

# Palm oil as alternate cutting fluid for machining processes

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**Abstract.** Our world is now entering a new era of high speed connectivity. It is evident in our surroundings where everything is moving in a pace faster than ever before, high speed internet i.e. 5G, building construction using 3D printings, high volume production in manufacturing, etc. The similar goes with machining processes where manufacturers are looking into innovative ways to increase its efficiency, be it on the machine itself, cutting tools or cutting fluid. This is especially true for difficult-to-cut materials such as Titanium. Titanium and its alloys are advanced materials widely used in the aircraft engines, biomedical applications, automotive applications, as well as the energy industries. However, machinability of Titanium and its alloys under high speed conditions is very challenging. While cutting fluids have been used to mitigate these challenges, these fluids have also been questioned due to the negative effects that came along. This topic introduces palm oil as the alternate cutting fluid. Palm oil has a high proportion of unsaturated fatty acids which enables the oil to provide high strength lubrication. The presence of fatty acids and polar carboxyl groups in palm oil have the ability to change the coefficient of friction and form a thin film of intermolecular layer, which promotes the boundary lubrication and significantly increases its reactivity and improve the lubricity. Therefore, it is expected that a better lubricating effect can be achieved.