

熟肉真空冷却过程的水分迁移对其肌肉组织的影响

Influence of moisture movement on the muscular tissue during vacuum cooling of cooked meat

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中文摘要:

该文以熟肉为试验材料,对真空冷却过程中熟肉内部温度场、水分蒸发速率以及含水率变化进行了试验研究。同时通过透射电子显微镜研究水分迁移对熟肉组织内部结构的影响。结果发现:熟肉的表面温度在4~5 min内从63℃降低到10℃,熟肉的平均含水率从71%降低到60.69%。真空冷却过程中水分的蒸发速率分为两个阶段:蒸发速率加速阶段和蒸发速率减速阶段。试验结果和理论分析显示,真空冷却过程中的水分迁移由两部分组成,一部分为由于产品内部温度不同造成不同的化学势引起食品内部的水分转移;另一部分为由于压力降低引起的水分蒸发或者沸腾后所产生的水蒸气的迁移。透射电子显微镜成像结果显示了经过真空冷却处理的熟肉中心和表面的肌肉组织形态没有发生大的变化。与真空冷却前相比,不管在熟肉中心还是表面,只是真空冷却后的肌肉纤维之间形成了更大的孔隙。

英文摘要:

Vacuum cooling of cooked meat was carried out to investigate the fundamental principles of moisture movement by the variations of temperature field, evaporation rate and water content of cooked meat. In addition, the effect of moisture movement on the interior tissue structure of cooked meat was studied by using transmission electron microscopy (TEM). During vacuum cooling, it can be found from the experimental results that it took only about the first 4~5 min to reduce the surface temperature of the cooked meat from 63℃ to 10℃. Average water content of cooked meat decreased from 71% to 60.69%. For evaporation rate, there were two periods: an accelerating period and a falling period. Experimental results and theoretical analysis showed that moisture movement within cooked meat during vacuum cooling consists of two parts. One was water migration within cooked meat caused by chemical potential; the other was water vapour movement produced by evaporation or ebullition caused by pressure drop. At the same time, transmission electron microscopy observations revealed that morphology of muscular tissue at the surface and the core of cooked meat treated by vacuum cooling remained intact. However, muscle fiber separation and formation of large intercellular spaces occurred in the intact muscle fiber of muscular tissue treated by vacuum cooling.

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