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**Chemical fibres - Determination of antioxidant activity - DPPH
and ABTS methods**

化学纤维 抗氧化活性测定 DPPH和ABTS法

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part

1. Structure and drafting rules for standardization documents" Drafting. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document is proposed and coordinated by the National Technical Committee on Chemical Fiber Standardization. This document was drafted by: PepsiCo Materials (Qingdao) Co., Ltd., Heye Health Technology Co., Ltd., Wuhan Maoren Cloud Business Technology Co., Ltd. Co., Ltd., Xiamen Jordan Technology Co., Ltd., Zhejiang Haili Environmental Protection Technology Co., Ltd., China Science and Technology Textile Research Institute (Qingdao) Co., Ltd., China Chemical Fiber Industry Association, Shanghai Textile Industry Technical Supervision Institute, Xiamen Xianglu Chemical Fiber Co., Ltd., Bosideng Down Garment Co., Ltd. Company, Shanghai Textile Group Testing Standard Co., Ltd., Hongxing Erke (Xiamen) Industrial Co., Ltd., Wuxi Jintong High Fiber Co., Ltd., Qingdao Island Baicao New Materials Co., Ltd., Shanghai Oriental Guochuang Advanced Textile Innovation Center Co., Ltd., Jiangsu Hengli Chemical Fiber Co., Ltd., Weifang Rujin Clothing Co., Ltd., Xinfengming Group Co., Ltd., Fujian Jingfeng Technology Co., Ltd., Xinjiang Yuxin New Materials Co., Ltd., Sinopec Yizheng Chemical Fiber Co., Ltd., Yiwu Huading Nylon Co., Ltd., Tianjin Polytechnic University Shaoxing Keqiao Research Institute, Shaoshi Inspection Measurement Technology (Shanghai) Co., Ltd., Yuyao Dafa Chemical Fiber Co., Ltd., and Zulijian Aging Industry Development Co., Ltd. The main drafters of this document are: Huang Xiaohua, Liu Yanming, Fang Yanwen, Ding Xiaofeng, Ruan Guoqing, Fu Ming, Chi Shan, Liu Shiyang, Wang Lili, Zhang Donggui, Chen Keyu, Zhang Xiaoyan, Huang Jianbin, Qian Qiyuan, Liu Cui, Lan Hongyan, Ni Fengjun, Hou Yanhui, Zhang Xuefeng, Fu Chongxian, Shen Xiaofen, Zhou Lihua, Liu Jinsong, Meng Jianqiang, Yang Guangming, Ma Zhefeng, Zhang Jinggang. Determination of Antioxidant Activity of Chemical Fiber DPPH and ABTS methods Warning. Personnel using this document should have practical experience in regular laboratory work. This document does not address all possible safety

issues. The user is responsible for taking appropriate safety and health measures and ensuring compliance with the conditions stipulated by relevant national laws and regulations.

1 Scope

China's national method for determining the antioxidant activity of chemical fibres by the DPPH and ABTS methods. Fibres modified with antioxidant active ingredients - plant polyphenols, vitamin derivatives, catechins - are sold on a functional claim, and the claim is worth a considerable premium in the textile market. Without a defined test the claim rests on the fact that something was added, which says nothing about whether any of it survived spinning, whether it is at the surface where it could act, or whether it remains after washing. DPPH and ABTS are the two established radical-scavenging assays, both working by presenting a coloured stable radical that the antioxidant reduces, with the colour change measured spectrophotometrically. Adapting them from solutions to a solid fibre is the technical content of the standard, which describes both methods and applies to chemical fibres modified with antioxidant active ingredients.

This document describes the method for determining the antioxidant activity of chemical fibers using the DPPH method and the ABTS method. This document applies to chemical fibers modified with antioxidant active ingredients.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document.

GB/T 4146 (all parts) Textiles - Chemical Fibers

GB/T 6504-2017 Test method for oil content of chemical fibers

GB/T 6682 Specifications and test methods for water used in analytical laboratories

3 Terms and definitions

GB/T 4146 (all parts) and the following terms and definitions apply to this document.

3.1 Antioxidant activity The ability to scavenge free radicals is expressed by the free radical scavenging rate of the fiber extract to be tested.

4 Abbreviations

The following abbreviations apply to this document. DPPH.1,1-diphenyl-2-picrylhydrazyl

5 Principle

DPPH is a dark purple prismatic crystal that forms a stable free radical in anhydrous ethanol, showing a dark purple color. It has a strong absorption peak at 517nm. ABTS is oxidized by potassium sulfate to generate a stable free radical, which is blue-green in color and can be seen in the visible light region. There is a strong absorption peak at 734nm. DPPH free radicals and ABTS free radicals can react with antioxidant active substances in chemical fibers. The DPPH solution and ABTS solution faded. The free radical scavenging rate was calculated by using a spectrophotometer based on the change in the absorbance of the solution. The removal rate was used to characterize the antioxidant activity of chemical fibers.