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**Evaluation of Coir Pith Aging in Enhancing Expansion Ratios for Sustainable Land Use in Agriculture**

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**Abstract**

Coir pith, a byproduct of coconut processing, has gained prominence in sustainable agriculture due to its favorable water retention and aeration properties, making it an effective growing medium. One commonly held belief is that aging coir pith enhances its physical characteristics, particularly its expansion ratio (ER), which is crucial for plant growth. However, this practice of aging increases the demand for storage facilities, labor, and production costs, raising concerns about both economic viability and environmental sustainability. This study evaluates the impact of short-term aging on the expansion ratio of coir pith to determine whether non-aged or minimally aged coir can be used as an alternative, reducing costs while maintaining its effectiveness. The objective of this study is to determine the variation in expansion properties of coir grow bags with respect to the aging duration of coir pith. The research investigates three treatments of coir pith: non-aged (T1), two-month aged (T2), and four-month aged (T3). The expansion ratio was calculated as  $ER = (V1 - V0) / V0$ , where  $V0$  is the initial volume and  $V1$  is the final volume after expansion. Data were subjected to statistical analysis (ANOVA) to determine whether significant differences existed between treatments. The results indicate that there were no statistically significant differences between the expansion ratios of non-aged and aged coir pith. These findings suggest that aging coir pith for two to four months does not lead to substantial improvements in its expansion ratio. Consequently, non-aged or minimally aged coir pith can be utilized in agriculture without compromising its performance as a growing medium. This has important implications for sustainable land use in agriculture, as reducing the need for aging lowers the costs associated with storage, labor, and production. Moreover, adopting non-aged coir pith contributes to more resource-efficient and environmentally sustainable agricultural practices. In conclusion, the study shows that aging coir pith for short periods does not significantly enhance its performance. The use of non-aged coir pith can therefore promote more sustainable agricultural systems by reducing operational costs while maintaining the effectiveness of the growing medium. Further research on long-term aging is recommended to explore any potential benefits that may arise from extended aging periods.

**Keywords:** *Coir pith aging, Expansion ratio, Sustainable agriculture, Growing medium, Resource efficiency*