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Thermodynamic investigation of M-cycle assisted open-cycle desiccant air conditioning systems

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There is a necessity of low-cost air-conditioning (AC) systems for the agriculture sector of Pakistan e.g. product storage/preservation, greenhouse growing and thermal comfort of animals etc. Solid desiccant air-conditioning (DAC) system can be a handy solution in this regard. The present study gives a detail overview of DAC assisted with the Maisotsenko cycle (M-cycle) system and its applicability for the agriculture sector and livestock applications. Ideal humidity and temperature requirements for the agricultural and livestock applications have been represented on psychometric charts. Comparison between DAC and conventional AC systems has been given which shows the significance of DAC technology in the AC sciences and also represented this difference as graphically. Desiccant (AC) systems are getting lots of attention in order to control the humidity in various air conditioning applications e.g. product storage, greenhouses and thermal comfort for the livestock. Different materials and arrangements are checked as which desiccant material and arrangement is more suitable in Pakistan situation in the desiccant air conditioning system. Additionally, some analysis has been made to investigate the DAC system which shows the importance of DAC in this field of agriculture as well as in livestock. Results show that the DAC can be low-cost heat driven air-conditioning system for the agricultural sector of Pakistan.

Keywords: desiccant; air-conditioning; M-cycle; agriculture; product storage; Pakistan.

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