NZS 4360:2004 regarding Risk Management with a qualitative risk analysis method consisting of stages of risk identification using JHA (Job Hazard Analysis), then conducting risk analysis by determine the value of the probability and consequence of each risk. This value is then compared with the standard risk level to get the level of risk that exists at each work step before doing the work until the job is finished. The instruments used in this study were interview guidelines and JHA sheets.

This research was conducted at the Technology Business Incubator, Teuku Umar University. The research was conducted for 3 months starting from September 2021 to November 2021. The research informants selected were 7 people, consisting of 5 main

informants, namely workers who were directly involved in the production process, 1 key informant, namely the IBT UTU manager and 1 informant. supporters, namely the UTU IBT Center Coordinator. Data analysis was carried out by reducing data, presenting data and drawing conclusions. The research data consists of primary data collected by researchers from observations and interviews, and secondary data from journals, books and other theoretical references.

IV. RESULTS

A. Risk Identification

Hazard identification is a process that can be carried out to identify situations or events that have the potential to cause accidents and occupational diseases that may arise in the workplace. According to Ramli (2010), the risks faced by a company are often influenced by internal and external factors [9]. Risk identification is carried out by observing 6 stages of the production process and conducting open interviews with workers, managers and the IBT UTU corpus.

TABLE I: Table Identification of Risk in Production Process Tea Moringa

No	Activity	Hazard Type	Hazard Identification	Risk
1	Harvesting	Physical hazards	Exposure to UV rays	Dry eyes
		Physical hazards	Moringa tree high Moringa tree near the pond / moat	Fall
2	Laundering	Environmental hazards	Floor slippery	Slip
3	Withering and Drying	Ergonomic hazard	Standing or sitting position for too long	Back pain Leg and hand cramps
4	Leaf sorting	Ergonomic hazard	Standing or sitting position for too long	Back pain Leg and hand cramps
		Physical hazards	Heat stress	Work fatigue Dehydration
5	Leaf size reduction	Chemical hazard	Inhalation of dust produced smoothing	Disorders Respiratory
		Physical hazards	Noise	Communication disorders
		Electrical hazard	Wiring Mess	Electrical current stung
6	Packaging	Ergonomic hazard	Standing or sitting position for too long	Back pain Leg and hand cramps
		Mechanical hazards	Machine press	Fingers pinched machine press

Based on the observasi and interviews with informants in table 1, from 6 stages of the moringa tea production process 11 risks were identified, 5 risks included physical hazards, namely dry eyes, falls, fatigue, dehydration and communication disorders, 2 risks included in ergonomic hazards, namely back pain,

cramping legs and cramping hands, and 4 other risks such as the risk of slip fall into the danger surrounding environment, respiratory disorders belong to the chemical hazards, electric shock due to messy wires belong in to the electrical hazards and fingers pinched machines press including to mechanical danger.

B. Risk Analysis

Analysis is an activity to categorize a risk from each work process using qualitative risk analysis to determine the value of probability and consequence, where the value of these two factors has been determined based on the AS/NZS 4360:2004 standard [10]. According to Zainuddin et al., 2017, risk analysis was carried out to distinguish between risks in the categories low, medium, high, very high [11].

TABLE II: Table of Risk Analysis in the Moringa Tea Production Process

No	Risk list	P	C	Risk level
1	Dry eye	B	1	Medium
2	Falling	B	2	High
3	Slipping	C	1	Low
4	Back pain	A	1	High
5	Leg and hand cramps	A	1	High
6	Work fatigue	A	1	High
7	Dehydration	B	1	Medium
8	Disorders of respiratory tract	C	3	High
9	Impaired communication	D	1	Low
10	Stung electric current	C	2	Medium
11	Fingers pinched machine press	C	3	High

The results of the risk analysis based on the AS/NZS 4360:2004 standard in table 2, there are 6 risks with a level, high risk namely the risk of falling, back pain, leg and hand cramps and respiratory disorders, 3 risks with a level, medium risk namely the risk of dry eyes, dehydration and being electrocuted, 2 risks with a level of low risk, namely the risk of slipping and communication disturbances. After getting the risk level, then risk control is carried out by referring to the Risk Control Hierarchy according to OHSAS 18001: 2007.

C. Risk Control

Control is the process of finding an appropriate treatment method to eliminate or reduce risk with the most effective allocation of costs and resources [12]. After knowing the level of risk that occurs in the Moringa tea production process, then systematic control is carried out. This control stage is carried out through interviews and discussions with the central coordinator, managers, and workers. Control measures are carried out

in accordance with the standards of the Risk Control Hierarchy according to OHSAS 18001:2007. Risk control in the Moringa tea production process is focused on risks that have a level of high risk in the process.

TABLE III: Risk Control Table for Category High Risk in Moringa Tea Production Process

No	Risk Event	Hierarchy of Control	Example
1	Falling due to a tall tree and near the pond	<i>Elimination</i>	Cutting tall trees and not planting Moringa trees near the pond.
		<i>Administrative</i>	Instructions for being careful, making SOPs for the right way of working.
		<i>PPE</i>	Provision of PPE such as <i>safety shoes</i> .
2	Back pain	<i>Administrative</i>	Limitation of working hours, making SOPs for the right way of working.
3	Cramping feet and hands	<i>Administrative</i>	Restricting working hours, making SOPs on how to work correctly, safely and comfortably.
4	Work fatigue	<i>Administrative</i>	Restrictions on working hours in the production room.
5	Respiratory tract disorders	<i>Administrative</i>	Supervision of the use of masks/PPE, training to increase workers' knowledge about K3 and routine health checks for workers.
6	Finger pinched machine press	<i>Administrative</i>	Making SOP on how to operate the machine <i>press</i> , putting up danger signs and instructions to be careful.
		<i>PPE</i>	Provision of PPE such as <i>safety gloves</i>

Based on table 3. shows that risk control in the Moringa tea production process is focused on risks that have a level of high risk, the control carried out is on the risk of falling by means of elimination controls such as cutting tall trees and instructions not to plant trees near the pool, administrative controls such as instructions to be careful and make SOPs and PPE controls such as providing safety shoes. The risk of back pain, leg and hand cramps, work fatigue and respiratory tract disorders can be done by means of administrative control such as making SOPs, limiting working hours in production rooms that have heat stress and supervising the correct use of masks/PPE as well as routine health checks for workers. The risk of being squeezed by the machine is press carried out by means of administrative control such as making SOPs and controlling PPE such as providing safety gloves or hand protective equipment.

V. DISCUSSION

Based on the results of interviews conducted with the IBT UTU Corpus and the UTU IBT Manager, one of the

causes of the risk of work accidents is the negligence of workers, this can be seen from the unsafe actions of workers such as placing tools or items carelessly, not wearing PPE when working and only wearing PPE properly when under supervision only.

Interviews were also conducted with workers about the reasons for not wearing PPE when working, the following is the result of an interview conducted with one of the workers.

"The purpose of PPE is to protect ourselves from risks that occur in the workplace, the important thing is to be careful when working. Sometimes I don't use it because the room is hot, Sis, so if you wear a mask, it's stuffy, there's no air coming in and it's uncomfortable to keep it complicated, Sis, if you wear gloves, your hands get wet from sweat." (Main Informant I).

The information above shows that the lack of awareness of workers in using PPE has the potential to cause work accidents and occupational diseases. Workers realize that the purpose of using PPE is to protect themselves while working, it's just that there are still workers who don't want to use PPE. In addition, changing a person's behavior is indeed difficult and cannot be done in a short time [13]. Therefore, it is necessary to make various efforts and actions to increase worker compliance and knowledge, such as Occupational Safety and Health (K3) training and apply it in daily life so that K3 culture can always be applied in the workplace.

In addition, interviews were also conducted on other workers by asking the same questions, the following are the results of the interviews. "I don't feel comfortable wearing gloves, Sis, especially when I press the tea bag, I'm afraid that the gloves will enter the press machine, sometimes I wear a mask sometimes not because it's hot inside, so if I wear a mask, it's very stuffy to breathe. There is also no working procedure and we don't know what's correct, the main thing is to be careful when working so that nothing happens." (Key Informant IV).

The information above shows that the reason workers do not wear PPE is because of discomfort and there are no correct work procedures, so workers choose not to wear PPE when working, and when this was confirmed by the researcher to the manager and the IBT UTU corpus, the following are the results of the interview that carried out with the manager and the IBT UTU corpus.

"The PPE used to produce Moringa tea should include eye protection, ear protection, masks, gloves, protective clothing and shoes. The PPE has been provided, but not all of them are just gloves and masks. The SOP is currently not available, we will make it as soon as possible because we are also new, so we don't know how to make the SOP. Actually, we have also given the workers information on how to work to make this Moringa tea." (Key Informant)

"For now, the PPE provided in the process of making Moringa tea is only gloves and masks. The availability of SOPs for Moringa tea production does not currently exist; in the future we will arrange the SOPs for Moringa tea production." (Supporting Informants) The

information above shows that it is necessary to have the correct SOP in the Moringa tea production process so

that workers can work properly and comply with the applicable SOP, and there needs to be good cooperation between the management and all workers.

The harvesting process is the earliest stage of the entire production process. This process has a risk of being exposed to the sun for too long and falling due to the condition of the tall Moringa tree and being near the pond. This risk can occur because the harvesting process is carried out outdoors so that workers are exposed directly to the sun for a long time, this risk can also occur due to dangerous action factors, namely unsafe worker actions such as doing work in a hurry and not using PPE properly. correct. According to Budiono (2016), a dangerous condition is an action that will cause an accident [14]. Dangerous condition factors are unsafe conditions from the work environment such as trees near ponds that allow workers to fall if they are not careful [15]. In this case, IBT UTU has not taken any preventive action. Recommendations for control that can be done are by compiling SOPs on how to work in the Moringa tea production process and providing personal protective equipment such as safety shoes and safety spectacles.

The washing process has the risk of slipping, this is caused by splashing water that falls on the floor to make the floor wet and slippery. Control that can be done at this stage is administrative control by installing warning signs that the floor is slippery and instructions to be careful. According to the research results of Putri et al., 2017, there is a relationship between the practice of implementing SOPs with a high risk of work accidents [16].

Withering/drying process, at this stage the work process is done manually, namely by arranging Moringa leaves on a mesh rack with a standing position that is too long. The risks in this process are back pain, leg and hand cramps. Administrative control can be done by limiting working hours in production rooms that have heat pressure, making SOPs for correct, safe and comfortable working methods. According to the results of research by Putranto et al., 2014, there is a significant relationship between body posture variables and complaints of low back pain [17].

The process of leaf sorting (separation of leaves from the stalks) has the risk of back pain, leg and hand cramps, work fatigue and dehydration. Administrative control can be done by limiting working hours in production rooms that have heat pressure. According to the results of research by Hamidundu et al., 2021, regarding the measurement of heat stress and risk assessment on workers at PT. Maruki Internasional Indonesia, showed that room temperature that has heat pressure can pose a risk of health problems, with the highest level of risk being the danger of impaired body function, dehydration, work accidents, shortness of breath and hearing loss and work stress [18].

The refining process has risks, namely respiratory tract disorders, communication disorders and electric shock. This is caused by chemical hazards such as dust from refining, physical hazards such as noise and electrical hazards such as wiring when using tools/machines. Administrative control can be done by supervising the use of PPE and training to increase

workers' knowledge about Occupational Safety and Health (K3). Meanwhile, the control of PPE can be done by providing the right masks. According to Sudarmo (2016) regarding the factors that influence behavior towards compliance with the use of PPE, it shows that there is an influence between supervision and the availability of PPE on compliance with the use of PPE with regression coefficient values of 70.0% and 67.8% [19].

The packaging process has the risk of back pain, leg and hand cramps and fingers pinched by the machine press. Administrative control can be done by making SOPs on how to operate the machine press, installing danger signs and instructions to be careful. PPE control can be done by providing safety gloves. According to the results of research by Kurniawan et al., 2018, there is a significant relationship between the attitude of using PPE and work accidents in manual lifting activities at the Fertilizer Packing Unit of Tanjung Emas Port [20].

VI. CONCLUSION

Based on the results of the study, it can be concluded that from the 6 stages of the Moringa tea production process, 11 risks were identified with 5 risks including physical hazards, 2 risks including ergonomic hazards and 4 other risks including environmental hazards, chemical hazards, electrical hazards and mechanical hazards. Meanwhile, for the high risk category, there are 6 risks, the category is medium risk 3 risks and the category is low risk 2 risks. Risk control is carried out on risks that have a category of high risk. The recommended risk control is risk control by means of elimination, administration and personal protective equipment.

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