VTT printed hemoglobin test on paper

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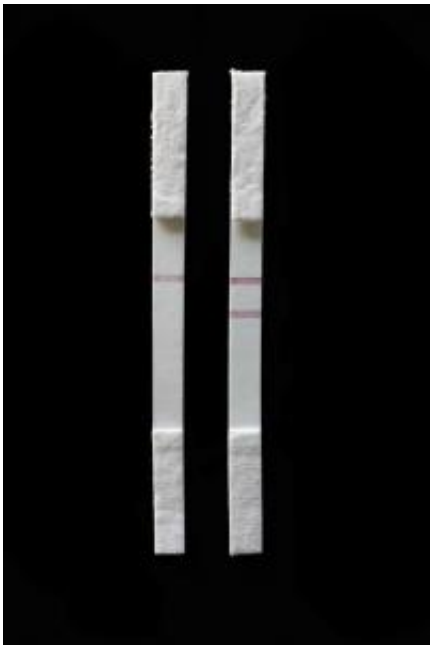

The picture shows haemoglobin tests printed on paper, the left half of which indicates that the sample does not contain detectable amounts of haemoglobin. Two bars running across the right side of the test means the sample does contain a detectable amount of haemoglobin.

VTT Technical Research Centre of Finland has developed a method of using printing technology to produce simple tests related to health, well-being and the environment. VTT has demonstrated the efficacy of the method by printing a hemoglobin test, i.e. manufactured paper that reveals whether a given sample contains hemoglobin.

VTT printed the paper with antibodies that react to the sample. The test result can be read in the form of a line, for example, which either does or does not appear depending on the sample – just like in the pregnancy tests already familiar to consumers. It is also possible to print instructional images or text, for example, either on or alongside the test.

Printed paper test can be used to test quickly and easily for the presence of a given substance. The test can be adapted to different purposes by exchanging the identifying antibody printed on the paper for another, for example. The test's subject may be many different types of liquid or substances soluble in water.

The paper can be manufactured using normal printing equipment. However, the delicate biomolecules require different handling and storage procedures to those followed with normal printing colours.

"The ongoing aims of the study are to apply new technology to different samples, and to identify new areas of application. The technology also presents new opportunities in terms of product design in comparison with the traditional diagnostic tests," comments Tomi Erho, who is in charge of the Bioactive Paper project. He also reminds that paper as a biodegradable natural material is a splendid substrate for multiple applications.

Novel products well-suited for mass production can be created by combining bio, paper and print technology. The technology can be applied in rapid diagnostics in the areas of health, wellbeing and the environment, or to bring additional features to packaging or labelling. The technology also presents new possibilities for ensuring product authenticity and impeding falsification.

The result is part of a series of projects over the period 2007-2008 aimed at developing bioactive paper. The projects are funded primarily

by Tekes, the Finnish Funding Agency for Technology and Innovation. VTT's partners in R&D work have been the Aalto University, Åbo Akademi University and the University of Lapland. The commercial partners in funding and in the management team have been UPM-Kymmene Corporation, Tervakoski Oy, BASF, Orion Diagnostica Oy, Hansaprint Ltd, Oy Medix Biochemica Ab, Starcke Securities and Eagle Filter Ltd.

Provided by VTT Technical Research Centre of Finland