

Ain Shams University Women's College Home Economics Dep.

# Red sea as a source of inspiration for different textile applications to serve tourism in Egypt

#### Thesis

**Submitted in partial fulfillment of Ph.D.** (Home Economics - Textile & Clothing)

# $\mathcal{B}y$

## **Mona Mohamed Mohamed Ali**

Assistant Lecturer- Home Economics Dep. Women's College - Ain Shams University

## Supervised by

#### Dr. Naglaa I. Elwakeel

Prof. of textile printing design Faculty of Applied Arts Helwan University

#### Dr. Marwa M. khodarv

Lecturer of textile & clothing Women's College Ain Shams University

#### Dr. Hebatulah A. Abd-Elaleem

Ass. Prof. of textile & clothing Dep. Women's College Ain Shams University

#### Dr. Enas A. Elokda

Lecturer of textile & clothing Women's College Ain Shams University



Ain Shams University Women's College for Arts, science &Education Home Economics Department

### Approval sheet

Thesis: submitted for the requirements of PhD (Home Economics-Textile and clothing)

#### Title:

"Red sea as a source of inspiration for different textile applications to serve tourism in Egypt"

#### <u>By</u> Mona Mohamed Mohamed Ali

#### **APPROVED BY**

# Prof. of textile printing design Faculty of Applied Arts... Helwan University. Dr. Hanan Nabih Ahmed Elzeftawi Prof. of Draping on the dress stand Faculty of Home Economics... Helwan University. Dr. Naglaa Ibrahim Elwakeel Prof. of textile printing design Faculty of Applied Arts... Helwan University. Dr. Hebatullah Ali A.Aleem Assistant professor of Textile & Clothing Home Economics Dept... Women's college-Ain Shams University.

Dr. Aisha Hassan Nasr

#### **ACKNOWLEDGEMENTS**

# First and foremost, I feel always indebted to Allah, the most beneficent and merciful

I am greatly indebted and wish to express my deepest thanks and gratitude to Prof. **Dr. Naglaa I. Elwakeel,** professor of textile printing design at faculty of Applied Arts, Helwan University, for her continuous supervision, encouragement and careful guidance in the field of textile design by providing all possible facilities to complete this artistic work.

It is also a pleasure for me to Acknowledge **Dr. Hebatalah A. Abd-Elaleem,** Assistant prof. of textile & clothing, Home Economics Department, women's college, Ain shams university, for her valuable supervision and sincere assistance and efforts.

I would like to express my deepest thanks with all my love and gratitude to **Dr. Enas A. Elokda**, Lecturer of textile & clothing, Home Economics Department, women's college, Ain shams university, for suggesting the topic of this thesis, and continuous guidance to complete the application of this work.

Also I would like to express my deepest thanks and gratitude to **Dr. Marwa M. Khodary** Lecturer of textile printing, Home Economics Department, women's college, Ain shams university, for her continuous supervision, careful guidance in Implementing of textile printing to complete this work.

I am pleased to express my thanks and appreciation to Prof. Dr. Aisha Hassan Nasr and Prof. Dr. Hanan Nabih Elzaftawy

Members of discussion committee for their acceptance to discuss this thesis.

I would like to dedicate this work to my family thanking them for their support, love and encouragement.

Last but not the least; I would like to thank all my sincere colleagues in Home Economics Department for their sincere help and support.

Finally, I hope to God that makes this research is the beginning of my research scientific breakthrough that beg to be learned of it.

# **CONTENTS**

Subject	page
<b>U</b>	1 8

1-Definition of the study and Previous Studies	1
2- Introduction and literature review	18
2.1 Red Sea Geography	18
2.2 Tourism in Egypt's Red Sea	19
2.2.1 Tourism activities	21
2.2.1.1 Therapeutic tourism	21
2.2.1.2 Recreational tourism	21
2.2.1.3 Historical tourism	22
2.2.1.4 Religious tourism	22
2.2.1.5 Tourism and safari adventure	23
2.2.1.6 Environmental tourism	23
2.3 Cultural and natural features of the red sea	24
2.3.1 Cultural features of the red sea	25
2.3.2 Natural features of the red sea	29
2.3.2.1 Red sea plants	29
- The Flowering Plants	29
- The Algae	30
2.3. 2.2 Red sea animals	31
- Vertebrate Animals	31
Bony Fish	31

- Invertebrate Animals	33
Coelenterata	33
• Sponges	36
Echinoderms	37
• Mollusks	39
Crustaceans	43
• Polychaetes	44
2.4 What is design?	46
2.4.1 Culture, Nature and design	46
2.4.2 The design processes	48
2.4.3 The creative process	49
2.4.3.1 Inspiration for textile designs	59
2.5 Role and importance of Computer technology in textile design and apparel	51
	<b>51</b> 53
technology in textile design and apparel	
technology in textile design and apparel  2.6 Printing	53
technology in textile design and apparel  2.6 Printing  2.6.1 Printing with pigment	53
technology in textile design and apparel  2.6 Printing  2.6.1 Printing with pigment  2.6.2 Printing methods	53 53 54
technology in textile design and apparel  2.6 Printing  2.6.1 Printing with pigment  2.6.2 Printing methods  2.6.2.1 Stencil printing	53 53 54 54
technology in textile design and apparel  2.6 Printing  2.6.1 Printing with pigment  2.6.2 Printing methods  2.6.2.1 Stencil printing  2.6.2.2 Screen printing	53 53 54 54 55
technology in textile design and apparel  2.6 Printing  2.6.1 Printing with pigment  2.6.2 Printing methods  2.6.2.1 Stencil printing  2.6.2.2 Screen printing  2.6.2.3 Heat Transfer printing	53 53 54 54 55 56

3- Experimental work	60
3.1 Materials	60
3.1.1 Fabrics	60
3.1.2 Chemicals	61
3.1.3 Pigments	61
3.1.4 Dyes	62
3.1.5 Software	62
3.1.6 Heat transfer printer	62
3.1.7 Ink Jet printer	64
3.1.8 evaluation sheet	66
3.2 Methods	67
3.3. Test methods	70
4- Results and discussion	74
4.1 Cultural and/or Natural Product Design Model	74
4.1 Cultural and/or Natural Product Design Model 4.2 The innovative designs	74 81
4.2 The innovative designs	81
4.2 The innovative designs Design No.1	81 95
4.2 The innovative designs  Design No.1  Design No.2	81 95 100
4.2 The innovative designs  Design No.1  Design No.2  Design No.3	81 95 100 104
4.2 The innovative designs  Design No.1  Design No.2  Design No.3  Design No.4	81 95 100 104 109
4.2 The innovative designs  Design No.1  Design No.2  Design No.3  Design No.4  Design No.5	81 95 100 104 109 113
4.2 The innovative designs  Design No.1  Design No.2  Design No.3  Design No.4  Design No.5  Design No.6	81 95 100 104 109 113 117
4.2 The innovative designs  Design No.1  Design No.2  Design No.3  Design No.4  Design No.5  Design No.6  Design No.7	81 95 100 104 109 113 117 121
4.2 The innovative designs  Design No.1  Design No.2  Design No.3  Design No.4  Design No.5  Design No.6  Design No.7  Design No.8  Design No.9  Design No.10	81 95 100 104 109 113 117 121 126 130 135
4.2 The innovative designs  Design No.1  Design No.2  Design No.3  Design No.4  Design No.5  Design No.6  Design No.7  Design No.8  Design No.9	81 95 100 104 109 113 117 121 126 130
4.2 The innovative designs  Design No.1 Design No.2 Design No.3 Design No.4 Design No.5 Design No.6 Design No.7 Design No.8 Design No.9 Design No.10 Design No.11 Design No.12	81 95 100 104 109 113 117 121 126 130 135
4.2 The innovative designs  Design No.1  Design No.2  Design No.3  Design No.4  Design No.5  Design No.6  Design No.7  Design No.8  Design No.9  Design No.10  Design No.11	81 95 100 104 109 113 117 121 126 130 135 139

Design No.15	154
Design No.16	158
Design No.17	161
4.3 Evaluation the Artistic and aesthetic values of the innovative compositions	163
4.4 Evaluation the suggested applications of the innovative compositions	174
4.5 Designs and Products	177
4.6 Evaluation the printed and implemented products	232
4.7 Effect of treatment with Evo® Protect FXM on water repellent, Water repellency rating and Oil repellency grading of used fabrics	235
4.8 Physico-mechanical properties of used fabrics treated with Evo® Protect FXM	237
4.9 Light fastness of Hp canvas fabric printed with Hp latex inks (CMYK)	239
- References	240
- Appendixes	263
- English Summary	i
- Arabic summary	1

# List of figures

No.	Title	page
1	Map of the Red Sea and surrounding region	19
2	Some of large and small vessels which navigate the water of the Red Sea	26
3	Umbrellas on the beach at Dahab in the Red Sea	26
4	Anchor with rope and chain	28
5	Some of lifebuoy types	28
6	Helm Steering boat wheel close-up	28
7	Sea grasses	30
8	Mangroves	30
9	The main types of coral reef algae	31
10	Some of different species of fishes in the red sea	32
11	Some of Sea anemones in different sizes and colors	34
12	Some of different shapes of Coral	35
13	Some of different species of jellyfish	36
14	the common three different body forms of sponges in the red sea	37

15	Different forms and colors of Sea stars in the red sea	38
16	The common forms and colors of Sea urchin in the red sea	38
17	the common snail (Gastropods)	40
18	Sea slug in red sea	40
19	Some of Sea shells in the red sea	40
20	Some of colorful nudibranchs in the red sea	41
21	Some of common bivalves	42
22	Some of common Cephalopods in the Red Sea	43
23	Common reef crustaceans in the Red Sea	44
24	Some shapes of polychaete worms in the Red Sea	45
25	FABRIJET FT-1904X transfer paper printer	63
26	MONTI ANTONIO MOD. 901-2000 printer	64
27	Hp Designjet L25500 printer	65
28	AATCC spray tester	71
29	Standard Spray Test – Ratings	71
30	Oil repellency grading	73
31	Primary cultural and/or natural design model (chart)	75

32	The first stage in building the cultural and natural model; the investigation stage.	76
33	The second stage in building the cultural and natural model; the development stage	77
34	The third stage in building the cultural and natural model; the implementation stage.	78
35	The natural and cultural product design process.	79
36	Cultural and/or natural design model.	80
37	The percent of agreement on the innovative composition.	169
38	Percent of agreement on the innovative composition and percent of their suitability with the functional purpose to serve tourism.	178

## List of tables

No.	Table name	page
1	Specification of the used knitted fabrics.	60
2	Specification of the used woven fabrics.	61
3	Percent of agreement of specialist teaching staff members on questionnaire items.	67
4	Drying and fixation treatment of the used fabrics.	70
5	Spray test rating chart.	72
6	Marine Nature and cultural artistic elements of the red sea and their analytical lines and abstracted elements.	82
7	(a, b, c, d) the percent of agreement on the artistic and aesthetic values of the innovative compositions.	165- 168
8	The analysis of variance (ANOVA) between the total innovative design compositions for each evaluation item.	171
9	(a, b)The analysis of variance (ANOVA) between the total evaluation items for each design compositions.	172- 173
10	The percent of agreement on the suggested applications of the innovative compositions (women, children apparel and interior furnishing).	175
11	The analysis of variance (ANOVA) between the suggested applications of the innovative compositions for evaluation items	176

12	(a, b)The percent of agreement on the printed and implemented products of the innovative compositions.	233- 134
13	Effect of treatment with Evo® Protect FXM on water repellent, Water repellency rating and Oil repellency grading of used fabrics.	236
14	Effect of treatment with Evo® Protect FXM on bursting strength of used knitted fabrics.	237
15	Effect of treatment with Evo® Protect FXM on Tensile strength and Tear strength of used woven fabrics.	238
16	light fastness of Hp canvas fabric printed with Hp latex inks (CMYK)	239