# CEC-Foder



**-for all animal feed**

**SAFE FEED**

Essential for quality nutrition

(Effective use of feed energy content)

## Feed production processes:

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#### When added to feed, CEC-FODER binds water ensures dry and loose feed.

**CEC-FODER ensures stability in feed moisture**

**results in better mixing and shaping properties,**

**prevents feed material from being contaminated by moulds and mycotoxins, ensures ammonia binding , better energy utilisation for animal performance**

**CEC-FODER prevents feedstuff from lumping**

**(lumps represent a danger of microbial contamination)**

# CEC-FODER

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## unique natural raw material for all animals

#### Composition / structure CEC-Feed

CEC-FODER is natural clinoptilolite, hydrated alumina silicate with crystalline structure. Due to such type of structure, clinoptilolite consists of many channels, pores and cavities inside its structure. These pores are useful for cation-exchange capacity (CEC), which is speciﬁc for clinoptilolite. Because the surface of clinoptilolite is negative charged have CEC-FODER afﬁnity for positive charged elements or molecules binding. Speciﬁc afﬁnity for clinoptilolites are molecules of ammonia (NH ), ammonium ion (NH +), water (H O), ions of heavy metals (Pb +; Hg2+; Cd2+; Cs2+; Co2+; Ni2+) and gas molecules (CO; CO ; N ; H S; C H ). The diameter of clinoptilolite pores is 400 pm (0,4 nm = 4 Å), so molecules with diameter < 400 pm could be trapped inside the structure, molecules > 400 pm are incompatible with their diameter.

3 4 2 2

2 2 2 2 2

#### Comparison of different diameters of molecules

**Conversions:**

1 Å angstrom = 100 pm (0,1 nm ) = 1x10-10m 1 nm nanometer = 1x10-9m = 1 000 pm

1 pm picometer = 1x10-12m

1 ųm micrometer = 1x10-6m = 1 000 nm

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Ions / molecules diameters < 400 pm :**  Na+ = 116 pm K+ = 152 pm Mg2+ = 86 pm Ca2+ = 114 pm S2- = 170 pm O2- = 126 pm Se2- = 184 pm Cl- = 167 pm NH + = 175 pm Pb2+ = 132 pm Hg2+ = 110 pm Cd2+ = 103 pm  4  Cs+ = 165 pm Co2+ = 170 pm Ni2+ = 73 pm NH = 360 pm  3 | | | | | | | |
| H2O  N2 | =  = | 282 pm  300 pm | H2S =  C2H2 = | 360 pm  240 pm | CO = 280 pm | CO2 = | 280 pm |

**Molecules diameters > 400 pm :**

glucose = 1 000 pm

globular protein = 4 000 pm

vitamin B1, B2 = 55 000 000 pm

amino acids = 800 pm

typical virus = 75 000 pm

insulin = 5 000 pm

vitamin A,E = 700 000 pm

#### Mode of action / utilization during digestion

CEC-FODER during digestive process in the gut trap elements with positive charge for which have the afﬁnity. Speciﬁc afﬁnity – selective binding of CEC-FODER is for ammonia ion, water molecule, heavy metals ions, metabolite products from digestion (hydrogen sulphide, mercaptans, carbon dioxide), toxins. Digestion process is made in liquid medium, so CEC-FODER ﬂowing via digestion system prolong the digestive process and have more time for utilization of nutrition elements and trap undesirable toxins, this is caused because of ion-exchange properties of CEC-Feed.

#### Could CEC-FODER trap amino-acids, vitamins molecule?

CEC-FODER do not attack and is not able to trap such big molecules > 400 pm, because of discrepancy of diameters clinoptilolite structure and diameter of such bigger molecules like vitamins and amino-acids are.



# CEC-FODER

### Nutrition important ions are < 400 pm, so could be trap by CEC-Feed?

CEC-FODER with ion-exchange properties during the digestive process is also directly in contact with mentioned **nutrition important ions** (Ca2+; Na+; K+; Mg2+…and others), these ions are compatible in diameter of CEC-FODER pores, so there could be a risk to be trapped, but **are** immediately **changed** with molecules and ions for which have CEC-FODER preferred speciﬁc afﬁnity, selective binding **for** – ammonia, free water, toxins, heavy metals. Selective binding is important property of CEC-FODER (clinoptilolite). CEC-FODER prolong digestive process – have longer time for such exchange activities which are under the process in ﬂuid medium in the gut and there is enough concentration of molecules with speciﬁc afﬁnity for CEC-Feed. 1 kg CEC-FODER could trap 15 - 23 grams of ammonia.

### How can CEC-FODERimprove performance of animals?

Using CEC-FODER for feed production helps animal organism trap toxic and metabolic elements which attack them, so such energy needed for detoxiﬁcation process without CEC-FODER is available for the organism for utilization and higher performance and better immune system.

### CEC-FODERapplications in animal nutrition

Premix production: carrier of premix, anti-caking agent for premix production, CEC-FODER is chemical inert for blending with other ingredients. CEC-FODER is safety carrier (control humidity and qualitative parameters regular particle sizes of CEC-FODER for blending, ﬁxed price for long period)

Compound feed production: for homogenously blending, protect the attack of humidity and

decrease mould contamination during storage of ready feed, anticaking effect – free ﬂowing feed, ammonia reduction effect in animal gut and better stable odour, technological additive for feed production – helps blending and feed ﬂowing

Special feed production: rumen stabilisation product (pH), anti-diarrhea products, immune

system stimulating products, mycotoxin binding products

**Maximum dosage of CEC-Feed:** 1% - 2 %

CEC-FODER- 100 % natural material - a silicate that is free from molds and bacteria (a danger in products of plant origin)

CEC-FODER– a safe product: regular quality control system in production plant (heavy metals,

dioxins, PCB, microbiology), free from GMO and products of animal origin.

CEC-FODER– storable for extended periods of time, stable during the whole duration od storage, no degradation into metabolites, stable structure

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CEC-FODER– available in different particle sizes depending on feed type production and

technological possibilities in feed factory





# CEC-Feed

## – application effects for use as cattle feed

#### DIGESTION PROCESS

* + rumen contents buffering, pH stability – lowers the risk of acidosis;
  + rumen ammonia resorption – lowers the permeation of urea into milk;
  + facilitates a slower passage of food through the digestive tract = a longer time

for the resorption of nutrients;

* + CEC-FODER binds bioamines (cadaverine, putrescine), toxins, metabolites; adsorbs ammonia selectively;
  + CEC-FODER lowers the amount of energy required for metabolism, which results in free

energy for growth, immunity, and higher production; stimulates the mucous membrane of the intestine, which results in better nutrient resorption (immune system support), and increases the use of Ig proteins;

* + CEC-FODER is not subject to metabolism (it does not degrade; instead, it acts as a carrier of nutrients); reduces the occurrence of diarrheic syndrome.

**YIELD**

* + increased milk production (propionate),
  + positive effects on meat quality, bioamine sorption,
  + supports growth and immunity, improves the health condition of animals (low ATB use),
  + improves fertility.

**ENVIROMENT**

* + CEC-FODER reduces the release of ammonia into the environment,
  + reduces the malodour and wetness of excrements – a reduction in the diseases of locomotive organs (impact on milk production),
  + it is not toxic to the environment

(bio-waste, fertilizers with N content),

* + Improves animal welfare.

**DOSAGE:**

* + ADULT CATTLE: 150-200 g per animal per day or 1 % by weight of the feed composition
  + CALVES: 100-150 g per animal per day mixed into

the feed or 1 % by weight of the feed composition.

# CEC-FODER

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## – application effects for use as pig feed

#### DIGESTION PROCESS:

* CEC-FODER has positive effects on the pH level in the digestive tract – pH control;
* CEC-FODER facilitates a slower passage of food through the digestive tract = a longer time for the resorption of nutrients;
* CEC-FODER binds bioamines (cadaverine, putrescine), toxins, metabolites; adsorbs ammonia selectively;
* CEC-FODER lowers the amount of energy required for metabolism, which results in free energy for growth, immunity, and higher production; stimulates the mucous membrane

of the intestine, which results in better nutrient resorption (immune system support),

and increases the use of Ig proteins;

* CEC-FODER is not subject to metabolism (it does not degrade; instead, it acts as a carrier of nutrients); reduces the occurrence of diarrheic syndrome.

**YIELD**

* positive effects on the increase of population,
* positive effects on meat quality,
* CEC-FODER supports growth and immunity, improves the health condition of animals (low ATB use),
* improves fertility.

#### ENVIROMENT

* CEC-FODER reduces the release of ammonia into the environment,
* improves the environmental climate,
* it is not toxic to the environment (bio-waste, fertilizers with N content),
* improves animal welfare.

**DOSAGE**

Generally, up to 1 % by weight of the feed used

# CEC-FODER

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## – application effects for use as poultry feed

#### DIGESTION PROCESS

* a supplier of water for the digestion process;
* grit for mechanical stomachs (feed crushing),
* facilitates a slow passage of food through the digestive tract = a longer time for the resorption of nutrients;
* CEC-FODER binds bioamines (cadaverine, putrescine), toxins, metabolites;

adsorbs ammonia selectively;

* CEC-FODER lowers the amount of energy required for metabolism, which results in free energy for growth, immunity, and higher production; stimulates the mucous membrane of the intestine, which results in better nutrient resorption (immune system support),
* CEC-FODER is not subject to metabolism (it does not degrade; instead, it acts as a carrier of nutrients); reduces the occurrence of diarrheic syndrome.

**YIELD**

* better meat quality,
* higher fat stock weight,
* improved intensity of egg-laying,
* better egg quality.

#### ENVIROMENT

* + lower ammonia discharge into the environment,
  + lower malodour and lower litter wetness,
  + a reduction in the occurrence of diseases of locomotive organs,
  + fewer dirty eggs
  + better litter properties,
  + non-toxic to the environment (bio-waste / fertilizers),
  + improved animal welfare.

#### DOSAGE:

FATTENING: phase I – 0.5 %, phase II – 1.0 %,

phase III – 1.5 % by weight of the feed composition; general dosage: 1 % added to the feed.



# CEC-FODER

## – application effects for use as pet food (dog, cats)

#### DIGESTION PROCESS

* CEC-FODER has positive effects on the pH level in the digestive tract – pH control;
* CEC-FODER facilitates a slower passage of food through the digestive tract = a longer time for the resorption of nutrients;
* CEC-FODER binds bioamines (cadaverine, putrescine), toxins, metabolites; adsorbs ammonia

selectively;

* CEC-FODER lowers the amount of energy required for metabolism, which results in free energy for growth, immunity, and higher production; stimulates the mucous membrane

of the intestine, which results in better nutrient resorption

(immune system support), and increases the use of Ig proteins;

* CEC-FODER is not subject to metabolism (it does not degrade; instead, it acts as a carrier of nutrients); reduces the occurrence of diarrheic syndrome.

**YIELD**

* positive effects and support of immunity system
* better health conditions of pet animals , low antibiotics use
* improves fertility.

#### ENVIROMENT

* CEC-FODER reduces the release of ammonia into the environment,
* improves the household climate,
* lower odour , better fecal score
* improves animal welfare.

#### DOSAGE:

generally dosage 0,5 % up to 1 % for pet food CEC-FODER does not effect the pet food taste .





# CEC-FODER

### CEC-FODER– application in the sphere of animal nutrition

* + as a binder: a substance that adsorbs water in the process of feed production (better feed structure and compatibility);
  + anti-clinkering properties: CEC-FODER adsorbs water contained in feedstuffs or pre-mixtures

(free from lumps);

* + adsorbs water and ammonia: a cleaner and healthier environment;
  + chemically inert: an excellent carrier for pre-mixtures, additional feedstuffs, and concentrates;
  + a synergist with enzymes: lowers viscosity and increases feed digestibility;
  + technological effects: feed is more liquid, additional liquid ingredients can be added as an option.

**CEC-FODER- structure and interactions**

CEC-FODER has a 3D structure – a network of cavities and pores of 0.4 nm, which is why is does not adsorb nutritionally desirable molecules (vitamins, amino-acids, sugars – big molecules in terms of size) – incompatibility.

CEC-FODER– exhibits a speciﬁc afﬁnity to ammonia and water molecules; in a moist enviro-ment (the digestive tract). It absorbs molecules which are similar in size and to which it exhibits a speciﬁc afﬁnity; there is a sufﬁcient number of them in the intestine, but CEC-FODER does not absorb non-speciﬁc molecules or elements.

**CEC-FODER– reasons for use in nutrition:**

* technological advantages – feed production and processing,
* nutritional advantages – a healthy intestine,

peristaltic movement stimulation,

* protective effects – feed protection – safe feed,
* environmental advantages – reduction in the generation of N-based substances.

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#### DELIVERY:

25kg-sacks

100okg-BigBag

**CONTACTS: Zeo Concept ECE Ltd**

**uk@zeo-concept.com**

**Tel: 01547 728730**

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