

Influence of Rosemary, Clove and Propolis on the Oxidation Stability of Lard Measured by an Accelerated Oxidation Test

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Goal

Lard from organic pigs has a high PUFA content, which can lead to rapid oxidation when processed into salami. The influence of natural antioxidants (AO) on oxidation stability was tested with lard using the accelerated Rancimat method and verified in salami.

Material and Method

3 ± 0.3g of lard was weighed into the test tube of the Professional Rancimat 892 (Metrohm Schweiz AG, CH-4800 Zofingen). After adding the subsequent antioxidants, the samples were heated up to 120°C with a constant air supply of 20L/h. The volatile reaction products of oxidation were constantly rinsed over into a second reaction vessel with deionized water. By measuring the conductivity, the oxidation induction time was determined.

- Rosmavox 20, AVO - Werke August Beisse GmbH, D - 49191 Belm bei Osnabrück
- Clove extract dispersed on salt, Omya, CH-4710 Balsthal
- Propolis extract, alcoholic solution (80% ethanol), Bienen Roth GmbH, CH-8492 Wila

Salami was produced according to a standard procedure (Meier et al. 2021). Salami slices were exposed to LED light (2000 lux) during 24h. Hexanal content of Salami was measured by GC-MS using a dynamic headspace vacuum transfer in-trap extraction method (DHS-VTT) according to Fuchsmann et al. (2019), TBARS were measured according to Crackel et al. (1988).

Conclusions

- Rosmavox 20 (0.05%, 0.25% and 0.5%) and alcoholic Propolis solution (0.33% and 3.33%) significantly increased oxidation induction times in lard measured by Rancimat, while clove did not lead to any improvement in oxidation stability.
- Oxidation stability of Salami could be improved by using Rosemavox 20 (0.5%) and alcoholic Propolis solution (1%), but not by clove extract (0.5%). Therefore, these natural antioxidants could be a suitable ingredient to improve oxidation stability of products containing lard with high PUFA content as derived from organic production.
- The accelerated oxidation test with Rancimat could be a suitable method to screen activity of antioxidants before using in products.

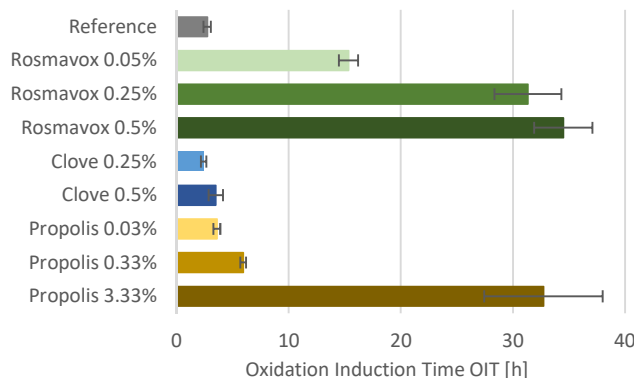


Figure 1 Influence of the addition of Rosmavox, Clove extract and Propolis solution to lard (PUFA 18%, MUFA 45%, SFA 37%) on Oxidation induction time measured with Rancimat (n=3)

Results

Rosmavox led to a significantly increased oxidation induction times (OIT) compared to the reference at all tested concentrations (Figure 1). Propolis prolonged the OIT only at the concentrations 0.33% and 3.33%. Clove, on the other hand, showed no significant influence on oxidation stability at either concentration. Hexanal (Table 1) and TBARS values (Figure 2) confirmed the antioxidant effect of Rosmavox and Propolis in salami.

Table 1 Hexanal content in Salami without and with addition of antioxidants (AO) before and after exposure to LED light

	without AO	Rosmavox 0.5%	Clove 0.5%	Propolis 1%
Hexanal ppm [mg/kg]				
Salami before light exposure	0.38 ± 0.10	0.25 ± 0.02	1.61 ± 0.22	0.20 ± 0.09
Salami after exposure to LED for 48 h	0.73 ± 0.22	0.17 ± 0.01	0.83 ± 0.08	0.19 ± 0.05

According to the TBARS values, clove again did not seem to improve oxidation stability. The TBARS values of salami without antioxidants were above the threshold of 1.0 mg MDAeq/kg at which a sensory perception of oxidation is expected (Bloukas et al. 1997). Both Rosmavox and Propolis had the potential to keep the oxidation process below this threshold.

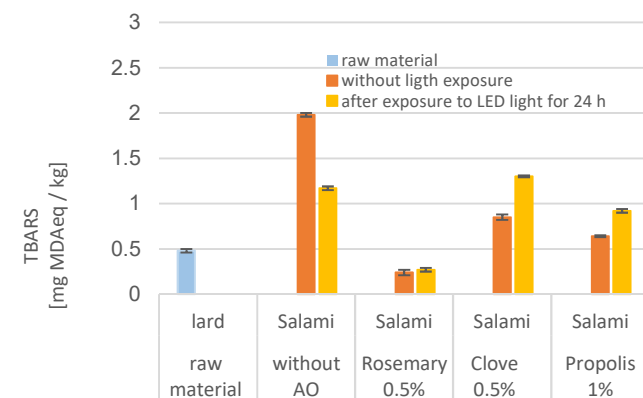


Figure 2 TBARS content in lard and salami produced from it without and with antioxidants before and after exposure to LED light