Environmental Sustainability Assessment of Different Beverage Packaging Substrates in India Using LCA

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Packaging plays a pivotal role in ensuring product protection and safety while offering consumers' purchasing experience with respect to the brand. In recent years, particularly after the pandemic, there has been unprecedented surge in e-commerce and consequently, the Indian packaging industry has witnessed steep growth. However, the predominant share of plastics in retail packaging and often less responsible attitudes of consumers, are resulting in plastic littering post usage, thereby creating environmental threats.

In recent years beverage sector accounted for 21% of the total consumer packaging requirement. Rigid packaging has had the largest share of (38%), followed by glass (32%), and multilayered packaging (cartons) 13%. Metal cans (mostly representing aluminium) has had a the least market share of (7%).

The study has used LCA tool used with India specific data to analyse the environmental impacts of multiple beverage packaging material. It adopts a 'cradle to cradle' approach substrates beginning with raw material extraction, manufacture of primary and secondary packaging material, transportation between different stages as well as end of life packaging material. The study presents 18 environmental impact categories including GWP, water consumption, acidification and material circularity. The volumes considered were the 250 ml and 500 ml aluminium cans; 200 ml, 600 ml and 750 ml PET bottles; 200 ml, 330 ml and 650 ml glass bottles; and 200 ml MLP carton.

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