INTERNATIONAL STANDARD

ISO 20418-2

First edition
2018-09

Textiles — Qualitative and quantitative proteomic analysis of some animal hair fibres —

Part 2: Peptide detection using MALDI-TOF MS

Textiles — Analyse protéomique qualitative et quantitative de certaines fibres animales —

Partie 2: Détection des peptides par MALDI-TOF MS

Reference number
ISO 20418-2:2018(E)

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Published in Switzerland

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Foreword

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This document was prepared by Technical Committee ISO/TC 38, *Textiles*.

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Introduction

Animal hair fibres have been used for fabrics or furs. In general, fibres from different animals show distinct colours and morphologies, and in most cases can be distinguished to the species level under microscopic observation. In the textile industries, the identification and quantification of animal hair fibres are very important to guarantee the quality of textile products. Currently, the only practical way to identify animal hair fibres is the microscopic method. However, microscopic identification of animal species from hair fibres can be difficult in certain cases of highly processed fibres or ambiguous samples. Thus, microscopists in testing laboratories require vast experience and a high skill level.

In order to overcome the difficulties of the microscope method, some novel objective methods such as DNA method have been developed to identify animal hair fibres. This method is very sensitive and can be used for qualitative analysis. However, it has been reported that the quantitative analysis of some highly processed samples remains difficult with the DNA method.

It is well known that animal hairs are mostly composed of proteins, and that the amino acid sequences of these proteins are slightly different among different animal species. In the early 2000s, mass spectrometry (MS) was shown to be a very useful method for identifying protein structures. MS of the small peptides obtained by enzyme digestion of proteins can be used to clarify the differences in amino acid sequences among proteins. A particularly efficient qualitative and quantitative method was developed using matrix-assisted laser desorption/ionization-time of flight (MALDI-TOF) MS in 2014. The method has been shown to be useful even for highly processed samples and is applicable to various types of animal hairs such as goat (cashmere or mohair), wool and yak.