

## Appropriate hydrothermal pretreatment of oil palm biomass in palm oil mill

### ABSTRACT

Oil palm (*Elaeis guineensis* Jacq.) is one of the most planted trees in Malaysia for the palm oil production. Thus, solid biomass had been generated from this industry such as empty fruit bunch, shell, mesocarp fibre, frond and trunk produced that causes problematic to the nation and expected to escalate up to 85-110 million tonnes by 2020. Besides that, palm oil mill effluent and excessive steam also generated from the production of palm oil. In situ hydrothermal pretreatment means the utilisation of excessive steam produced by the oil palm mill and at the same time, generating value added product as well as reducing the biomass. Oil palm biomass is rich in lignocellulosic materials which comprised of lignin, hemicellulose and cellulose. Refinement of lignocellulosic from oil palm biomass can be utilised to form fermentable sugar, bioethanol and other potential chemicals. Recalcitrant property of lignocellulosic reduces the ability of enzymes to penetrate, thus pretreatment is required prior to hydrolysis process. Pretreatment can be either physical, chemical, biological or combined. In this review paper, three types of hydrothermal pretreatment were discussed as suitable in situ pretreatment process for oil palm biomass; in palm oil mill. The suitability was measured based on the availability of excess steam and energy in the mill. Furthermore, physicochemical pretreatment also facilitate the saccharification process, whereby it loosened the lignocellulose structure and increase the surface area. The effects and factors in choosing right pretreatment are highlighted in this paper.

**Keyword:** *Elaeis guineensis*; Oil palm biomass; Hydrothermal; Pretreatment; Lignocellulose