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Abstract	:	Bio lubricants represent a promising alternative to conventional petroleum-based lubricants. The problem with these types of lubricants is their non-biodegradability, which harms the environment. This study focuses on comparing the performance of two vegetable oils, palm oil and red palm oil, as potential bio lubricants. The objective of this research is to assess the suitability of palm oil and red palm oil as bio-lubricants by evaluating their density and viscosity characteristics and simulating their behaviour using Computational Fluid Dynamics (CFD) software. Experimental analysis involved calculating the density and viscosity of the raw vegetable oil samples through experiments. These parameters were then utilized in CFD simulations to analyse the fluid dynamics of the oils. The comparison within the CFD simulations revealed notable differences between palm oil and red palm oil in terms of their performance as lubricants. Red palm oil demonstrated superior characteristics, showing significant potential as an alternative to conventional engine oil. However, it was observed that the high saturated fat content of palm oils could lead to increased viscosity and decreased fluidity in certain lubricating applications, potentially limiting their suitability. In conclusion, this study underscores the viability of red palm oil as a renewable lubricant, outperforming palm oil in various aspects. Future research could explore optimization strategies and further investigate the specific applications where each oil excels.