Combinatorial interaction testing (CIT) is a popular approach to detecting faults in highly configurable software systems. The core task of CIT is to generate a small test suite called a t-way covering array (CA), where t is the covering strength. Many meta-heuristic algorithms have been proposed to solve the constrained covering array generating (CCAG) problem. A major drawback of existing algorithms is that they usually need considerable time to obtain a good-quality solution, which hinders the wider applications of such algorithms. We observe that the high time consumption of existing meta-heuristic algorithms for CCAG is mainly due to the procedure of score computation. In this work, we propose a much more efficient method for score computation. The score computation method is applied to a state-of-the-art algorithm TCA, showing significant improvements. The new score computation method opens a way to utilize algorithmic ideas relying on scores which were not affordable previously. We integrate a gradient descent search step to further improve the algorithm, leading to a new algorithm called FastCA. Experiments on a broad range of real-world benchmarks and synthetic benchmarks show that, FastCA significantly outperforms state-of-the-art algorithms for CCAG algorithms, in terms of both the size of obtained covering array and the run time.