

Improvement in Drying Characteristics of Raisin by Carbonic Maceration- Process Optimization

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Abstract : Traditional raisin production is a long time drying process under sunlight. During this procedure, grapes are open to some environmental effects besides the adverse effects of the long drying period. Thus, there is a need to develop an alternative method being applicable instead of traditional one. To this extent, a combination of a potential pretreatment (carbonic maceration, CM) with convectional oven drying was examined. CM application was used in raisin production (grape drying) as a pretreatment process before oven drying. Pressure, temperature and time were examined as application parameters of CM. In conventional oven drying, the temperature is a process variable. The aim is to find out how CM and convectional drying processes affect the drying characteristics of grapes as well as their physical and chemical properties. For this purpose, the response surface method was used to determine both the effects of the variables and the optimum pretreatment and drying conditions. The optimum conditions of CM for raisin production were 0.3 MPa of pressure value, 4°C of application temperature and 8 hours of application time. The optimized drying temperature was 77°C. The results showed that the application of CM before the drying process improved the drying characteristics. Drying took only 389 minutes for grapes pretreated by CM under optimum conditions and 495 minutes for the control group dried only by the conventional drying process. According to these results, a decrease of 21% was achieved in the time requirement for raisin production. Also, it was observed that the samples dried under optimum conditions had similar physical properties as those the control group had. It was seen that raisin, which was dried under optimum conditions were in better condition in terms of some of the bioactive contents compared to control groups. In light of all results, it is seen that CM has an important potential in the industrial drying of grape samples. The current study was financially supported by TUBITAK, Turkey (Project no: 116R038).

Keywords : drying time, pretreatment, response surface methodology, total phenolic

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