

**Using microfibers to produce a one-layer warming-up sportswear****Assist. Prof. Dr. Ahmed Mahmoud Abdo Elshikh****Professor & Head of Apparel Department Faculty of applied arts Benha university****Assist. Prof. Dr. Mona Mohamed Sayed Nasr****assistant Professor of Apparel Department Faculty of applied arts Benha university****Walaa Taha Mahdi Abd El-Hameed Afifi****Demonstrator in Apparel Department Faculty of applied arts Benha university**[Mona.nasr@fapa.bu.edu.eg](mailto:Mona.nasr@fapa.bu.edu.eg)**Summary**

Sportswear is the most diversified and fastest growing group in the functional clothing market. It increases the performance of the player while achieving a comfortable feeling. It also qualifies the sport to compete to the maximum performance using modern and advanced materials technology and creating a good design that supports the sport with physiological comfort. While training and ease of movement without adding an extra burden on the player. Recently increased the proportion of sales of sports clothing, which led to the attention of textile developers, manufacturers and designers of sportswear to the introduction of greater improvements and innovations on these clothes. Recently, modern micro fiber has become a major concern in the future of the textile industry, where it has become popular in the manufacture of outerwear and accessories, underwear and sportswear especially. The design of modern sportswear also deals with the physiological aspects of body behavior, where both sides of rest and function are of paramount importance.

**Research problem:**

The loss of the warm-up allowance for some of the desired characteristics in improving the efficiency of the players and protect them from some injuries that may occur to them because of not warm up enough or required. It is also possible to produce a one-layer warm-up coat of microfiber fibers with thermal insulation and sweat absorption characteristics to reduce warm-up time.

**Research goals:**

- 1 - The use of microfiber fibers in the production of warm-up sports suit one-layer helps to achieve the properties of comfort and facilitate the process of metabolism and allow the body to complete the process of cooling and sweating without tightness or stress.
- 2- Determining the required properties in microfiber fabrics to produce warm-up sport suit.

**Research Methodology:** Experimental Descriptive Methodology

search limits:

- 1 - The research is limited to warm-up clothes for athletes in the open stadiums and not in closed halls.
- 2- Technical textile fabrics and modern materials [Microfiber fibers].

**Research hypotheses:**

- 1 - The use of single-layer fabrics keeps the body dry and maintain the temperature acquired by the player.
- 2 - the use of microfiber fabrics that allow the presence of breathing to the skin and sweat affects positively on the players.
- 3 - The use of warm-up clothing provides comfortable comfort in terms of sweat absorption and appropriate thermal insulation
- 4 - The difference in the quality of microfiber fabrics, whether woven or knitting leads to different results in terms of thermal insulation and air permeability.

**Keywords:** Microfiber, Sports Warming- Up Wear.

**Theoretical: Functional Clothing:**

Career clothing has become a basic requirement for consumers of readymade garments. People no longer need clothes that are protected from weather or heating. There is a need for clothing that functions as a body to absorb the sweat from the body and expel it away from it, creating a feeling of comfort that affects the person. The function is concerned with the use of the appropriate and appropriate for the needs of the human body and therefore the appropriateness of the material used with the purpose of its use. These clothes are worn for performing a specific function such as hospital workers and firefighters who are exposed to shortness of breath as well as sports clothing. The basic purpose of this clothing is comfort for those who wear and solve some problems such as humidity control and regulating the heat and falls under the clothing resistant to ultraviolet radiation and resistance to bacteria and odors the undesirable.

**Sportswear:**

Sportswear is the most diversified and fastest growing group in the functional clothing market. It increases the performance of the player while achieving a comfortable feeling. It also qualifies the sport to compete to the maximum performance through the use of modern and advanced materials technology and creating a good design that supports the sport with physiological comfort. While exercising and easy to move without adding an extra burden to the player. Recently, the proportion of sales of sportswear has increased, which has attracted the attention of textile developers, manufacturers and sportswear designers to introduce greater improvements and innovations on these clothes. Where newly used high-technology fibers that are characterized by strong performance and provide comfort and well-being. The design of modern sports clothes also deals with the physiological aspects of the behavior of the body, where the sides of comfort and function are of the utmost importance.

**Warming-up:**

Warming is a physiological process that affects the vital organs of the body so that the individual can perform a successful sport. All the organs of the body act as one unit and are connected to each other, and each training begins with warmth and ends with calm. The athlete must make these preliminary preparations, which are performed in the body before starting to engage in violent activity in a few minutes. He turned the sport before starting any exercise that beats harder than it was, becomes deeper, and fills the blood with sugar until the muscles are ready to work.

**Comfort:**

"The relationship between the human body, the clothes it wears, and the surrounding circumstances depends on the specificity of the threads, the degree of absorption, the elasticity, the humidity, the static electricity, the resistance to water penetration, etc."

The comfort of sports clothing can be divided into several different key aspects:

Thermo physiological comfort.

Sensory comfort of the skin sensory comfort.

Ergonomics comfort in the workplace ergonomics wear comfort

Psychological comfort.

Comfort thermal comfort thermal.

Relaxing comfort tactile comfort

**experimental work**

Since the main objective of the research is to work instead of warm-up sports fibers of microfiber, has been used three samples of fibers woven microfiber knitting and the work of various tests on samples of these fabrics to determine the best of these samples, and therefore use and use in the implementation of three samples of sports allowance and test This is the best allowance for achieving the required warm-up.

**First: Laboratory tests:** Tests and laboratory tests were carried out for fabric samples in the Egyptian Organization for Standardization and Quality (EOS). Three microprocessor samples with different compositions for woven micro-fiber fabrics were used to determine the best samples for use in the warm-up suit.

**Second: The tests conducted in the Gymnasium:**

The sport tests were conducted on the treadmill to determine the most appropriate and the most efficient in the warm-up required for exercise.

The conditions of the test have been established and the same athlete is installed. A person with high fitness and health has been used to use the treadmill for the duration of the exercise, since the normal person cannot perform the exercise as efficiently as the person Sports. The exercise was also installed as follows: Stabilizing the treadmill device to be used in the three exercises, as well as fixing the exercise time at 6:00 am to ensure that the person is not exposed to external influences from fatigue or exhaustion that may affect and exercise in the morning helps to burn more fat by 20% when performing exercise on an empty stomach before breakfast. The actual exercise time is 20 minutes.

**Discussion of results:**

Of Table (3-29) shows that Suit No. (1) is best for all physiological properties related to its effect on the performance of the performance of the warm-up allowance by 95.24% and its first order. It allows the player to retain the temperature gained during warm-up if possible. It is also best for water permeability, allowing sweat to penetrate outside the body, giving the player a better sense of comfort in the desired clothing. The second suit recorded 73.015%, while the suit number (3) was the lowest for all the physiological properties related to the effect of the performance of the performance of the warm-up of sports, by 56.43% and the third order. The lowest allowance was given in thermal insulation and air permeability, Water and therefore do not check any of the warm-up or comfort required.

- As indicated by the results in the research that warm-up woven suit is the best instead of warm-up knitting and thus achieved the hypothesis of research No. (4).

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