

The Science of Cooking Oils Webinar, presented by Dr Joanna McMillan Participant Questions

1. What foods do you recommend for obtaining essential omega6 fatty acid Linoleic acid?

Given that essential fatty acid deficiency is only seen at levels below about 2-5g a day, it is extremely rare to see – during early days of parenteral nutrition certainly before enough was known about EFA requirements.

Linoleic acid is found in many foods including, albeit in small amounts, leafy greens, and comprises about a quarter of the fat present in beef and pork, and just less than a fifth of the fat in chicken and lamb.

In oils, linoleic acid comprises about 11% of the fats in olive oil, 18% in avocado oil, 2% in coconut and palm oils, 33% in sunflower and almost 50% in corn oil. We really don't need those higher amounts however – we get plenty from using olive oil along with the other foods in our diets, especially whole nuts and seeds. E.g. about a quarter of the fat in almonds is linoleic.

2. It is interesting on the study looking at 2 olive varieties. Picual is more stable than Arbequina in terms of oxidation stress but contains less polyphenol. Would you think there are other factors protecting the oil from oxidation?

Wrong way around ... The Picual is the variety with the highest level of polyphenols and the far greater oxidative stability. On slide 13 you'll see the scales of the y axis indicate the oxidative stability of the oils with the Picual (the lower graph) showing more than double the oxidative stability of Arbequina. Giving you the data from the original paper the Picual had a total phenols value of 406mg/kg and the Arbequina 82mg/kg. This almost certainly explains the differences seen between the oils.

There are also small differences in the fatty acid composition of the two varieties and this may have impacted on stability. The Picual contained higher proportion of oleic acid, while the Arbequina had 2.5 times the polyunsaturated fatty acid linoleic acid found in the Picual. Total tocopherols were again slightly higher in the Picual.

To bring this back into an Australian context where we don't really buy oils as specific varieties, the take home message is that an oil with a high monounsaturated and low polyunsaturated fatty acid content combined with a high level of polyphenols is safest for cooking and more beneficial to health. Brings us back to promoting extra virgin olive oil (and not refined olive oil sold as 'pure olive oil' or 'light olive oil') and with the evoo category the premiere and more robust flavoured oils have the highest polyphenol levels.

3. Are you aware of any oil blends that would be better for industrial uses, considering the results of the studies investigating polar compound development? (I suspect at the moment they're using blends that incorporate those that produce high amounts

of polar compounds, but it seems unrealistic to be able to fill a deep-fryer with EVOO?)

Great question and I can only give an educated guess at the answer. That study did show benefits of adding phenols or an oxidative inhibitor to the mixed seed oil. So, this may well be what needs to be done to industrial cooking oils. It is also clearly important to have an oil that is lower in polyunsaturated fats and higher in the more stable monounsaturated fats. Perhaps commercial production of extracting olive oil phenols from the residues of evoo production could be used to stabilise a canola or high oleic acid sunflower blend oil? Would that prevent the polar compounds produced in such high levels in canola? That study would need to be done to know the answer.

There are also compounds found in refined oils such as stigmastadienes and we really don't know what their effect on health is. This work also needs to be carried out. Perhaps refining processes can be improved to make these oils safer. Further to this we do know that refined oils contain some trans fats. Although levels may be within what are defined as the safe limits, these fast do not occur at all in extra virgin olive oil. Given that there is no mandatory labelling of trans fats in Australia do we really know the levels in our food supply?

A [paper published in The BMJ](#) in 2015, suggested a total ban on trans fats in processed food in England could potentially prevent or postpone over 7000 deaths from heart disease by 2020. The US Food and Drug Administration (FDA) moved to ban trans fats entirely in the food supply within three years. Should we be pushing for the same here in Australia? The evidence strongly suggests so.

For your interest a recent paper published this year reports a reduction in hospital admissions for Myocardial Infarction and Stroke before and after Trans Fat restrictions in fast food outlets in New York: <https://www.ncbi.nlm.nih.gov/pubmed/28403435>

Meantime as dietitians we can only discourage the consumption of too much food fried in industrial oils outside of the home (and in pre-prepared meals and foods) and encourage the use of evoo at home.

4. Does once off use of sunflower oil in the domestic situation cause any problems?

It doesn't seem likely that many polar compounds would be produced during very short cooking times of less than 15 minutes. For domestic use I think the problem is more the omega-6 to 3 ratio, the unknown problems of the residues and compounds found in refined oils such as sunflower oil, and the missing out on the beneficial compounds such as phenols and squalene found in evoo.

5. Are cold pressed seed oils such as those produced by Pressed Purity acceptable?

I spoke with Leandro Ravetti, the technical oils scientist at Modern Olives and an International expert on oil refining, regarding this. He confirmed the following: Most seed oils are produced through either pressing or solvent extraction or a combination of both. In the case of this company, they seem to be limited just to pressing. In general terms, this is better than solvent extraction as the process is less aggressive and uses fewer chemicals.

In any case, most seed oils (particularly canola, sunflower, etc.) still need to be refined after its extraction as they are very dark in colour and have unpleasant flavours. This company uses a rather modern refining system that is becoming increasingly common in the oil industry as it uses fewer chemicals and lower heat than traditional refining. In any case, if an oil is refined (even physically), it is exposed to high temperatures and some undesirable substances such as stigmastadienes are produced.

Unrefined seed oils such as some macadamia oils or almond oils do not have those substances but their chemical characteristics are highly unsuitable for cooking due to their very low smoke point and poor oxidative stability. Furthermore, regardless of its extraction method, seed oils are naturally low in polyphenols and squalene and this does not change dramatically based on the extraction or refining method.

6. How do we advocate for a more Mediterranean approach to oil rather than a measure/limit approach?

We move towards discussing whole foods and stop basing everything on kilojoules and grams of fat. I talk about kilojoule awareness rather than deliberate counting. We must stop assessing foods and meals based on fat content rather than quality of the food ingredients. This goes for carbohydrates too. If we talk whole foods to consumers and focus on quality and balance, with an emphasis on dietary patterns such as the Mediterranean Diet, then we're on the right track. Finally, we must speak out and speak up to change our profession and ensure we are viewed as nutrition scientists on top of our game.