Paper has many advantages, especially in the packaging sector. Except for some costly produced special grades, it provides, however, no barrier against liquids or gases. The most common modifications to paper for barrier purposes, namely the extrusion coating with polymers or the treatment with fluorochemicals, are the object of growing public criticism against the background of health concerns and limited recyclability of composite materials. The present study aims to substitute the existing fluorochemically based oil and grease barrier solutions on the basis of renewable raw materials.

Microfibrillated cellulose (MFC) gains increasing interest by researchers [1, 2] as well as by the big paper companies [3-5]. It is produced by separating the building blocks of a cellulose fibre, which can be done for example by excessive beating. The resulting particles are basically individual fibrils [1]. The potential of MFC as a barrier material has already been shown in several studies [2, 6]. Besides its barrier against oxygen [7-10] the material has a potential as oil and grease barrier as well [7, 11, 12]. With a few exceptions, like the work of Kumar et al. [13], MFC coatings have only been applied on a laboratory scale so far.

After successful laboratory trials that have been published elsewhere [14] a pilot trial was conducted in order to evaluate the continuous application of two different MFC grades with coat weights between 7 and 15 g/m² on a 40 g/m² base paper. The characteristic of the conducted trials is the application of the MFC at the wet-end of a paper machine. Furthermore, the effect of calcium carbonate was evaluated by adding a mass fraction of up to 20% to the MFC.

The results of the pilot trial prove the feasibility of a continuous application of MFC on paper for the purpose of generating oil and grease resistant paper. A finer MFC showed a higher barrier performance than a coarser grade. The coat weight generally has a positive effect on the barrier performance, while the addition of calcium carbonate showed a slightly negative effect. In case of the coarser MFC grade, calendering was able to improve the barrier performance, but could not reach the level of the coating with finer MFC.

Literature