
**Pulps — Determination of
carbohydrate composition**

Pâtes — Détermination de la composition des hydrates de carbone



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 6, *Paper, board and pulps*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The carbohydrate composition - the contents of the five principal, neutral monosaccharides; arabinose, galactose, glucose, xylose and mannose - provides chemical information about the main polysaccharides in wood pulps. The most commonly-used methods are based on acid hydrolysis of the polysaccharides using sulfuric acid, followed by subsequent chromatographic determination of the monosaccharides.

This document describes a method for the determination of the contents of the five principal, neutral monosaccharides; arabinose, galactose, glucose, xylose and mannose, as they appear in wood pulps. The procedure is based on the sulfuric acid hydrolysis of the samples. The monosaccharides are determined either by using high performance anion exchange chromatography with a pulsed amperometric detector (HPAEC-PAD) – subsequently referred to as ion chromatography (IC), or by using gas chromatography with a flame ionization detector (GC-FID) – subsequently referred to as gas chromatography (GC).

The determination of carbohydrate composition can also be carried out by HPLC (High Performance Liquid Chromatography), as described, for example, in Reference [3], provided that the results have been validated against those obtained with this document.

Pulps — Determination of carbohydrate composition

1 Scope

This method describes the determination of the carbohydrate composition in wood pulp samples. This method makes it possible to determine concentrations of individual anhydrous monosaccharides down to 1 mg/g oven-dry pulp.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 638, *Paper, board and pulps — Determination of dry matter content — Oven-drying method*

ISO 7213, *Pulps — Sampling for testing*

ISO 14453, *Pulps — Determination of acetone-soluble matter*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

carbohydrate composition

amounts of the five principal, neutral monosaccharides; arabinose, galactose, glucose, mannose and xylose, in a sample, in milligrams per gram

4 Principle

The pulp samples are hydrolysed with sulfuric acid using a two-step technique. The amounts of the different monosaccharides are determined using either ion chromatography (IC) or gas chromatography (GC) in the presence of an internal standard to validate the results. If GC is used, the hydrolysed sample is reduced and acetylated, and the resulting alditol acetates of the monosaccharides are then separated and determined by GC.

5 Apparatus

5.1 Grinder with a 40 mesh screen or equivalent equipment.

5.2 Filtration equipment: filtering flask; filtering crucible, fritted glass, medium or fine porosity, 30 ml; adapter for the filtering crucible, siphon tube (optional).