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home **page** about **us** contact 

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Table of
Contents

IN PRESS

CJAS 2015

CJAS 2014

CJAS 2013

CJAS 2012

CJAS 2011

CJAS 2010

CJAS 2009

CJAS 2008

CJAS 2007

CJAS 2006

CJAS 2005

For Authors

- [Authors Declaration](#)
- [Instruction to Authors](#)
- [Guide for Authors](#)
- [Fees](#)
- [Submission](#)

Subscription

Czech Journal of Animal Science

Analysis of raw cow milk quality according to free fatty acid contents in the Czech Republic

Hanuš O., Vegrícht J., Frelich J., Macek A., Bješka M., Louda F., Janů L.:

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[[fulltext](#)]

The concentration (c) of free fatty acids (FFAs) in milk is an indicator of dairy cow nutrition, milk straining, its bacterial contamination and storage quality. High FFA concentrations (cs) caused by

properties of milk products. Therefore the FFA content is introduced thanks to an increase in the efficiency of modern analytical methods as a milk quality indicator and as an indicator for its price as well. The goal of this paper was to analyse the FFA relations to the other milk quality indicators. The data set ($n = 11\ 586$) was evaluated by regression methods. In November and December the respective FFA means were 0.614 ± 0.458 and 0.835 ± 0.491 mmol/100 g with a relatively high variability of 74.6 and 58.8%. The frequency of unsatisfactory FFA values (> 1.3) was 7.51 and 13.93%. Casein content ($r = -0.17$; $P < 0.01$) and crude protein content ($r = -0.12$; $P < 0.01$) were related more closely with FFA c. The FFAs can increase by 0.066 mmol/100 g with casein decrease by 0.10%. The FFAs in milk fat can slightly increase by the supply of energy to dairy cows (protein and casein decrease) and rise with the deteriorating health state of mammary gland (lactose, $r = -0.14$; $P < 0.01$) as well. The somatic cell count correlated with FFAs more weakly ($r = 0.07$; $P < 0.05$), similarly like the total mesophilic bacteria count ($r = 0.11$; $P <$

0.01), relatively more closely the psychrotrophic bacteria count ($r = 0.27$; $P < 0.05$). The deterioration of almost all hygienic indicators signified an FFA c increase. The urea content correlated with FFAs weakly ($r = -0.08$; $P < 0.05$) and the fat content imperceptibly as a component of similar substance like FFAs. The mechanical milk stress led to FFA liberation from fat esters proportionally to the intervention intensity ($P < 0.001$). Even a relatively small mechanical stress caused by mixing comparable to the current milking technology, milk transport and storage increased the FFA c of milk fat from 1.11 ± 0.19 to 1.80 ± 0.40 mmol/100 g ($P < 0.05$). The highest experimental stress up to 6.88 ± 0.55 mmol/100 g ($P < 0.001$).

Keywords:

cow; raw milk; bulk milk sample; mammary gland; fat; free fatty acids; crude protein; casein; lactose; somatic cell count; total mesophilic bacteria count; psychrotrophic bacteria count; urea; mechanical stress; lipolysis

[[fulltext](#)]

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