

CONTROL OF PESTS IN COCOA BEANS AND HAZELNUTS WITH CARBON DIOXIDE UNDER HIGH PRESSURE

Sabine PROZELL¹, Christoph REICHMUTH¹, Gottfried ZIEGLEDER², Bernd SCHARTMANN³, Reinhard MATISSEK, Jürgen KRAUS⁴, Dieter GERARD⁴, and Stefan ROGG,⁵

¹*Federal Biological Research Centre for Agriculture and Forestry, Institute for Stored Product Protection, Königin-Luise-Straße 19, D-14195 Berlin, Germany.*

²*Fraunhofer Institute for Food Technology and Packaging, Schragenhofstraße 35, D-80992 München, Germany.*

³*Association of German Confectionery Industries, Adamsstraße 32-54, D-51063 Köln, Germany.*

⁴*Carbo Carbon Dioxide Factory, Sprudelstraße, D-53557 Bad Honningen, Germany.*

⁵*Technical University Berlin, Institute for Process Engineering, Straße des 17 Juni 135, D-10623 Berlin, Germany.*

Agricultural raw products in the food processing industry such as cocoa beans and hazel nuts require quick disinfestation prior to storage. Such a preventative treatment should not lead to any reduction in quality including build-up of chemical residues. A recently developed effective control method for this purpose is exposure of the commodity to carbon dioxide under pressure of 20 - 40 bar for a few hours.

The experiments comprised the insertion of 12 species of caged insect pests at their different developmental stages in 1 tonne of bagged commodity in a 3 m³ chamber. Results showed that at a temperature of about 10°C under 20 bar of carbon dioxide the lethal exposure period for treatment was 3 hours, and this was about 1/5 longer than at 20°C. Complete control at 30 bar and 37 bar and 20°C was achieved within 1 hour and 20 minutes, respectively.

Examination of cocoa beans after all treatments showed that quality had not changed, whereas with hazelnuts there was a tendency for the treated nuts to turn rancid earlier than the untreated ones.

The data are compared with laboratory results. The rate of distribution of the gas depended on the nature and density of the product.