

# Establishing the Influence of Character, Health and Other Characteristics of the Cow on its Milk Using the Biocrystallisation Method

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## *Zusammenfassung*

Dieser Artikel beschreibt, wie verschiedene Eigenschaften individueller Kühe sich in den Kristallisationsbildern ihrer Milch ausdrücken. Es handelt sich um die erste Untersuchung der Milch von individuellen Kühen mit einer bildschaffenden Methode in grösserem Stil. Neun Sets von Eigenschaften der Kristallisationsbilder wurden unterschieden. Jedes Set kombiniert diverse ähnliche Phänomene, die man auf den Bildern findet, z.B. «Störung der Struktur», «Versteifung» oder «starke Präsenz». Gleichzeitig wurden Befunde im Zusammenhang mit Charakter, Gesundheit und einigen anderen Merkmalen der Kühe in 21 Kuh-Kategorien geordnet. Brachte man diese in Verbindung mit den Sets der typischen Charakteristika der Kristallisationsbilder, ergaben sich drei Hauptkategorien bei den Kühen: «Feurig», «Unauffällig» und «Ängstlich», die mit einem extrovertierten, einem neutralen und einem auf Rückzug bedachten Charakter der Tiere einhergingen. Interessanterweise konnten die Gesten dieser Charaktereigenschaften direkt auf die Gesten bezogen werden, die auf den jeweiligen Kristallisationsbildern zu erkennen waren. Ausserdem wurden auf den Kristallisationsbildern andere Merkmale der jeweiligen Charaktereigenschaften gefunden, die für diese typisch waren. Das zeigt, dass die Kristallisationsmethode Charaktereigenschaften direkt abbilden kann. Wir stellten auch fest, dass die hervorstechendsten Sets von Eigenschaften der Kristallisationsbilder nicht in der Milch von ganz jungen Kühen auftreten, aber in der Milch der ältesten Kuh sehr präsent sind – ein Hinweis, dass der typische individuelle Charakter einer Kuh sich erst mit zunehmendem Alter manifestiert.

Schlüsselwörter: Kristallisationsmethode, Kuhmilchqualität

## *Summary*

In this paper we describe how various characteristics of the cow are reflected in the crystallisation pictures of its milk. It is the first larger scale investigation of the milk of individual cows by means of a picture forming method. Nine sets of crystallisation picture characteristics were discerned. Each set combines similar phenomena encountered on the crystallisation pictures, such as: disturbance of the structure, stiffening and strong presence. At the same time, attributes relating to character, health and certain other characteristics of the cows were gathered in 21 cow categories. Linking the sets of crystallisation picture characteristics with the cow categories, three main cow categories were found: fiery, inconspicuous and fearful. They are associated with an outward-reaching, a neutral and a withdrawing character trait, respectively. Interestingly, the gestures of these character traits could be directly linked with the gestures found on the relevant crystallisation

pictures. Moreover, other features of the character traits were encountered on crystallisation pictures that were typical for these character traits. This indicates that the biocrystallisation method can capture character-related features. We also found that the most striking sets of crystallisation picture characteristics were not present for the youngest cows, but very present for the oldest cows, which suggests that the typical character of a cow takes time to be embodied.

Keywords: biocrystallisation, cow milk quality

## 1 Introduction

Cow milk forms an essential part of human nutrition. Not only is a lot of milk being consumed as such, but it also forms the basis of products like cheese, butter, yoghurt, curd, etc. The total yearly consumption in Germany and The Netherlands amounts to more than 300 litres per person. This makes cow milk quality an important issue and a lot of quantitative-analytical research has been devoted to it. Qualitative-holistic research using picture forming methods like the biocrystallisation method, capillary dynamolysis or roundfilter chromatography, however, is quite scarce (e.g., *Balzer-Graf & Balzer 1991, Wohlers 2011, Abel 2013, Kahl et al. 2014*). Because this research mostly involves bulk milk, investigations of the milk of individual cows are even scarcer. *Wohlers (2003, 2011)* used capillary dynamolysis and did not achieve unequivocal results (personal communication). *Irion (2002)* distinguished the biodynamic milk of nine horned cows from the conventional milk of nine hornless cows, both with the biocrystallisation method and with capillary dynamolysis. *Waldburger & Spengler (2007)* used all three picture forming methods to determine the lactation stage of twelve cows and, moreover, found milk quality to decrease with increasing yearly milk production. The investigation presented here is the first to investigate the milk of individual cows on a larger scale.

Milk quality depends on fodder, breed, living environment (meadow, barn), farming method (conventional, organic, biodynamic), milking method (manual or machine) and cow dehorning (*Wohlers 2003*). But additionally, the individual animal and its health, constitution, character, age and lactation stage have an impact on milk quality. In a pilot project, the milk of selected individual cows from the “Genneper Hoeve” biodynamic farm was investigated. All these cows are of the same breed, enjoy their lives in the same meadows and barn, have access to the same food, are machine milked, were not dehorned and live more or less in the same calving rhythm. This meant variability was largely limited to the individual animal. The description of character, health and constitution of the selected cows was compared with a visual evaluation conforming to *Huber (2010)*. It was found that the biocrystallisation method applied to milk of individual cows could