



CHAPTER 1

INTRODUCTION

1.1 THE PURPOSE OF THIS INVESTIGATION

Silk, "Queen of Fabrics", is one of the world's most exclusive and luxurious fibres, and will probably become even more so in the future.

Silk has long held the interest of man from the scientific, technological and aesthetic points of view. The importance of silk as a textile fibre lies in its soft deep lustre, handle, draping qualities and luxurious appearance. Silk is comfortable to wear because it is so absorbent. It dries quickly and gives up soil easily due to its smooth surface. Silk is reasonably resistant to acids and is usually dyed with acid dyes or with direct dyes. Silk has a high elastic modulus with a limited though useful extensibility but high strength both when dry and wet. These reasons make silk valuable and very popular to the users. However, the silk fibre displays a low lightfastness, low wrinkle recovery and low wet fastness when dyed with acid dyes, but these problems can be overcome by modifying its properties.

In Thailand, "Thai Silk" is well-known to be a national symbol and foreigners' favourite product. From 1984 to 1989, the export of silk fabrics and silk products inclusive of domestic and tourists markets were at a high record. Especially in 1989, the export value of silk fabrics and silk products was about 1 billion baht as shown in Table 1.1. In addition, in 1989, the consumption of silk fabrics and silk products in domestic and tourist markets was about 1 billion baht as shown in Table 1.2.

The demand for good quality silks is as strong as ever. The year 1992 will bring about a global European market in which aggregate G.P. will be much higher than the sum total of its components; political tensions and confrontations seem to be easing worldwide. These new environments are bound to bring, in the year to come, higher corporate and personal incomes opening added opportunities for quality goods and services.

Silk goods will adjust easily towards these new perspectives, and will not need to imitate synthetic fibres in order to sell. Silk's very high value for very small volumes, as seen in Tables 1.1 and 1.2, gives to silk its particular character as a commodity, thus leading to possibilities of hoarding and speculation. On top of the possibilities of speculation, the added value in

TABLE 1.1 Export of silk fabrics and silk products, 1984-1989

Year	Silk fabrics				Silk products			
	Quantity (m ²)	% ^a change	Value (Baht)	% ^a change	Quantity (m ²)	% ^a change	Value (Baht)	% ^a change
1984	714,234	-8.30	159,264,034	-6.58	609,928	2.48	78,742,262	3.36
1985	835,554	16.98	196,511,035	23.39	450,301	-26.17	73,207,779	-7.03
1986	1,079,061	29.14	249,560,968	27.00	690,924	53.44	109,210,894	49.18
1987	1,037,045	21.13	360,349,814	44.40	1,028,117	48.80	159,445,842	46.00
1988	1,468,648.91	12.36	391,971,507	8.78	1,481,097	44.06	229,592,140	44.00
1989	1,510,388.75	2.84	492,588,889	25.67	1,675,233	13.10	330,818,724	44.09

^a compared to the preceding year

Source : Office of Commodity Standards

Department of Foreign Trade

TABLE 1.2 Domestic consumption of silk fabrics and silk products, 1984-1989

Year	Value (baht)	
	Silk Fabrics	Silk products
1984	165,190,437.00	76,616,488.00
1985	216,162,138.00	80,528,545.00
1986	274,517,064.00	120,131,983.00
1987	396,384,796.00	175,390,426.00
1988	331,168,657.00	252,551,354.00
1989	541,857,777.00	363,900,596.00

Sources : Office of Commodity Standards

Department of Foreign Trade

silk processing is very high. It may increase the value of the raw material about one hundredfold.

Consequently, it is necessary to develop value-added silk goods toward high quality garments as well as furnishing and upholstery goods, including carpets, wall coverings, window shades and draperies, in order to be able to compete with other countries in the world. The faults of silk fibres can be improved, perhaps by modifying the properties of silk through graft copolymerization.

In this research, we attempt to improve the properties of silk fibres by graft copolymerization of N,N'-methylenebisacrylamide onto silk fibres by manganese(III) acetylacetonate. It is interesting to study whether $Mn(acac)_3$, which has been reported to be the most active metal chelate could be suitable to graft copolymerize vinyl monomers such as N,N'-MBA so as to improve properties of the grafted fibre. N,N'-MBA is of current interest due to its ability to crosslink and its appreciable dyeability on natural fibres.

1.2 OBJECTIVES

1.2.1 To develop a graft copolymerization method of the vinyl monomer onto silk fibres.

1.2.2 To study the influencing parameters on properties of the grafted silk fibres.

1.2.3 To search for improvement in the properties of the fibres, and perhaps to expand the range of utilization of silk fibres.

1.3 SCOPES OF THIS INVESTIGATION

1.3.1 Literature survey and collection of information utilized in this research work.

1.3.2 Synthesizing graft copolymer of N,N'-MBA onto silk fibres using manganese(III) acetylacetonate as initiator by varying the monomer and initiator concentrations.

1.3.3 Characterization of graft copolymerization of N,N'-MBA onto silk fibres.

1.3.4 Determination of physical and chemical properties significantly relevant to graft copolymerization of N,N'-MBA onto silk fibres.

1.3.5 Summarization of the results and writing the report.