International Journal of Advance Research in Science and Engineering
Vol. No.4, Issue 10, October 2015
www.ijarse.com
IJARSE
ISSN 2319 - 8354

DESIGN AND FUNCTIONALLY APPROPRIATE FABRICS TO BE USED FOR CHILDREN CLOTHES

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ABSTRACT

Because of the great importance and the role that clothing plays in the lives of children in terms of feeling comfortable wearing clothes when there was the need to care for fabrics that make them these clothes and knowing the characteristics and specifications that must characterize.

On the other side prefers not to use synthetic fibers used in private used in a pure image, so that despite the economic advantages of industrial fibers but they are not suitable for children's clothing for sensitive children's skin in addition to what is caused by synthetic fibers not Absorb sweat and power generation Static electricity.

The aim of this research is to Design fabrics by using blends of natural materials and structures of various textiles, in order to get the textile and functionally appropriate for children clothes products.

A total of Nine woven fabrics were produced in Three kind of woven constructions were chosen namely, Plain 1/1, Twill 1/3 and Satin 4, each one were weaved using 100 % Flax yarns were used in *warp direction (22yarn / cm), 28/1 Cotton. Three kind of weft blend were used, 28/1 Cotton 100 % Flax yarn, 100% Viscose 24/1 Cotton, (25 pick/cm). The test results obtained showed that the plain weave was the highest value abrasion resistance with the types of fabric blend, the maximum value abrasion resistance was (1Viscose-2flax) for plain1/1. The plain weave was the highest value of air permeability with the types of fabric blend, and weaving types used. The best productive samples According to the measured properties and the required fabrics children properties were for plain weave.*

Keywords: Children Clothes, Comfortable Fabrics, Design Fabrics, Viscose, Woven Constructions,

I. INTRODUCTION

Despite the importance of children's wear fabrics, but the attention to the design comfortable fabrics from natural materials are not commensurate with the importance of this age. However, given the great importance and the role that clothing plays in the lives of children in terms of feeling comfortable wearing clothes when there was the need to care for fabrics that make them these clothes and knowing the characteristics and specifications that must characterize.

Cotton is one of the best fitness for children's clothing in general and in this age group in particular [1].

On the other side prefers not to use synthetic fibers used in private used in a pure image, so that despite the economic advantages of industrial fibers but they are not suitable for children's clothing for sensitive children's skin in addition to what is caused by synthetic fibers not Absorb sweat and power generation Static electricity [2].

Attention as the aesthetic of woven and is in addition to the functional properties of the product Textile of the most important factors that help attract consumer and economically vogue product.

And the process of wide fabric design border dimensions handles designer through with many rules are difficult to be summarized in a few points, but every single vocabulary building woven suitable in itself to be a target for the design of non-woven with specific functions and values of aesthetic private [3,4].

Thus, the functional design fabrics for clothing Take into consideration account the important properties of some of the following: -

1) Ease of use and is in (Resiliency-Crease –Recovery-Dimensional stability after washing)

2) Tenacity and increased consumer old is to: - (Abrasion Resistance.- fabric elongation and tensile strength) [5].

In general for all consumers, the choice of textile and clothing products is governed by a number of different needs and restrictions. These can be classified as "aesthetic", "functional" and "availability" requirements. Clothing should enhance an individual's Self Esteem and be attractive to both the wearer and others. It should also be comfortable and appropriate for any physical requirements. In addition it should be easily available for reasonable price [6].

The aesthetic requirements for children clothes as follows :- (Fabric appearance, color, and texture-Fabric drape) And keep appearance cloth of the factors that determine consumer life of the product which includes several properties are : - (Resiliency-Crease –Recovery-Shape Retention-Pilling Propensity) [7, 8] .

We have what concept of textile design after the enormous scientific advances Fabric structure of textile industry in recent times, has become a design concept reflects the actual translation to crystallize all those discoveries through product offers to the consumer, cast accepted and can competition between the counterpart of the products markets, because the design innovative work leads to achieve the purpose or function which was designed for [3, 4 ,9].

Textile design features that builders modular design results from the interaction of a number of key factors in building a woven together, and tiger Fabric structure yarn count used for warp and wefts, as well as the number of each of the warp and weft unit of measurement [3].

Consequently, The aesthetic appearance of the fabric, whether Textile or decorative effect, is not determined only by the structural composition factors.

Attention as the aesthetic of woven and is in addition to the functional properties of the product Textile of the most important factors that help attract consumer and economically vogue product [7].

And the process of wide textile design border dimensions handles designer through with many rules are difficult to be summarized in a few points, but every single vocabulary building woven suitable in itself to be a target for the design of woven with specific functions and values of aesthetic private. [3, 4 ,9] To prove it, we mention the following: -

- The multiplicity of textile raw materials significantly and each severity of physical and chemical properties which vary depending on the raw material, and the possibilities of employment of these raw materials Without Borders.

- Are woven through the building fibers and yarns forms a multi-turn, in addition to twisting and cabled and trends and their impact resulting aesthetic factors.
- Is the artistic influences aesthetic textile structures such as ribbing and prominence and decline and softness and luster and appearance, as well as crape blanks longitudinal and wrinkling of the most prominent manifestations of aesthetic, artistic and technical effects required for the textile design [3,4].
- The Functional purpose of the product Textile instrumental impact on the nature of the design, but may determine the trends as the multiple determinants of employment in turn.

Selection of color arrangements for the yarn and textile intensity and their structures, to achieve different aesthetic values and (handle, color, luster.....)

All of these factors need time and hard effort of fabric designed and conducted multiple experiments to choose the best and most Results For the purpose of use [3,4,9].

The word comfort and one of the important expressions which have different definitions are but the feeling comfortable Different from person to person because of the physiological and psychological differences between them.

It differs property requirements depending on the type of end-use of the product studies have shown that there are elements overlap in the production of comfortable fabrics, which include (air permeability, warmth cycle or cold thermal conductivity or Prevent the absorption of moisture Prevent the absorption of moisture, and reduce shipments static formed and the texture and weight of fabric) and associated properties Comfort clothing closely linked to the type of raw material used in the manufacture of clothing, providing Kinetic and thermal comfort of the child in this small age [1,2].

Comfort is divided into :-(Psychological comfort- Physiological Comfort)

- Psychological comfort reflects the suitability of clothing for the person and for the same occasion that the person wearing the clothing of Waitangi discomfort Because of the psychological state and not physiological or the result of a defect in the clothing the same [5,10].
- Physiological Comfort is the subject of comfort various dimensions of the complex and multidimensional topics in both studied or analyzed remained of difficulty associated with achieving".

  "Physiological comfort" functionally essential goal must be pursued in private clothes especially including certain functional purposes [5].
- Physiological comfort is divided into :-(Sensorial Comfort- Thermal Comfort)

  1)Sensorial Comfort is a sense of cloth handle of the cloth may cause tingling Sensitivity has caused severe This is in addition to the nature of the cloth itself and the extent of adhesion as a result of the body's inability to absorb sweat [5,10].

2) Thermal Comfort is the comfort resulting from moisture and heat exchange between the human body and its surrounding medium [5, 10].

Body sensation stops cold temperature fabrics or fabrics on the ability to deliver heat from the body to the outside as well as from the outside to the body composition of this Textile structure of the cloth which is known as the dynamic of the body's heat loss through fabric construction [6].

The properties of absorption of moisture and water vapor features a highly regarded comfort link the ability of fibers or yarns or fabrics to absorb moisture.

The properties of absorption of moisture go into determining the appropriateness of the cloth in terms of comfort when in use or not [5].

- Stretch Comfort is the comfort of not restricting clothing movements natural rights may be reasons for Feeling of kinetic comfort either impede the clothing of the movement or the inadequacy of the measured, and the necessary body freedom of movement within his clothes even feel comfortable, as the failure of clothes these requirements lead to pressure loads on the body [11, 5].

  It must be from natural fabrics and soft materials, crease recovery, easy washing and proper textile structures with regularly.
- Be of the age of a consumer longer (high tenacity)

  Shall be fabrics with light weights as much as possible in order to provide comfort for the child Because of the heavy weight fabrics impede the movement of the child, making it the nervous. [2, 5]
- To be of a high capacity to absorb moisture
- Must be highly resistant to friction

And children's clothes are different requirements for requirements that you need, as well as adult clothes vary according to the amount of stresses them. [10, 12]

The aim of this research is to Design fabrics by using blends of natural materials and structures of various textiles, in order to get the textile and functionally appropriate for children clothes products.]

II. MATERIALS AND EXPERIMENTAL METHODS

2.1 Fabrics Specifications

Table I shows the specification of the produced fabrics and its weaving construction. 100 % Flax yarns were used in warp direction (22yarn / cm), 28/1 Cotton. Three kind of weft blend were used, 28/1 Cotton 100 % Flax yarn, 100% Viscose 24/1 Cotton, (25 pick/cm)

Table I: Fabric Specifications (Type of Warp Yarns is 100 % Flax)

No	Weft Blending	Weaving Structure
1	1 viscose :1 flax	Plain 1/1
2	1 viscose :1 flax	
3	1 viscose :1 flax	
4	1 viscose :2 flax	Twill 1/3
5	1 viscose :2 flax	
6	1 viscose :2 flax	
7	2 viscose :1 flax	Sateen 4
8	2 viscose :1 flax	
9	2 viscose :1 flax	

2.2 Testing and Analysis

Laboratory tests on the produced samples were carried out at the standard conditions for textiles with an air temperature (20±2°C) and relative humidity of air (65 ± 5 %) according to the American Society of Testing Materials (ASTM). Tests applied to samples are:-

2.2.1- Fabric tensile strength (kg) and elongation (%) was determined according to ASTM standard test method [13]

2.2.2- Fabric Crease Recovery (Degree).

2.2.3- Fabric Abrasion Resistance (Cycles).

2.2.4- Fabric Water Absorption (Second).

2.2.5- Fabric Thickness test (Mm).

2.2.6- Fabric Air Permeability (Cm3/Cm2/S).

2.2.7- Fabric Square Meter Weight (G m).

III. RESULTS AND DISCUSSION

The results of experiments tests carried out on the produced samples are shown in Table II. The results of experiments carried out to measure the properties of the samples produced are shown in Figs (1-10).And figure (11) shows arrangement the samples produced in terms of the measured properties depending on the labs quality

Figure (1) shows the relationship between fabric blend and weaving type and warp Tensile strength. It is shown that the amount of warp Tensile strength showed great variance according to the fabric blend and weaving type.

It is clearly shown that In general, the plain weave was the highest value of warp Tensile strength with the types of fabric blend, while Sateen 4 and Twill 1/3 were the lowest value. The maximum of warp Tensile strength was (1Viscose-2flax) for plain1/1, while the minimum was (2Viscose-1flax) for Sateen 4.

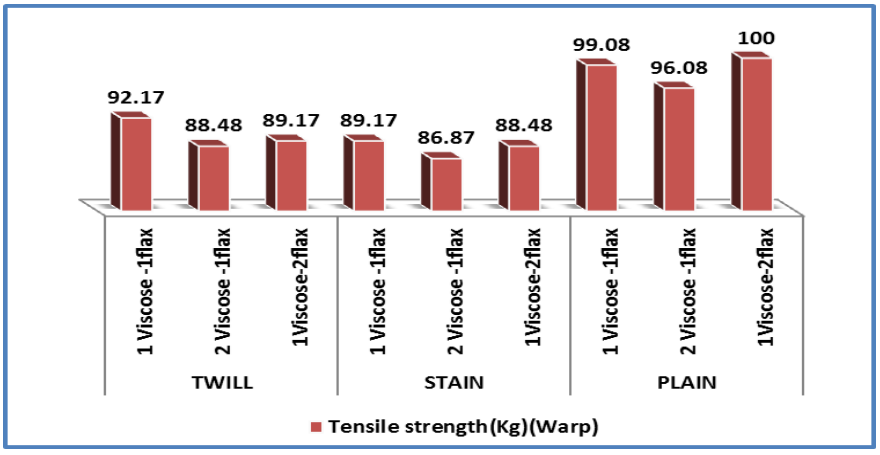

Figure1. Relationship Between fabric blend and weaving type and warp Tensile strength

Figure (2) shows the relationship between fabric blend and weaving type and weft Tensile strength. It is clearly shown that In general, there is a convergence between the values of fabric weft tensile strength with the types of fabric blend, and weaving types used. The maximum of weft Tensile strength was (2Viscose--1flax) for plain1/1, while the minimum was (1Viscose-2flax) for Twill 1/3..

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www.ijarse.com
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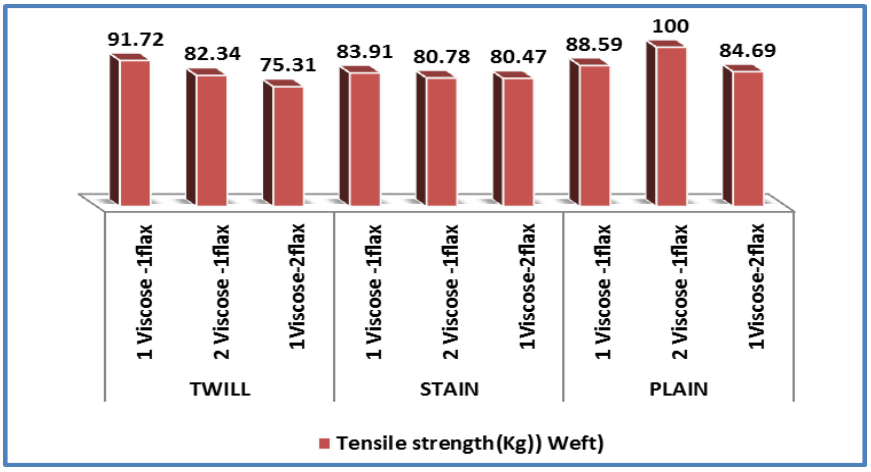


Figure2. Relationship Between fabric blend and weaving type and weft Tensile strength

Figure (3) shows the relationship between fabric blend and weaving type and warp elongation. It is clearly shown that In general, There is a convergence between the values of warp elongation with the types of fabric blend ,and weaving types used . The maximum of warp elongation was (1Viscose--2flax) for plain1/1, while the minimum was (1Viscose-1flax) for Twill 1/3.

Table II .The results of laboratory tests on the produced samples

W .S	Fabric Blend	Tensile strength(Kg) (Warp)	Tensile strength(Kg) (Weft)	Elongation (%)(Warp)	Elongation (%)(Weft)	Abrasion resistance (Cycles	Water absorption (Second)	air permeability ($Cm^3/Cm^2/S$)	Crease recovery (Degree)	Thickness (Mm)	Square meter weight (Cm)	The ideal space	Quality Labs
PLAIN	1Viscose-2flax	100.00	84.69	100.00	92.44	84.00	34.10	100.00	82.65	85.71	87.86	851.45	85.145
	2 Viscose -1flax	96.08	100.00	89.38	100.00	26.67	5.20	92.52	98.98	100.00	92.68	801.51	80.151
	1 Viscose -1flax	99.08	88.59	83.75	86.76	100.00	48.43	83.31	86.73	95.45	97.44	869.54	86.954
STAIN	1 Viscose -2flax	88.48	80.47	75.94	84.24	51.85	42.89	46.17	86.73	73.68	89.94	720.39	72.039
	1 Viscose -1flax	86.87	80.78	72.81	93.91	31.26	56.83	44.20	83.67	73.68	95.60	719.61	71.961
	2 Viscose -1flax	89.17	83.91	67.50	87.39	43.41	100.00	42.14	100.00	76.36	100.00	789.88	78.988
TWILL	1 Viscose -2flax	89.17	75.31	78.44	89.71	59.26	67.10	50.33	82.65	72.41	84.92	749.3	74.93

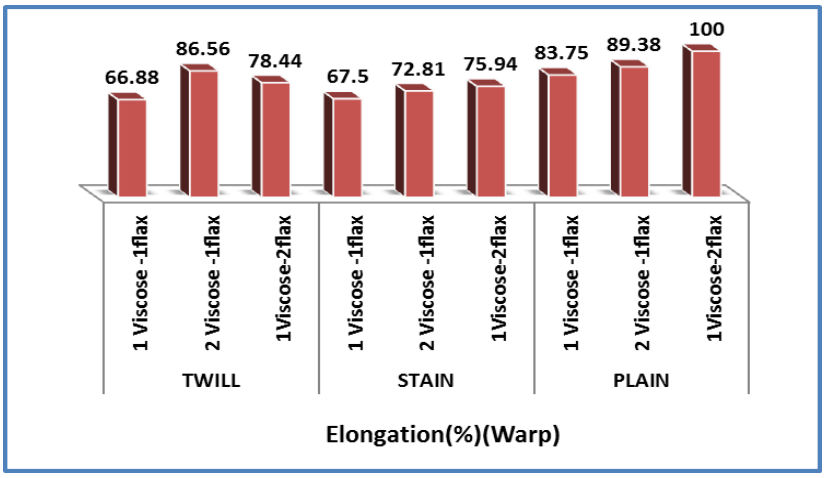


Figure3. Relationship Between fabric blend and weaving type and warp elongation

Figure (4) shows the relationship between fabric blend and weaving type and weft elongation. It is clearly shown that In general, There is a great variance between the values of weft elongation with the types of fabric blend ,and weaving types used, . The maximum of weft elongation was (2Viscose-1flax) for plain1/1, while the minimum was (1Viscose-2flax) for satin 4.

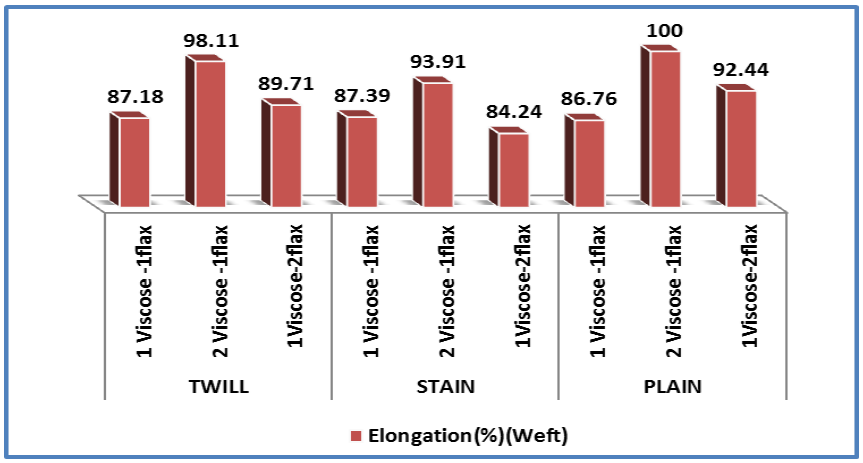


Figure4. Relationship Between fabric blend and weaving type and weft elongation

Figure (5) shows the relationship between fabric blend and weaving type and fabric abrasion resistance It is clearly shown that In average, the plain weave was the highest value abrasion resistance with the types of fabric blend, and that might be attributed to the short floats of plain weave. Followed by Twill 1/3, while Sateen 4 was the lowest value of abrasion resistance. The maximum of abrasion resistance was (1Viscose-1flax) for plain1/1, while the minimum was (2Viscose-1flax) for plain1/1.

Figure (6) shows the relationship between fabric blend and weaving type and fabric water absorption. There is a great variance between the values of water absorption with the types of fabric blend ,and weaving types used. The maximum of water absorption was (1Viscose-1flax) for satin 4, while the minimum was (2Viscose-1flax) for plain1/1, and that might be attributed to the short floats and the large number of interlacing of plain weave which was the lowest in the water absorption.

Figure (7) shows the relationship between fabric blend and weaving type and fabric air permeability. It is clearly shown that In general, the plain weave was the highest value of air permeability with the types of fabric blend ,and weaving types used. While Sateen 4 and Twill 1/3 were the lowest value of air permeability. The maximum of air permeability was (1Viscose-2flax) for plain1/1, while the minimum was (1Viscose-1flax) for satin 4.

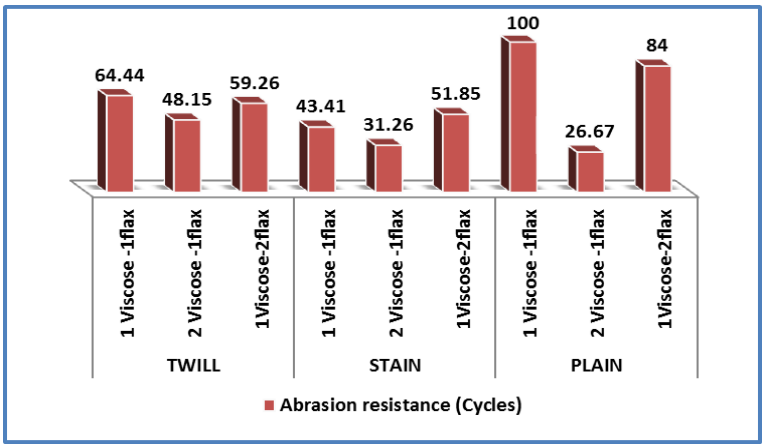


Figure5. Relationship Between fabric blend and weaving type and fabric abrasion resistance

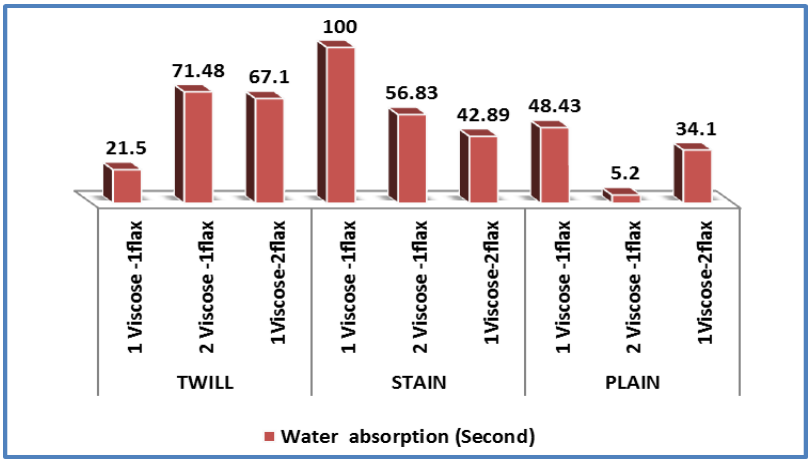


Figure6. Relationship Between fabric blend and weaving type and fabric water absorption

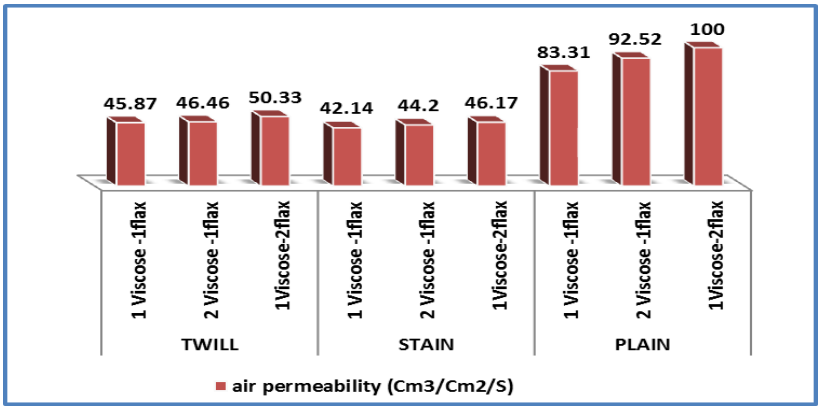


Figure7. Relationship Between fabric blend and weaving type and fabric air permeability

Figure (8) shows the relationship between fabric blend and weaving type and fabric crease recovery. It is clearly shown that In general, there is a convergence between the values of crease recovery with the types of fabric blend, and weaving types used.

The maximum of crease recovery was (1Viscose-1flax) for satin 4, while the minimum was (2Viscose-1flax) for twill1/3.

Figure (9) shows the relationship between fabric blend and weaving type and fabric thickness. It is clearly shown that In general, there is a convergence between the values of thickness with the types of fabric blend, and weaving types used but the plain was the highest, and that might be attributed to the large number of interlacing of plain weave. The maximum of thickness was (2Viscose-1flax) for plain1/1, while the minimum was (1Viscose-1flax) for twill1/3.

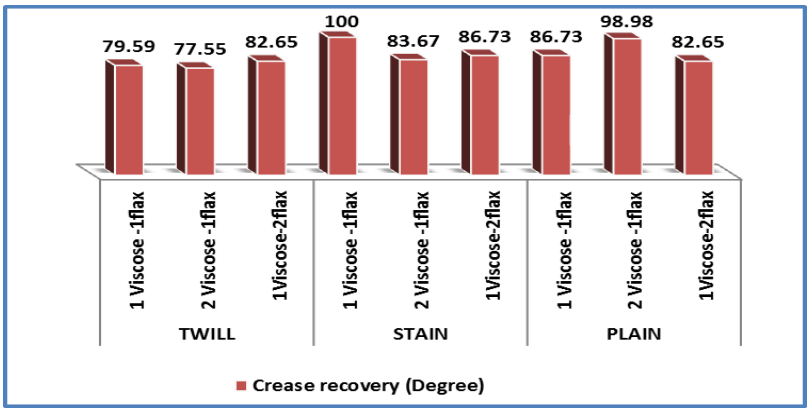


Figure8. Relationship Between fabric blend and weaving type and fabric crease recovery

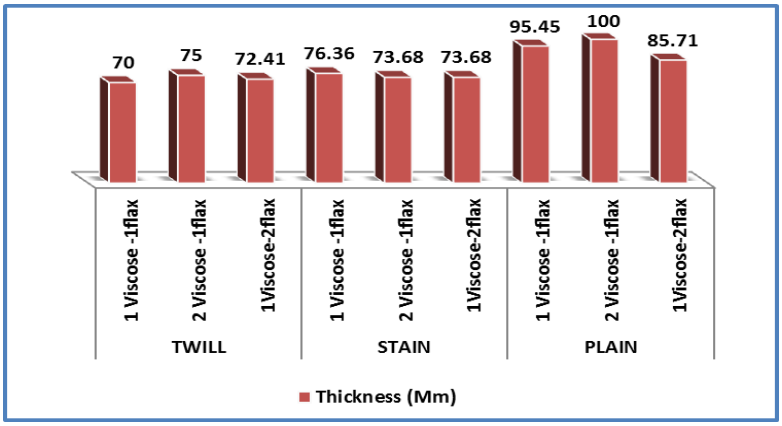


Figure9. Relationship Between fabric blend and weaving type and fabric thickness

Figure (10) shows the relationship between fabric blend and weaving type and fabric square meter weight. The maximum of square meter weight was (1Viscose-1flax) for satin 4, while the minimum was (1Viscose-2flax) for twill1/3.

Figure (11) shows arrangement the samples produced in terms of the measured properties depending on the labs quality. It is clearly shown that the best productive samples According to the measured properties and the required fabrics children properties were form plain weave, This is indicated by the first three samples were from the plain weave. The best sample was (1Viscose-1flax) for plain1/1, While the sample was the worst (2Viscose-1flax) for twill1/3.

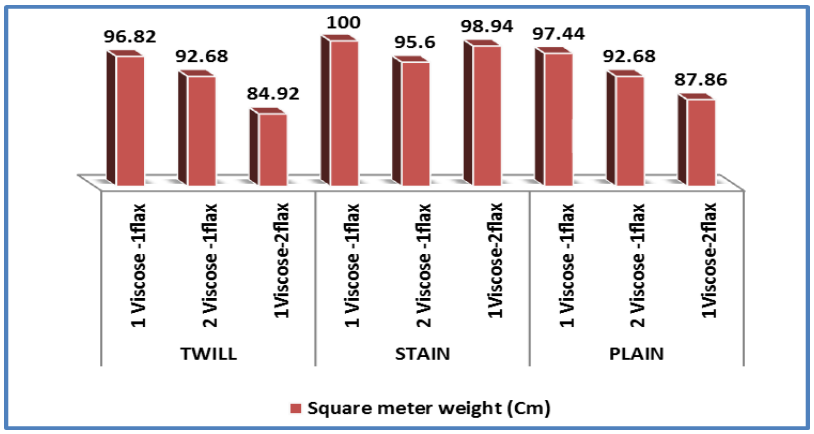


Figure10. Relationship Between fabric blend and weaving type and fabric square meter weight

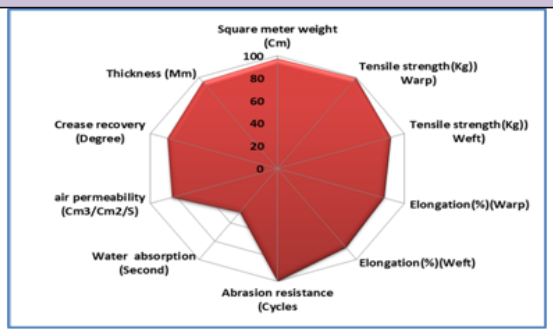
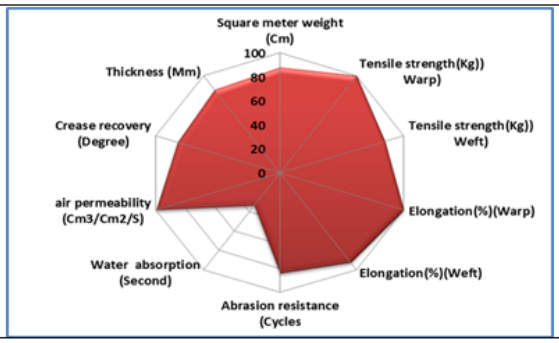
W .S	Fabric Blend		The ideal space	Quality Labs	order
PLAIN	1 Viscose -1flax		869.54	86.954	1
PLAIN	1Viscose-2flax		851.45	85.145	2

Figure11. Arrangement of the samples produced in terms of the measured properties depending on quality labs

IV. CONCLUSIONS

In this study, through the evaluation of the properties of fabrics produced for children's clothing by using (Viscos and Flax) yarns with different weave types and different types of fabric blend were investigated. From the results, the following conclusions can be made:

The plain weave was the highest value of warp Tensile strength with the types of fabric blend, while Sateen 4 and Twill 1/3 were the lowest. The maximum of warp Tensile strength was (1Viscose-2flax) for plain1/1.

The maximum of warp elongation was (1Viscose--2flax) for plain1/1 with the types of fabric blend ,and weaving types used .

The plain weave was the highest value abrasion resistance with the types of fabric blend, the maximum value abrasion resistance was (1Viscose-2flax) for plain1/1.

The plain weave was the highest value of air permeability with the types of fabric blend ,and weaving types used.

The best productive sample According to the measured properties and the required clothes children properties was (1Viscose-1flax) for plain1/1, While the sample was the worst (2Viscose-1flax) for twill1/3.

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