

BioMater Centre - Services of the Hard Tissue Laboratory



BioMater Centre at the University of Kuopio provides services for research and quality control studies for companies and other research institutes.

Samples including hard or soft materials, such as wood, plastics, bone (or other tissue), metal and ceramics can be processed to achieve thin slices for microscopical analysis and imaging. Various sample types, materials or even products can be processed with the techniques and methods available in our laboratory.

The techniques and consultation of the specialists at the BioMater Centre enhance companies' opportunity to study properties and behavior of their products after use in diverse environments and demanding applications.

Applications of the methods

Especially companies and research institutes operating in the field of biotechnology, health or material technology can benefit from our services. Furthermore, other industrial fields, such as woodworking and forest industry may utilize these techniques and analysis methods in their quality control. The focus may also be, for example, orthopaedic implants, stents for arteries, multi-layer structures in electronics and coating technology.

The equipment and their features

Preprocessing includes dehydrating and embedding the sample in a polymer (e.g. methacrylate) for processing (Fig. 1 on the left). A sawing machine (Fig. 1 in the middle) is capable of cutting samples consisting of both soft and hard materials; muscular or bony tissue and metal, for example. Brittle materials, such as tooth enamel, can be processed, too without damaging the sample and, above all, devastating the interfaces in the sample. After cutting, a grinding machine (Fig. 1 on the right) is applied to prepare thin slices (thickness 20 μm at lowest) for analysis with an optical microscope.

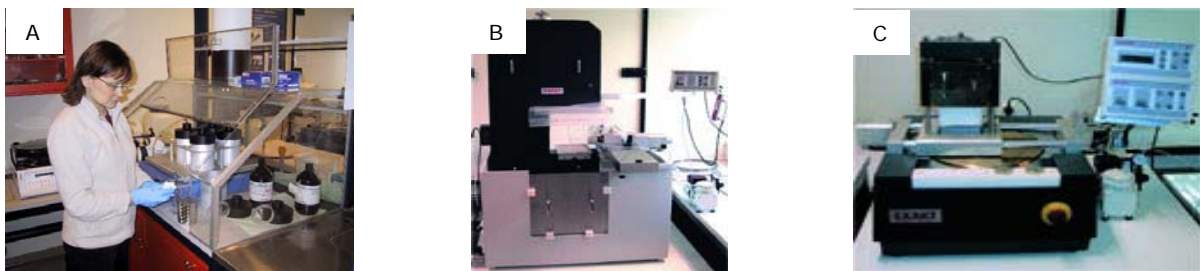


Figure 1. Preprocessing of the samples (A), a *Macro Exakt 310 CP* macro sawing machine (B) and a *Exakt 400 CS* micro grinding machine (C).

The figures show examples where these techniques are applied in various applications (see Fig. 2).

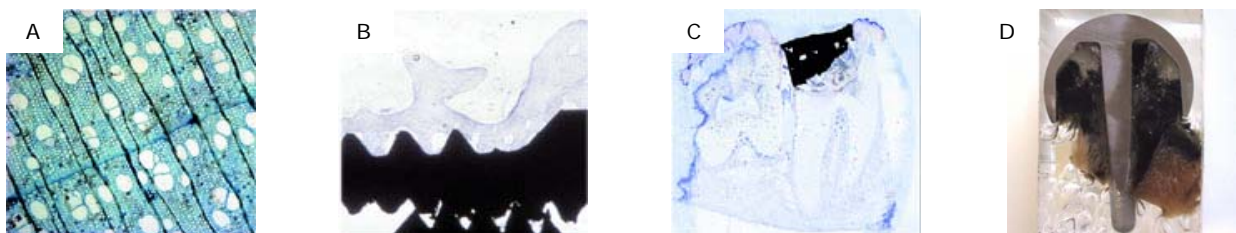


Figure 2. A thin slice sawed from a birch (A), a bone sample including a metallic screw (B), a amalgam filling in a tooth (C) and retrieved metallic hip surface replacement implant (D).

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