

## **Design of a prototype photoreactor uv-leds for radiation vulcanization of natural rubber latex**

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### **Abstrak**

The land area and production of rubber on smallholder rubber plantations contribute to about 85% and 81% of national rubber production, respectively. Based on this, having technology to utilize vulcanized natural rubber latex (NRL) in a way that is simple, inexpensive, energy-saving, environmentally friendly, and according to the quality standards of the processing of NRL is important. The purpose of the current research is to design of a prototype photoreactor ultraviolet light-emitting diodes (UV-LEDs) for the vulcanization of NRL that is irradiated (VNRLI) to produce NRL-irradiated free carcinogens and protein allergens. The methodology used is the technological development of a prototype photoreactor with an UV-mercury irradiator that located in a vertical cylindrical glass column with the capacity of VNRLI about 249.2 tons/year. The development of technologies applied to increase the capacity of VNRLI by enlarging the area of thin NRL films to be irradiated with UV-A rays derived from UV-LED irradiators that are more energy-efficient, long-life, and environmentally friendly than UV-mercury irradiators. The results allowed for the design of a prototype photoreactor UV-LEDs to process feed NRL with the capacity VNRLI about 522 tons/year. The UV-LED photoreactor prototype design results show that the UV-LED photoreactor prototype is ready to test the VNRLI process function that can produce NRL- irradiated free carcinogen and protein allergens.