

# Makhana Processing Key to Doubling Farmer's Income

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**Abstract**—*Makhana seeds are popularly called as Black Diamond as raw and famously known as white ball when it popped. Roasting plays an important role into its processing. The starch of makhana gets gelatinized and achieve elasticity once get roasted. The traditional method for roasting and popping of makhana was very tedious in nature. Tempered makhana is allowed to roast in cast iron pan having surface temperature of 290-340<sup>0</sup>C followed with continuous stirring. The cracking sound confirms the roasting. Seeds are then removed from the pan and kept on the hard surface. It is then beaten with wooden hammer so as to remove the hard shell. As soon as shell is removed, the popped makhana comes out. Depending upon raw seeds quality, the yield of popped makhana varies from 35-40% on raw seed weight basis. The above said process is very cumbersome, dangerous and time consuming for Makhana workers. To ease this typical method, the mechanized pilot plant was developed and established by ICAR-CIPHET, Ludhiana. The pilot plant consists of Makhana seed washer, raw seed grader, Roaster, and puffed Makhana seed grader. The time and temperature combination during roasting plays an important role in popping of makhana. The size of makhana seed determines the roasting time. The small size of makhana (8-9mm) takes less time for roasting. The big size of makhana (12-16mm) takes more time to achieve full roasting. The perfect roasting is confirmed once the gelatinization of Makhana starch is attained. The pilot plant is designed to mechanize the unit operations involved in Makhana processing and giving relief to workers from cumbersome and time taking operation. It also helps farmers to double its income for sustainable livelihood.*