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Germ reduction on spices by means of low pressure microwave plasma

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The primary causes for the spoilage of food are microorganisms, which are inserted by raw materials or by contamination during processing into the product. At present, different methods exist to reduce the microbial load of spices effectively. However, these procedures are connected with substantial disadvantages such as colour deterioration, textural alternation and reduction in the essential oil content. Against this background, the sterilization potential of microwave-sustained low pressure plasmas was fundamentally examined and a new procedure for the germ reduction on spices was implemented for the first time. The challenge of the most complex surface structure of spices and herbs necessitate a basic research on the sterilisation mechanisms as well as on the morphology aspects. By means of VUV-spectroscopy the most effective operation gas for the plasma process was indentified, and due to the difficult substrate structure, a direct plasma contact was necessary to reduce the test germ *Bacillus subtilis* (*B. atrophaeus*) effectively. The obtained results from the basic studies were completed through a laboratory test stand and led to the development and the setup of an operating model for the sterilization of black peppercorns.

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