

Til Fødevarestyrelsen

### Levering på bestillingen "RNA-rige gærceledele som foder"

Fødevarestyrelsen har i en bestilling fremsendt d. 15. juli 2020 bedt DCA – Nationalt Center for Fødevarer og Jordbrug – om at udarbejde en *"redegørelse for formålet med at anvende RNA som foder til dyr; er det overvejende et ernæringsmæssigt formål eller et performanceformål"*.

Nedenfor følger besvarelsen, der er udarbejdet af Postdoc Takele Feyera fra Institut for Husdyrvidenskab, Aarhus Universitet. Fagfællebedømmelse er foretaget af Seniorforsker Nuria Canibe fra samme institut.

Besvarelsen er udarbejdet som led i "Rammeaftale om forskningsbaseret myndighedsbetjening mellem Miljø- og Fødevareministeriet og Aarhus Universitet", "Ydelsesaftale Husdyrproduktion 2020-2023, ID-nr 20-H3-09".

Venlig hilsen

Klaus Horsted  
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**Answer regarding whether 80% RNA should be considered as feedstuff or feed supplement**

*Takele Feyera, Department of Animal Science, AU*

AU Department of Animal Science has been asked to evaluate whether a 80% RNA-rich yeast extract intended for growing and adult animals of all species should be considered a “feedstuff” or a “feed supplement”. Feeding stuff is organic or inorganic substances that is used singly or in mixtures, whether or not containing additives, for oral animal feeding; while feed additive is substance which, when incorporated in feed stuff, is likely to affect their characteristics or livestock production (EC, 1970).

We have reviewed the available relevant literature and have not found any animal study on the product in question (80% RNA-rich yeast extract). However, there is quite some literature reporting the use of nucleotides-rich yeast extract (**NRYE**) in animal feeding, typically in young growing animals. Thus, the response herewith was based on results reported in studies investigating NRYE-supplemented diets. Generally, NRYE has been reported to be included in the diet at 0.05% for chickens (Leung et al., 2019a, 2019b) and 0.1% (Patterson et al., 2019) to 6% (Carlson et al., 2019; Rigueira et al., 2013) for pigs.

At very low inclusion level in the diet (0.05 to 0.2%), the reviewed literature highlighted the functional role of NRYE in modulating intestinal morphology, improving ileal immune response, promoting feed conversion efficiency, upregulating inflammatory cytokines, positively modulating proliferation of beneficial gut bacteria and suppressing proliferation of harmful bacteria, thereby reducing the incidence of post-weaning diarrhea/stress (Superchi et al., 2012; Waititu et al., 2016; Waititu et al., 2017; Leung et al., 2019b; Patterson et al., 2019). However, these authors reported contrasting effects of NRYE supplementation on growth performance, which indicates that the product at these low inclusion levels acts more as a feed additive with specific effects on the host’s gut health and immunity rather than as a feedstuff having a nutritional role.

On the other hand, at relatively high dietary inclusion levels (2.5% to 6%), the nutritional role of NRYE has been reported. Carlson et al. (2005) compared the impact of feeding 2.5% and 5% SDPP spray-dried plasma protein (**SDPP**) with the same amount of NRYE in weaned pigs (weaned at 19 days of age). Diets were supplemented with 5% NRYE or SDPP from day 0 to 14 post-weaning and with 2.5% of the same products from day 15-28 post weaning. From day 28 post-weaning until finishing at day 130 post-weaning, animals were fed the same non-supplemented grower-finisher diet. The results demonstrated similar growth performance (average daily gain, average daily feed intake) and intestinal morphology in the two groups during the four weeks post-weaning. However, subsequent grower-finisher performance was significantly greater in NRYE-fed pigs than in those fed diets supplemented with SDPP.

Further, Rigueira et al. (2013) reported similar results to those of Carlson et al. (2005) in post-weaning pigs during the nursery period when 2-6% SDPP was replaced by an equal amount of NRYE. In another investigation where 3% NRYE replaced an equal amount of SDPP and fed to post-weaning piglets for 15 days, Wu et al. (2016) observed similar average daily gain, average daily feed intake, profile of most plasma amino acids, and intestinal mucosal morphology in both groups. Therefore, these studies demonstrated similar growth performance in pigs fed SDPP- and NRYE-supplemented diets, indicating that NRYE could fairly replace SDPP in the diet of young pigs without any detrimental effect on growth performance, thus NRYE could be considered as a feedstuff ingredient.

In the reviewed literature, the percentage of nucleotides in the NRYE products ranged from 1.1% (Waititu et al., 2017) to 10.5% (Wu et al., 2016), while cell wall polysaccharides, crude protein and carbohydrates were 22%, 33% and 14%, respectively. However, 80% RNA contain 80% nucleotides, which are not amino acids, on a dry matter basis. Considering that yeast extract in general contains approximately 10% ash on dry matter basis, there would be only 10% left for carbohydrates, CP, fat and fiber fractions in this new product, which reflects the functional property of the product as feed supplement but not as a feedstuff. Moreover, the company does not argue on dosage level in the diet. Therefore, we conclude that the 80% RNA-rich yeast extract should be considered as a feed supplement and not as a feedstuff.

## REFERENCES

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