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Freeze Drying Cannabis Flower for Improvements in Potency, Appearance, and Shelf Life

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Abstract: Lyophilization or freeze drying of cannabis flower can be used to improve potency, appearance and shelf life by avoiding the traditional dry and cure process. The traditional dry and cure process degrades potency and results in oxidation and shrinkage of buds. The proper lyophilization techniques can eliminate the traditional dry process and expedite cure time. Cannabis flowers maintained in a cold chain can maintain their quality up to 2 years. The flower can be stored in chest freezers (-4F) for a period of a year and then after they have been freeze dried they are stable sealed in a temperature controlled environment for up to another year. This breakthrough in process allows for producers to freeze dry flower once there is demand for a certain cultivar. The freeze drying process takes 20-22 hours and then the cure is accomplished rapidly thereafter, upon exposure to oxygen. The cure process completes within 1-3 days post-lyophilization. Through this process the cannabis is dried, cured, and trimmed within a 2 day period, presenting a much needed a revolution to the cannabis supply chain. The throughput of freeze dry equipment is maximized, with the cold storage step offering a material staging area for up to a year. Through this method one can freeze dry up to 350lb in a year off a single small scale freeze dryer. Freeze dried cannabis product quality is unprecedented. Larger greener buds with higher cannabinoid content (on average 2% higher potency) pleases consumers with a smoke that feels less harsh.