Universiti Teknologi MARA

Determination of Primary Specifications of An Oil Palm Biomass Processing Machine Through Quality Function Deployment

Mahmudin Saleh

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ABSTRACT

Despite sound economic growth recorded over the years, oil palm industry is recognised to generate a substantial amount of biomass, i.e., about 90% of the entire industry's dry matters. In the forms of trunks, fronds and empty fruit bunches (EFB), the biomass albeit underutilised contains lignocellulosic fibres suitable in wood-based industries. Wood processing machines however, are unable to extract these fibres effectively. A study on establishment of primary specifications for an indigenous oil palm biomass processing machinery, is thus demonstrated which encompasses: (i) understanding the fundamentals in oil palm fibres extraction; (ii) assessment at key agencies on resources available and oil palm biomass related R&D activities conducted and (iii) adoption of Quality Function Deployment (QFD) method for customer requirements to machine characteristics transformation. Findings reveal that a three-stage processing: biomass primary breaking-up, unwanted particles isolation and moisture removal are pre-requisites to extract the fibres. Whilst, moisture level, purity and length are the fibres' critical characteristics toward specific end uses. Furthermore, scientists and design facilities are two critical resources at key agencies toward conducting fundamental, applied and specialised designs on oil palm biomass processing machine. Nine characteristics meanwhile are concluded as major primary specifications for the indigenous oil palm biomass processing machine leaving ten others as minor. Besides being relevant for future oil palm fibres-based industries, it is envisaged that findings from this study would further catalyse knowledge and technology advancements indicated in the recommendations.