**A phenology-based backscattering model for oil palm using C- band**

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***ABSTRACT***

The main indicator of production in oil palm is phenological data. When it comes to managing oil palm farms, oil palm phenology offers several benefits. These benefits include the ability to estimate harvest, produce fruit bunches, estimate palm oil tax, replant, fertilize, and identify oil palm diseases. The study currently work on a technique that models oil palm phenology using remote sensing. Synthetic aperture radar (SAR) remote sensing techniques can be used to identified phenology for research purposes. The objective of this study is to investigate oil palm phenology model derived from the C-band data using the scattering mechanism extraction of dual-polarization SAR (VV and VH). The radiometric data (backscattering coefficient) is proposed to analized the relationship between oil palm phenology. The image data used is Sentinel-1A with acquisition on November 14, 2022 and the oil palm planting year block data to identified the oil palm age includes planting years 2022, 2021, 2019, 2016, 2015, 2014, 2013, 2012, 2011, 2006, 2005, 2004, 2003, 2002, 2001, and 2000. The result showed the The relationship between oil palm phenology and backscatter model with accuracy 78% for VV and 71% for VH. The scattering characteristics of oil palms at VV and VH polarization in young oil palms have the lowest scattering values ​​at the age of 2 to 4 years which is caused by surface scattering (rough scattering). Mature oil palms have higher scattering values ​​at the age of 7 to 14 years which is caused by double-bounce scattering. Old palm oil has a lower scattering value at the age of 17 to 21 years which is caused by volume scattering.

**Keywords:** Oil Palm Phenology, SAR, C-band, Backscatter.