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UV-vis spectroscopy, refractive index and lineal models to detect adulterations in EVOO

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Extra virgin olive oil (EVOO) is a natural juice of the highest quality olives obtained exclusively by mechanical and physical processes [Frankel *et al.* 2013]. EVOO has exceptional sensory and nutritional properties that give a high economic value and makes this product may be subject to mixtures with others cheaper vegetable oils, which constitutes an economic fraud as well as a health risk for consumers. Then, several international regulations have been developed to protect consumers and product quality. Currently there is a high interest in getting relate olive oil with the production area due to the European Union introducing the protected designation of origin (PDO) [Torrecilla *et al.* 2013]. The color of olive oil comes from the pigments presents in the fruit, which are divided in chlorophylls and carotenoids. Has been linked by optical techniques such as UV-vis spectroscopy and refractive index (RI) with the quality and authenticity of AOVE based on the biological properties of these pigments [Domenici *et al.* 2014, Torrecilla *et al.* 2015, Aroca-Santos *et al.* 2015]. Have been used EVOO binary mixtures, one EVOO with PDO and other without PDO, to measure the UV-Vis absorbance and RI, with a development of a linear model that allows us to distinguish the proportion of the oils. This project presents a quick, economical and easy method to detect adulteration of EVOO. Also it does not require prior sample preparation nor qualified personnel.

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Who has put beach waste in my ice cream?

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We humans cannot break cellulose, unlike starch, into simple sugars to meet our energetic needs and yet we eat cellulose. We do it when we eat vegetables and non-peeled fruits. These small amounts of cellulose are part of what nutritionists call "insoluble fiber". That is not all. Cellulose is also used as a food additive. Cellulose (white powder) is added to sour cream, yogurt, ice cream, milkshake, fast-food cheese and some non-dairy creamers. It makes your food creamy, gelatinous with no fat, no sugar and no calories. The bad part: it usually comes from wood (when not from cotton). Its manufacturing implies harvesting woods, debarking it, reacting it with sulfurous acid, reacting it with chlorine or chlorinated compounds, generating sludge… not a very clean process. We propose an easier, cheaper and cleaner process to obtain cellulose. Instead of wood from pine and eucalyptus, our raw material is everywhere across the European Atlantic and Mediterranean coastlines: seagrass and macroalgae. They form blooms in the shorelines, affecting the environment, biodiversity, people's health and tourism. This waste is collected and then disposed or burnt, but… what if we could re-use it? According to our results, the lignin content of *Z. noltii* is in the low range and easily diminished. No need to use sulfurous acid. With small amounts of hydrogen peroxide, caustic soda, anthraquinone, magnesium sulfate and an activator complex known as DTPA, working under mild conditions, the percentage of lignin becomes as low as 3.76%, not hard to be removed in further treatments.

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