# A novel approach to the optimization of date-palm kernel artificial coffee preparation as the ethno-traditional product

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**Abstract:**

**Background and purpose:** Due to the importance and widespread use, many studies have been done on the date-palm kernel. Animal studies have shown that the use of palm kernel extract has been effective in reducing blood glucose level. Caffeine-free artificial coffee is an excellent alternative for people who use a lot of coffee. Due to the characteristics of the palm kernel, its conversion into reproducible powders has many challenges which can reduce the willingness of the manufacturer and the consumer to use this inexpensive product with desirable properties. New approaches to optimization based on statistical sciences provide a high degree of certainty to explore the conditions for optimal pharmaceutical production.

**Methods and Materials:** Kabkab date kernel was identified by a laboratory expert of medicinal plants, washed and dried with water. Fifty grams of dates were heated in a furnace at 200°C for 25 minutes. After the initial shear cutting, to obtain a uniform powder, the factors affecting the reduction of particle size were evaluated by Design-Expert software using ball mill via D-optimal design. The particle size distribution was considered as a response, and the optimum powder was evaluated for pharmaceutical characteristics.

**Results:** The obtained model indices for powders are statistically acceptable and appropriate. The value of 0.81 for the Pred R-Squared is proportional to the Adj R-Squared of 0.93. The calculated equation shows that in case of increasing milling time and decreasing the rate of miller, and if there is a reverse rotation, a smaller particle size distribution will be obtained.

**Conclusion:** The obtained powder, while having an appropriate particle size and particle size distribution, has acceptable flow characteristics for the modernization of this traditional medicine product. Also, the method used in this study can be a good model for other traditional medicine products that need processing through the preparation.