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Modeling of the Thermal Exchanges of an Intelligent Polymer Film for the Development of New Generations of Greenhouses

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Abstract : Greenhouse farming has greatly contributed to the development of modern agriculture by optimizing crops, especially market gardening, ornamental horticulture, and recently, fruit species … Greenhouse cultivation has enabled farmers to produce fruits and vegetables out of season while guaranteeing them a good production, and therefore a considerable gain throughout the year. However, this mode of production has shown its limits, especially in extreme conditions, such as the continental steppe climate and the Saharan climate, which are characterized by significant thermal amplitudes and strong winds, making it impossible to use conventional greenhouses for several months, of the year. In Algeria and precisely in the highlands, the use of greenhouses by farmers is very rare or occasional, especially in spring, because the limiting factors mentioned above are frequent there, causing significant damage to the plant product and to the environment. infrastructure. The same observation is observed in the Saharan regions but with less frequencies. Certainly, the use of controlled multi-chapel greenhouses would solve the problem, but at what cost? These hi-tech infrastructures are very expensive to purchase but also to maintain, so few farmers have the financial means to obtain them. In addition, the existence of intelligent and less expensive polymer films, whose properties could control greenhouse production parameters, in particular, the temperature parameter, maybe a judicious solution for the development of new generations of greenhouses that can be used in extreme conditions and normal.

Keywords : greenhouse, polymer film, modern agriculture, optimizing crops
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