Effect of Increased Surface Area on Precipitation Efficiency in Precipitation Process for Paclitaxel Purification

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In this study, we evaluated a high surface area precipitation process to achieve the effective purification of paclitaxel, an anticancer agent, from plant cell cultures. Fractional precipitation experiments were performed by increasing the surface area per working volume (S/V) to 0.428 mm−1 using a variety of ion exchange resins. When the cation exchange resin Amberlite IR 120 H was used, the highest purity (>85%) and yield (>80%) of paclitaxel could be obtained in the shortest fractional precipitation time (within 6 hr). Use of an ion exchange resin also resulted in the production of smaller paclitaxel precipitates since it inhibited the growth of particles. When Amberlite IR 120 H in particular was used, paclitaxel particles were two to three times smaller (less than 30 m radius) than those obtained in the absence of ion exchange resin. In general, paclitaxel particle size was inversely correlated with the zeta potential of the fractional precipitation solution after the addition of ion exchange resin.