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Efficacy of Friedland clay (montmorillonite–illite mixed layer clay) when used as a technological additive for all animal species

EFSA Panel on Additives and Products or Substances used in Animal Feed (FEEDAP)

Abstract

Friedland clay (montmorillonite–illite mixed layer clay mineral) was shown to be effective as a binder (at concentrations between 1 and 2 % in four different types of feed) and as an anticaking agent (at concentrations of 2 % in rolled oats, in a mixture of poultry grains and a high fat compound feed). It was concluded that Friedland clay has the potential to act as a binder and as an anticaking agent in feed for all animal species.

Keywords: Friedland clay, montmorillonite–illite mixed layer clay mineral, binder, anticaking agent, technological additive

Requestor: European Commission

Question number: EFSA-Q-2015-00295

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Summary

Following a request from the European Commission, the Panel on Additives and Products or Substances used in Animal Feed (FEEDAP) was asked to deliver a scientific opinion on Friedland clay (montmorillonite–illite mixed layer clay).

Friedland clay (montmorillonite–illite mixed layer clay mineral) was shown to be effective as a binder (at concentrations between 1 and 2 % in four different types of feed) and as an anticaking (at concentrations of 2 % in rolled oats, in a mixture of poultry grains and a high fat compound feed). It was concluded that Friedland clay has the potential to act as a binder and as an anticaking agent in feed for all animal species.

Table of contents

1. Introduction

1.1. Background and Terms of Reference as provided by the European Commission

Regulation (EC) No 1831/2003 establishes rules governing the Community authorisation of additives for animal nutrition and in particular, Article 9 defines the terms of the authorisation by the Commission.

The applicant, FIM Biotech GmbH, is seeking a Community authorisation of montmorillonite-illite mixed layer clay mineral to be used as a technological additive for all animal species. (Table 1)

Table 1: Description of the substances

Category of additive	Technological additive
Functional group of additive	Binders, anticaking agents
Description	Montmorillonite-illite mixed layer clay mineral
Target animal category	All animal species
Applicant	FIM Biotech GmbH
Type of request	New opinion

On 30 October 2014, the Panel on Additives and Products or Substances used in Animal Feed of the European Food Safety Authority ("Authority"), in its opinion on the safety and efficacy of the product, could not conclude on the efficacy of montmorillonite-illite mixed layer clay mineral. According to the aforementioned EFSA opinion the FEEDAP Panel considers that insufficient evidence was provided to establish the binding and anticaking properties of Friedland clay.

The Commission gave the possibility to the applicant to submit complementary information in order to complete the assessment on the efficacy to allow a revision of the Authority's opinion.

On 29 April 2015, the Commission has received new data on the efficacy of montmorillonite-illite mixed layer clay mineral.

In view of the above, the Commission asks the Authority to deliver a new opinion on the efficacy of montmorillonite-illite mixed layer clay mineral as a technological additive for all animal species based on the additional data submitted by the applicant.

1.2. Additional information

Friedland clay is a clay composed of montmorillonite/illite. The Panel on Additives and Products or Substances used in Animal Feed (FEEDAP) delivered an opinion on the safety and efficacy of this product when used as a feed additive for all animal species (EFSA FEEDAP Panel, 2014). In that opinion, the FEEDAP Panel could not conclude on the efficacy of the additive as a binder and anticaking agent.

2. Data and Methodologies

2.1. Data

The present assessment is based on the data submitted by the applicant in the form of additional information[1] to a previous application on the same product.[2]

[1] EFSA dossier reference: FAD-2015-0020.
[2] EFSA dossier reference: FAD-2010-0244.

2.2. Methodologies

The approach followed by the FEEDAP Panel to assess the efficacy of Friedland clay is in line with the principles laid down in Regulation (EC) No 429/2008[3] and the Guidance on technological additives (EFSA, 2008; FEEDAP Panel, 2012).

3. Assessment

Friedland clay is typically composed of the major constituents montmorillonite, illite, quartz and kaolinite. Other minor constituents are calcite, cristobalite, goethite, gypsum, hematite, lepidocrocite, magnetite, plagioclase, pyrite, rutile, siderite and tridymite. It is specified to contain ≥ 75 % phyllosilicates (≥ 35 % montmorillonite/illite, ≥ 20 % illite/muscovite, ≤ 15 % kaolinite), ≤ 20 % quartz and < 1 % of each of the minor constituents siderite and pyrite.

The additive is intended for use in all animal species and categories as a binder and anticaking agent at a maximum concentration of 20 000 mg/kg complete feed.

3.1. Efficacy

3.1.1. Efficacy as binder

The binding efficacy of the additive was measured by determining pellet hardness by means of the Kahl pellet hardness tester, by which a certain pressure is exerted on the pellet until it breaks. Feeds for pigs (wheat, maize, barley, rye), dairy cows (rye, rye bran, wheat bran, dried distiller's grain solubles), chickens for fattening (wheat, maize, soybean meal) and turkeys for fattening (wheat, maize, soybean meal) were supplemented with Friedland clay at 0, 1 % (pigs and cows) or 2 % (poultry) and pelleted (pellet diameter 3 mm for poultry diets and 5 mm for pig and cow feed).[4] Pellet hardness was measured in 10 sub-samples of each of the pelleted feeds. The results showed that pellet hardness (resistance to pressure) was significantly ($P < 0.05$) increased by the addition of Friedland clay to feeds for pigs (1.19 vs. 1.10 kg), cows (1.31 vs. 1.09 kg), chickens (0.91 vs. 0.83 kg) and turkeys (1.93 vs. 1.77 kg) at both supplementation levels.

3.1.2. Efficacy as anticaking agent

The efficacy of Friedland clay as an anticaking agent was assessed by means of the cohesion index using GranuDrum powder rheometer. The rotating drum measurement is characterised by Lumay et al. (2012) as "the most practical geometry to study the flow of granular materials". The endpoint measured is the cohesive index. The lower the cohesive index is the better flowability is. For that purpose, samples of rolled oats, a mixture of "poultry grains" (wheat, corn, barley, peas, sunflower seeds and limestone) or "winter fat feed" (sunflower seeds, oats, rolled oats, vegetable fat and oilseeds) were tested in triplicates dry, after the addition of 10 % water and after the addition of 10 % water and 2 % Friedland clay. Results showed that the cohesive index increased when samples were moistened, and that addition of 2 % Friedland clay significantly reduced this index in all three types of feed.

4. Conclusions

Friedland clay was effective as a binder (at concentrations of 1 % and 2 %) and as an anticaking (at concentrations of 2 %). It is concluded that Friedland clay has the potential to act as a binder and as an anticaking agent in feed for all animal species at a level of 2 %.

[3] Commission Regulation (EC) No 429/2008 of 25 April 2008 on detailed rules for the implementation of Regulation (EC) No 1831/2003 of the European Parliament and of the Council as regards the preparation and the presentation of applications and the assessment and the authorisation of feed additives. OJ L 133, 22.5.2008, p. 1.

[4] Technical dossier/Efficacy of FIMIX as binder and anticaking.

Documentation provided to EFSA

1. Efficacy of Fimix. April 2015. Submitted by FIM Biotech GmbH

2. Supplementary information. July 2015. Submitted by FIM Biotech GmbH

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