

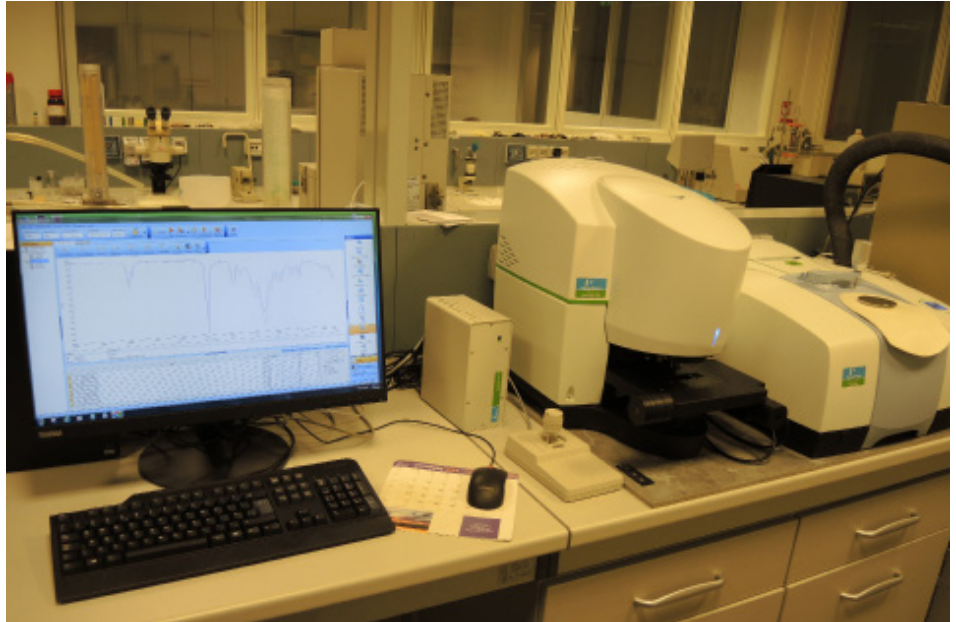
The prefix “bio” is very common today in the description of a product.

The term derives from the Greek βίος and is evidently linked to the concept of living, life or living being.

A product can therefore be called -bio at least for two reasons, or because it is “friend” of living beings, or because it derives from them.

In the first case, the bio concept basically concerns the safety for users and the environment in general, while in the second case it means that the raw materials it is made of come from living organisms (or that were).

Although they are often confused, they are two completely different concepts that do not necessarily overlap.



In this article we will consider the second case and we will briefly discuss biomaterials such as plastics, resins, adhesives or paints that are more and more often proposed by the market. As already mentioned, these are products that derive from biological sources which are normally called “biomass”. From the definition of biomass obviously all substances that come from geological or fossilized formations like coal and oil are excluded.

Examples of biomass are therefore plants, trees, algae, animal organisms and microorganisms.

It is important to underline that a bio-based product derives from biomass but the same can still be subjected to chemical, physical or biological treatments to reach the finished product (plastic, paint, etc.). A bio-paint can therefore not be a “natural” product meaning, with this term, a raw material that comes from nature (for example an oil) without having undergone particular chemical treatments.

Furthermore, for various reasons linked to availability, performance and costs, the definition of bio-based material applies to product containing at least a certain percentage of biological raw materials. Usually this minimum percentage is around 25% (source CEN TC249 / WG17 Biopolymers) even if there are no clear and univocal rules on this definition.

Coming back to the premises of this article, it is therefore possible to state that for the reasons explained above a bio-material is non-necessarily bio-friendly, that means, safe and compatible with the environment.

Depending on their molecular structure, for example, there are bio-materials that are very resistant to biodegradation. Their biodegradability may even be lower than that of some synthetic polymers.

Product safety is also independent of the bio-based label. Depending on their chemical composition, added additives and other possible ingredients (solvents, monomers, etc.), “bio-based” products can determine safety precautions very similar to those of the more traditional synthetic products.

In conclusion a bio plastic, a bio paint or a bio adhesive are products that certainly look to the future containing raw materials that do not come from the petrochemical industry and meeting the current and future needs of increasingly renewable and sustainable products. However, it is important to remember that these materials are not necessarily bio-friendly, safe or compatible with the environment by definition, but must also be evaluated in this sense like any other product of the chemical industry.

## A little research carried out by Catas on “natural” products

The world of plastics is already providing specific rules to regulate the complex matter of bio-based and natural products, especially from the terminological point of view.

As we have seen, transparency on what really is a bio-material becomes essential considering the actual percentages of biological derivatives it contains.

Information on related aspects, such as biodegradability, is also clearly needed to provide a clear and complete picture of the material under consideration.

The introduction of such standards would certainly be desirable also for the world of adhesives and coating materials considering the growing offer of natural and bio-based products that is also found in the wood and furniture sector.

Just to give evidence of this need, Catas has recently made a small study on about twenty products for the treatment of parquet all of them declared “natural”.

A simple analysis was performed using infrared spectroscopy (see box) by evaluating which components were present in greater quantity in each product, excluding water and any solvents present.

The following table shows the results obtained from this small survey.

N° samples	Main component
6	Urethane alkyd resins
5	Vegetable oils
4	Iso and ortophtalic alkyd resins
3	Vegetable oils + polyamine waxes
3	Vegetable oils + surfactants
1	Acrylic resins

As evidenced by the results summarized in the table above, most of the products analysed (14 out of 22) are certainly not completely natural based containing synthetic resins or waxes, while only 5 samples show the prevalent presence of vegetable oils. Finally, three samples contain emulsifying agents whose nature should be further clarified.

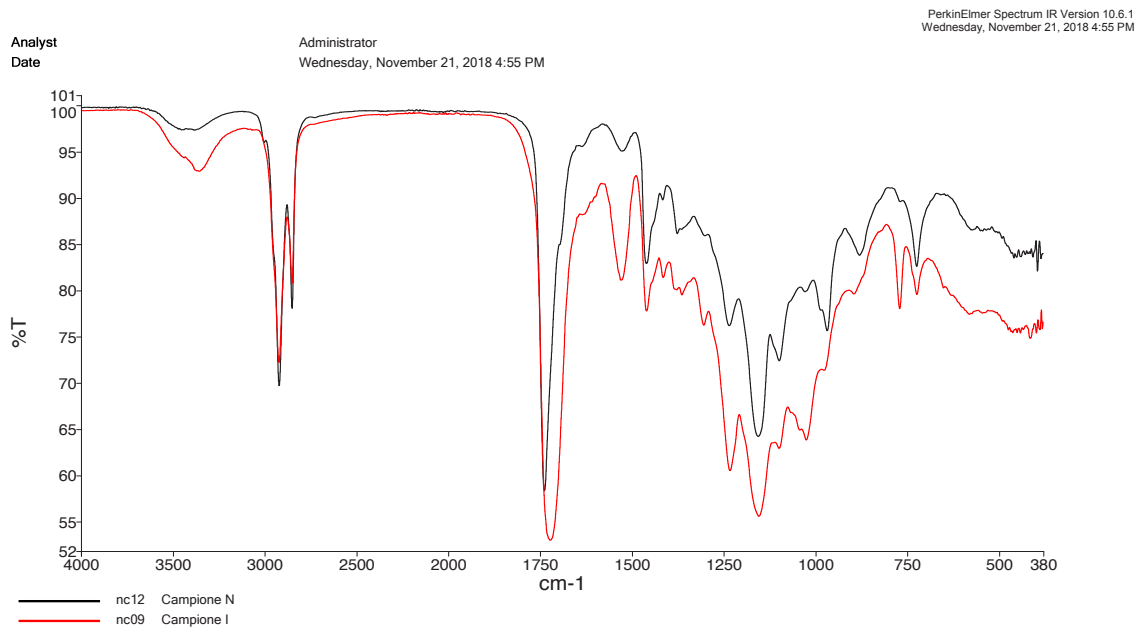
Apart from this, especially in view of the fact that many of these products are solvent-based, their composition should be further explored in relation not only to their “naturalness” but, similarly to any other product of the chemical industry, also to aspects related to safety for users and end users.

In conclusion, this short article and the results of the small research conducted by Catas clearly reveal the need for clear and transparent rules on these increasingly recurrent themes also in the wood and furniture sector.

## Bibliography

- EN 16575
- prEN 17228

Thanks to Mr. Riccardo Menegatto for his collaboration in the study on parquet products.



## IR spectroscopy

*Infrared spectroscopy or IR spectroscopy is a spectroscopic absorption technique normally used in the field of analytical chemistry and characterization of materials.*

*The technique is based on the evidence that the chemical bonds constituting the functional groups of a molecule absorb the IR radiation at certain and precise frequencies.*

*An infrared spectrum, in short, is nothing else than the result of the absorption of all the functional groups present in a molecule thus allowing its recognition.*

*At Catas, the chemical analysis of the resins used in coatings, adhesives and plastics is performed by infrared spectroscopy, combining it with possible preliminary sample treatments or other complementary techniques. Catas has now more than thirty year's experience with IR spectroscopy, having also accumulated a considerable database specific for the wood-furniture sector.*

*Recently, the laboratory has equipped itself with a new microscope that, combined with the IR spectrophotometer, allows the analysis of very small samples allowing the recognition of the chemical nature of defects such as inclusions, spots or speckles.*

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