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An Investigation of Thermal Comfort of Woolpeach Modest-Fashion Products: A Case Study in Indonesia

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ABSTRACT
Woolpeach is a type of fabrics made of 100% polyester with best-selling record in Indonesian market. Muslims form the largest population in Indonesian, and it is not surprising that they wear modest-fashion, usually made of woolpeach fabrics, in performing their daily activities. Therefore, this research wants to know thermal comfort of woolpeachwhen used in creating modest-fashion products in relation to tropical climate of Indonesia. This research used three indicators to know thermal comfort of the modest fashion made of woolpeace, including: 1) thermal insulation of heat, 2) water vapor permeability, and 3) air permeability. Qualitative method was used in this study to deeply know the reaction of participants tothe uses of the modest fashion made of woolpeace fabrics. Twenty students in fashion department in Malang State University were involved as participants in this research. The results of this research shows that 1) most of the participants agreed that modest fashion made of woolpeach fabrics is comfortable to wear in daily activities, which means they did not feel hot, 2) woolpeachcan absorb their sweat, and 3) woolpeach is a fabricwhich can produce cold sensation.
***Keywords**: woolpeach, thermal comfort, modest fashion*

I. INTRODUCTION

Considered one of the basic human needs, fashion will continue to stimulate an interesting discussion throughout human civilization. Both informal and academic discussions about fashion in the form of scholarly articles follow the fashion trends.From a psychological point of view about fashion industry, women's fashion products have dominated the fashion market more than those of kids and men.In terms of either amount of variation or rapid changes, they are far superior to the other two.

The spread and development of Islam worldwide have recently contributed to the growth of the trend in women's fashion towards modest fashion. The world's most populous Muslim-majority country, Indonesia is considered the trendsetter of modest fashion in the world (CNN Indonesia, 2016). Some Indonesian modest-fashion designers have participated actively in the fashion world: Dian Pelangi and Etu who have penetrated runway London Fashion Week and Japan Fashion Week respectively. This suggests that modest-fashion commodities enjoy a considerable reputation in the fashion world.

Furthermore, modest fashion begins to attract interests of researchers worldwide.Some research on modest fashion studies the increasing use of modest-fashionproducts (Bin Nafisah, 2016). A case study in Turkeyeon the importance of comfort found that comfort and precise measurements are major factors for potential buyers to consider in choosing clothes (Kaplan andOkur, 2007).

In 2017, many modest fashion products in circulation in online trading were made of woolpeachmaterial. This fabric is a mixture of cotton and synthetic fibers, so that it has all good quality of the fibers.One of the basic materials for clothes, woolpeachhas many advantages in that it is soft, smooth, fairly thick but light and not transparent.But what is most important is that it is sold at a price even lower-middle-classed citizens can afford.Such useful features are a perfect combinationfor the making of modest fashion productsbecause to make a single modest-fashion product, we need more than three-meter-long fabric,considering modest-fashion products' nature to cover almost all parts of the users'body, from neck to toe.

It is important that modest-fashion products are comfortable enough to wear on account of its covering most of all human body. In this term, the standards for thin-bodied users' comfort may indeed differ from those of fat-bodied ones. Therefore, ideal body shapes form the logical choice as a common standard at least for two reasons: (1) most of the female population has the ideal body shape and (2) from the persective of physiological mechanisms, it produces a fair number of sweat beads.

In fact, little have we read research thoroughly examining thisgradually-emerging fashion trend although woolpeach-made modest-fashion products have widely spread.For this reason, this research finds it important to carry out research on the comfort level of M-sized modest-fashion products made of woolpeach in everyday uses. Given the

aforementioned background, the purpose of this research is to know the thermal-comfort level of M-sized modest-fashion products made of woolpeach.This research is of practical use to common people and related industries,for it will make available helpful information concerning main factors in comfortabilty of modest fashion which is on trend in present Indonesia. Hopefully it will contribute to the development of creative industries, particularly in fashion industries.Moreover, it may provide those in education or public health sectorswith reference material on developing the technology for garment industryas a life-based academic field.

II. LITERATURE REVIEW

2.1. Modest Fashion

Modest Fashionis a fashion term used to refer to a fashion model which covers most of women's body.It is by definition a trend in women of wearing less skin-revealing clothes. In Muslim countries, it is often called hijab, the cover of the intimate parts of the body, 'awrah).

"Weeks and high On a general, people may have different standards on modest fashion, as long as it does not involve flashing the flesh. Modest fashion across religions has a great point of consensus that it should not be experienced as a limiting factor in style. Today, modest street style is thriving and can be visibly noticed during fashion -end events" (https://en.wikipedia.org/wiki/Modest_fashion)

In time modest fashion intensifies a worldwide marketing campaign throughe_commers, social media, and other non-traditional markets.This attracts interest of world-class designers such as Dolce &Gabbana, danMax Mara in partaking in designing modest-fashion products, which causes Muslim women not to be the only target consumers of modest fashion (https://www.forbes.com/sites/deborahweinswig/2017/03/31/is-modest-fashion).

Modest fashion products on trend are no more limited in the form of Muslim traditional, old-fashioned clothes. Today this fashion models becomes exclusive high fashion that is sold at exorbitant prices. Here are some latest designs of modest fashionproduced by a fashion house of Dolce &Gabbana and put on the high-fashionmarket.

(Dolce &Gabbana's New Hijab Collection, 2017)

2.2. Comfortability of Fashion

In addition to visual appearances, some parts of fashion products deal with human comfort felt when someone wears them. A fashion product can be considered comfortable if it is made neither too loose nor too tight, which enables its users to feel undisturbed, safe and free to move and by turns builds up their confidence.

Nowadays consumers prefer to choose clothes in which they look fancy and feel comfortable. As a consequence, comfortability forms a parameter of fashion products. Malik, (2012:55) defined "Comfort as a pleasant state of physiological, psychological and physical harmony between a human being and the environment."

Comfortability of fashion deals with some aspects including 1) thermo physiological, 2) sensorial, 3) body movement, and 4)aesthetic appeal(Bhatia and Malhotra, 2016:volume 6). A study in Turkeyediscoveres a corroborative evidence for this statement that comfortability of fashion is attributed to six factors plus one factor difficult to categorize: 1) aesthetic, 2) structural, 3) thermal, 4) disturbing, 5) sensory, 6) mechanical, dan 7) others (Kaplan&Okur, 2007). Nonetheless, not all of the factors the two statements identified are possible to be considered in fashion products because they also depend on mode, material, danthe purpose of the related research.

Therefore, in setting modest fashion as a research objective, this research identifies factors in fashion comfortability in accordance with the essential needfor which modest fashion is used. Those factors are 1) aesthetic comfort, 2) structural comfort, and 3) thermal comfort.

Aesthetic comfortrelates to the sense of beauty clothes convey. Aesthetic comfort includes 1) colors, 2) designs, 3) precise measurement, and 4) fabric construction.

Structural comfortrelates to the physical features of fashion products which include 1) perfectly-created structures, 2) volume, 3) durability, and 4) thickness.

Meanwhile, thermal comfortrelates to thermal environment, especially hot air, felt when one wears a fashion product. Some factors attributed to this comfort are1) heat insulation, 2) sweat absorption, and 3) air permeability.

2.3. Sizes of Modest-Fashion Products

Fashion productsare manufactured to cover people's body, but unfortunately, those available in markets cannot always fit varying body shapes and sizes of their users.Therefore, many fashion companies mass-produce clothes in standardized sizes, determined on the basis of the most frequently visiting consumers' body measurements.

In Indonesia, Zoya is considered one of the modest-fashion producerswith a stellar reputation.Zoya's products are made in the following size chart.

Table 2.1. S / M / L / XL/ XXL Sizes of 'ZOYA'

Body Measurements	**Standard Sizes of Zoya's Modest-Fashion Products**				
	S	**M**	**L**	**XL**	**XXL**
Body ciurcumference	94	100	106	112	120
Waist circumference	87	93	99	105	113
Pelvis circumference	100	106	112	120	128
Shoulder width	11.5	12	12.5	13.5	14
Arm length	54	56	58	60	60
Wrist circumference	34	35	36	38	39
Manset size	22	22.5	23	23	23.5
Collar circumference	46	46	47	48	48
Tunic Length	85	85	85	85	85
Dress Length	138	138	138	138	138

http://www.milazone.com/blog-285-detail-size-zoya.html, accessed on March 18, 2018.

Some body measurements necessary for making modest-fashion products are not mentioned on the table above, so that for the purpose of data collection, the researcher needs to modify the listed measurements by increasing or decreasing their sizes.Commonly, Indonesian fashion industry uses the standard S, M, L, XL, and XXL sizesto offer costumers broad ranges of sizes from small/thin sizes to large/fat sizes. However, in fact, many fashion companies commonly produce clothes in M size more than in other sizes taking into consideration the fact that M size satisfies most consumers' demands. In other words, the most frequently visiting consumers are women in M size.The following is the standard M size of mosedt-fashion products and body measurements of consumers involved in this research as repondents.

Table 2.2. Standard Size of Modest-Fashion Products and Respondents' Body Measurements

Standard Size of Modest-Fashion Products	**M**	**Tolerance**
Body circumference	100	
Waist circumference	93	
Pelvis circumference	106	
Back length	38	
Shoulder width	12	
Upper-back width	36	
Sleeve circumference	48	
Upper-arm circumference	40	
Wrist circumference	34	
Dress length	138	
Body Measurement		
Body circumference	96	-2 to +2cm
Waist circumference	89	-2 to +2cm
Pelvis circumference	102	-2 to +2cm

(milazone.com. modified by Prahastuti)

2.4. Woolpeach Fabric

In this research, the material of which modest-fashion products are made is woolpeach. Indonesian peopleoften call woolpeach Arab fabric, because most Arab-native Muslim women living in Indonesia wear clothes made of the fabric. In the last two years, woolpeach has been used by producers of Muslim fashion products for some reasons:1) it has smooth textures,2) it is soft, skin-tight,3) thin, and 4)light but not transparent, and5) it produces cold sensation when worn.
https://ommihijab.blogspot.co.id/2016/11/wollpeach-wolfis-ciri-karakteristik-kualitas-kain-wolfis.html
Woolpeachis a commercial name for woven material made of synthetic fibers, namely, polyester, most often used in modest fashion production. In a fabric burn test, woolpeach burns quickly, melts, shrinks, and produces a plastic-like smell and black smoke.It was Taufik (2011)that gave us the description that when burnt,polyester burns quickly and can continue to burn after a flame is removed, produces black smoke and a plastic-like smell, leaves coarse ashes, and shrinks.
It is known from the aforesaid statements that woolpech is made of a synthetic fabric called polyster. This is in line with the statement.ofMizutex (2017) that woolpeach is made of synthetic fabrics, not of cotton silk fabrics like the widespread misconception.
Polyester is a synthetic fabric resulting from the polymerization of ethylene glycol with terephthalic acid thorugh condensation polymerization,resulting in a chip or a polymer melt, subsequently made fibers through a spinning process(Ricard, 2011). Polyester fiber is known for its qualities to endure, resist wrinkles, and dry quickly when dried in the sun.Besides, polyester is also resistant to shrink, stretch and bacterial strains.However, it absorbs sweat less than natural fabrics, making it sensitive to temperatures and unsuitable to wear in hot temperatures.

III. RESEARCH METHOD

3.1 Research Plan

This research is planned to be qualitative and descriptive research.To obtain comprehensive data about comfortability of M-sizedwoolpeach modest-fashion products, the researcher asked some respondentsto wear them during a 3-hour-long learning activity in a laboratory,during and after which the researcher interviewed the respondents while observing their expressions and movements and filming a visual documentary.

3.2 The Researcher's Participation

In his direct participation, the researcher led the workshop and at the same time filmed all repondents' activities in woolpeach-made, modest-fashion products for e hours.In short, the researcher served as an observer, a data collector, and a data analyst (Arikunto,2002:15).
The active involvement of both the researcher and the participants in the workshop, as a leader and members respectively,gave the researcher an ease with which to collect data about their feeling, responses, and other detailed, research-related information. This helped ensure the validity and reliability of the qualitative data.

3.3 Data Sources and Reseacrh Location

The respondents involved in this research are undergraduate students who in 2014 and 2015 registered at Fashion Department of Malang State University.They are those with M-sized body measurements. Those students were selected as participants based on an assumption that after taking the course on techniques for creating women's fashion products and the course on textiles, fashion students are expected to have some competencies needed to accomplish the purpose of this research. Therefore, they could wear the M-sized clothes and assessed the quality of those clothes. There were 51 students registering in 2014 and 61 students registering in 2015 actively attending class activities. Of all those students, the researcher selected 20 students in total as the respondents of this research: 14 students from those registering in 2014 and 6 students from those registering in 2015. The selection process is shown in the following table 3.1.

Table 3.1. The Total Numbers of Respondents

Registration Years	**The Total Number of Students**	**The Total Number of Respondents with M-sized Body Measurements**
2014	51	14
2015	61	6
The Total Number of Respondents		20

This research was conducted in a workshop on modest fashion in the fashion laboratory of Malang State University.The laboratory is the 8-meter x 11-meter-wideroom with a temperature of 33°C (The temperature measurement is mentioned in appendix 4).

3.4.Research Instruments

Qualitative data about comfortability of M-sizedwoolpeach modest-fashion products were collected using some instruments, including interviews, observations, and documents.The interview was conducted under a set of guidelines as shown in the following table.

Table 3.2 Instruments

Research Focus	Indicators
Thermal comfort of M-sized woolpeach modest-fashion products	1) Thermal insulation of heat
	2) Water vapor permeability
	3) Air permeability.

3.5. Data Collection

This research was conducted in the 8 m x 11 m fashion laboratory of Malang State University in a temperature of 33°C (Appendix 4). The room has 4 windows opened wide, 2 doors, and 1 blower that turns right and left 60cm in diameter. The interview was conducted in three rounds: every single hour to the end of the workshop. The data collection also involved observing respondents' expressions by focusing on how the woolpeach fashion products absorb sweat within the three-rounded interview.In addition, the data was also documented in the form of written documents concerning the respondents' body measurements to be compared with the data collected through interviews and observations.

3.6. *Data Analysis*

The data analysis process moved through three stages: 1) data reduction, 2)data presentation, dan 3) the drawing of conclusion (Miles &Huberman, 1992). Data redeuction means selecting the collected data and focusing on the significant ones, identifying the consistent themes and patterns, and reducing the unnecessary ones (Sugiyono, 2016:338). Afterwards, the data on comfortability of M-sizedwoolpeach modest-fashion products were presented in a short overview, which is categorized based on the level of their comfortability (Appendix 3). A conclusion was then drawn from such data sources as interviews, observations, and documents gained duringthe research process.

3.3. Data Validity Evaluation

Data validity is important to assure in conducting research. An evaluation technique needs to be applied to assess the validity of data. In this research, the researcher applied a technique called methodological triangulation, especially source triangulation.

3.4. Data Intepretation

Data interpretation is the researcher's effort to comprehend the collected data so as to anwer the data questions. The interpretation of some categories used in this research is shown in the following table 3.3.

Table 3.3. Data Interpretation

Categories	Clarification
Disagree	Uncomfortable
Somewhat disagree	Fairly uncomfortable
agree	Comfortable
Strongly agree	Very comfortable

4. RESULTS AND DISCUSSION

The exploration of the result of the research data deals with the aforementioned research focus, that is, to analyze comfortability of M-sizedwoolpeach modest-fashion products while worn in particular room.The related information was gained from some data-collecting techniques, including interviews, observations, and documents. The collected data were discussed basweed on the listed indicators, which include (1) heat insulation, (2) sweat absorption, (3) air permeability of comfortability of M-sizedwoolpeach modest-fashion products.

4.1 Heat Insulation

Heat insulation of a fashion product is its ability to conserve heat outside of the body, a hot temperature of the environment, so that the body of its users becomes hot. Fashion products with good heat insulation keep their users' body cool inspite of high temperature. In this research, some respondents wore M-sized modest-fashion products for three hours, and they were interviewed every hour to know the products' heat insulation. The researcher wrote of the heat insulation as follows.

In the first stage of data-collecting process, in the first one-hour use, 20 respondents had varying opinions about the fashion products.On the one hand, a respondent said that he/she felt comfortable in the product in that he/she enjoyed performing the activity for an hour.Besides, eleven respondents had the same feelings. On the other

hand, three respondents felt nothing, neither heat nor comfort, but the other five found it uncomfortable to wear M-sized woolpeach modest-fashion products for an hour.

4.2 Sweat Absorption

Sweat absorption of a fashion product can be detected from a fabric's ability to absorb beads of sweat, so that the user's body is not bathed in sweat running off his/her body. In this research, the fabric of which a fashion product is made iswoolpeach. Of sweat absorption the researcher wrote as follows.

As for sweat absorption of fashion products, the researcher collected information three times, conducted every one single hour. In the first one hour of wearing the products, four respondents felt hot while wearing the products in performing the activity in the room. After two hours of wearing the products, twelve respondents felt hot and beads of sweat began to stand out.Meanwhile, three respondents felt hot and their sweat spread after their wearing the products for three hours.In contrast, a respondent felt comfortable and did not soak in sweat although bustling with the activity in the room.

4.3 Air Permeability

Air permeability is a fabric's quality to inhale air outside the body into an area of a woven fabric and at the same time to pass it through the fabric.Air permeability can be felt when the air into and from the woven fabric flows easily, which in turn produces cold sensation during the air circulation.In the following paragraph, the researcher wrote of the air permeability.

Modest-fashion's fabric material's ability to inhale air into a hollow space between the woven fabric and the body and then blow it back through the fabric made eleven respondents recognize that modest-fashion products they were wearing were made of fabric material with good qualities to circulate air very well. However, two respondents stated the contrasting opinion that the products did not perform the job well; meanwhile, the other seven respondents had the mixed feelingthat they hardly felt the cold sensation.Of the three categories of respondents, those who felt that the fashion products had good air permeability, the ability to produce good air flow, formed the most – 11 of 20 respondents.

5. CONCLUSION

Given the finding, it can be concluded that woolpeach modest-fashion products are comfortable to wear even in the hustle and bustle of indoor activities. Such comfort results from woolpeach's being neither too thick nor too thin.Woolpeach is a mixture of silk, cotton, and synthetic fabrics.What is more, woolpeach is known to be light, smooth, and not transparent and produce a cold sensastion, which is comfortable and suitable to wear in tropical regions like Indonesia.

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