htba Sugarex
Sweeteners

The best sweetener range based on Neohesperidin DC

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Formulating new standards

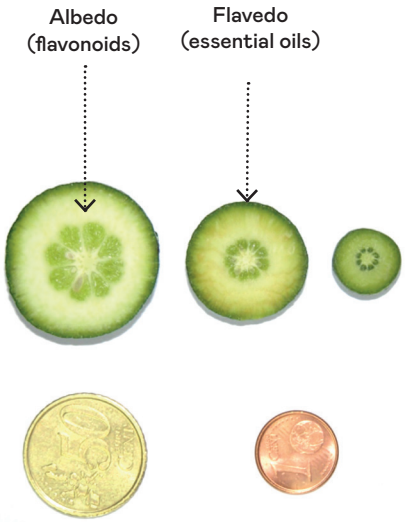
What is Neohesperidin DC?

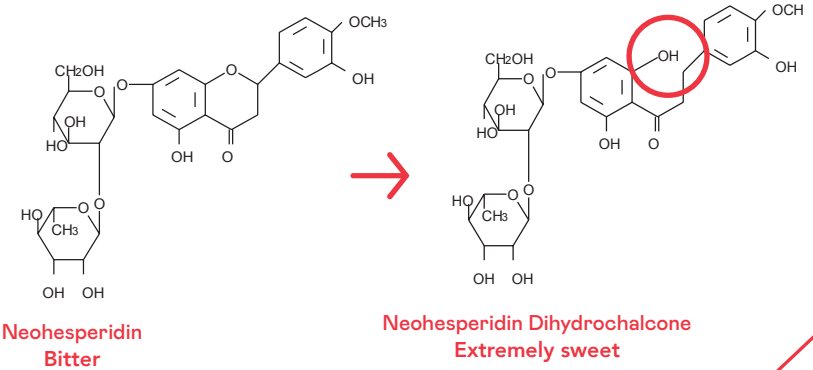
Neohesperidin Dihydrochalcone (NHDC) is an additive derived from the hydrogenation of Neohesperidin, a flavanone which is found in bitter oranges (*Citrus aurantium*). NHDC is 1,500-1,800 times sweeter than sucrose at threshold levels and its main features are:

- It is a high-intensity sweetener and flavouring agent
- Acts in synergy with other natural and artificial high-intensity sweeteners
- Is used to mask unpleasant tastes
- Enhances and modifies flavours

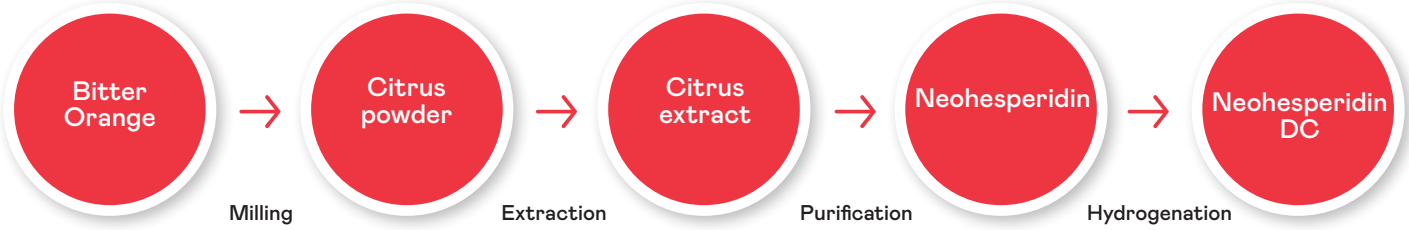
What is the origin of Neohesperidin DC?

Flavonoids are a large group of polyphenolic compounds present in all fruits and vegetables. Depending on their chemical structure, they are classified into several groups: flavanones, flavones, and chalcones, among others. Specifically in Citrus fruits, the highest concentration of flavonoids such as Hesperidin, Naringin, and Neohesperidin has been identified in the albedo part during immature stages. Neohesperidin DC is derived from the hydrogenation of Neohesperidin.





How is Neohesperidin DC manufactured?



Neohesperidin DC: multifunctional additive

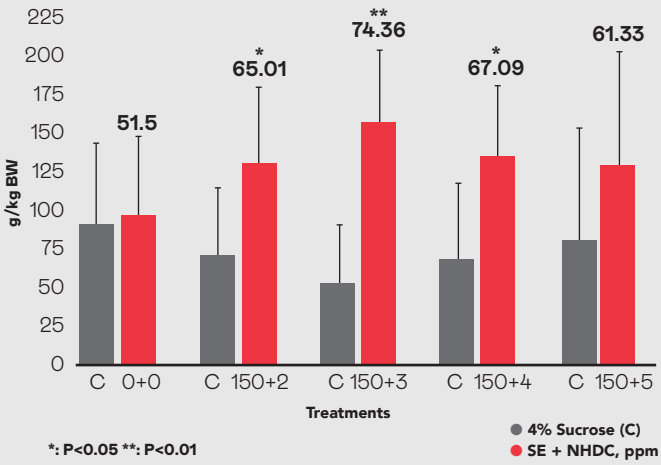
NHDC's synergy with other natural and artificial high-intensity sweeteners

The combination of Neohesperidin DC with other sweeteners enhances NHDC's sweetening properties. One of the best matches of NHDC is with Sodium Saccharine. NHDC eliminates the metallic aftertaste of Saccharine. In addition, NHDC improves the sweetener's profile of Stevia extracts and reduces their off-flavours.[1]

NHDC increases Stevia preference in piglets

Weaning piglets showed a higher preference for feed with the inclusion of NHDC and Stevia Extracts (SE) when compared to the control feed with 4% sucrose. The main effects were observed in the T3 starter diet, which included 3 ppm of NHDC and 150 ppm of SE. [2]

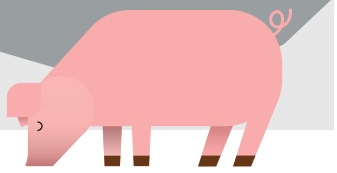
Feed intake and % of preference for different piglet's diets including NHDC and Stevia Extracts



*: P<0.05 **: P<0.01

Reference 2

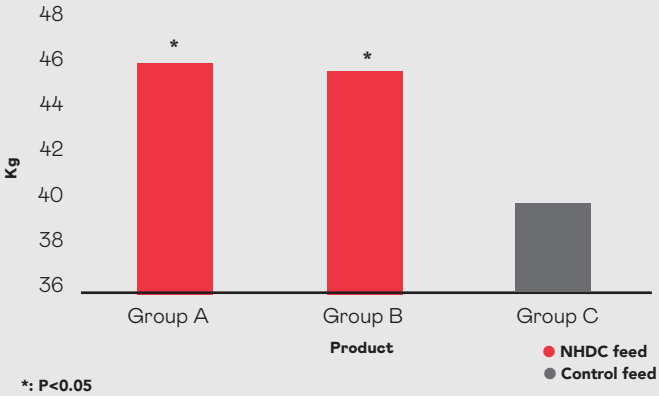
A statistically significant difference was observed in the treatments of 150 ppm of SE plus 2, 3 or 4 ppm of NHDC. The inclusion of NHDC in piglet's diet increased the preference for SE and enhanced its sweetness



NHDC masking power in medicated feeds

NHDC has a high masking effect, covering the metallic aftertaste of saccharine and reinforcing the top sweet notes. Scientific studies have shown that medicated feed has a better acceptance in piglets when NHDC and Sodium Saccharin (SS) are added to medicated and regular feeds. [3]

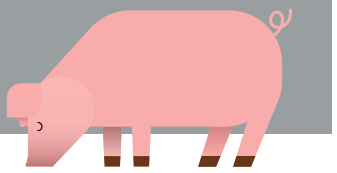
Feed intake of medicated starter piglet's diets incluiding NHDC and Sodium Saccharine



***: P<0.05**
Group A: Without medication + (165 g SS + 5 g NHDC)/ton of feed.
Group B: With medication (250 g acid sulfadimidine + 400 g chlorydrate tetracycline/ton of feed) + (250 g SS+ 7.5 g NHDC)/ ton of medicated feed.
Group C: With medication (250 g acid sulfadimidine + 400 g chlorydrate tetracycline/ton of feed) without sweetener.

Reference 3

Statistically significant differences were observed between groups fed NHDC+ SS medicated feed and non-sweetened medicated feed



Neohesperidin DC: feed intake enhancer

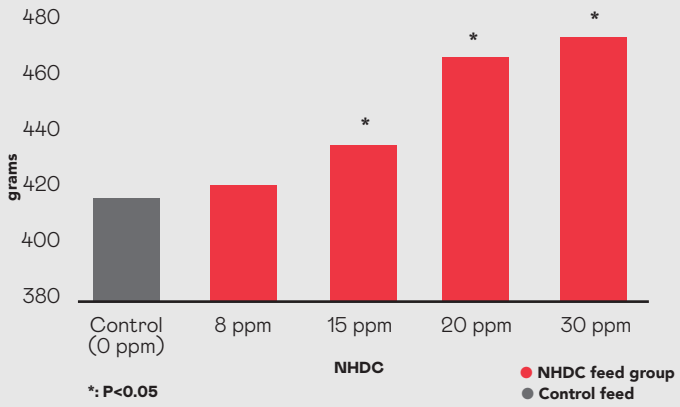
NHDC is an effective high-intensity sweetener and flavouring agent that boosts the feed intake of piglets, calves, sheep, and dogs. **In February 2015, NHDC use was extended in the EU to pigs for fattening and to fish.**

Scientific studies have demonstrated that the inclusion of NHDC in animal diets increases feed intake, average daily gain and the conversion rate, thus improving animal performance.

NHDC in feeds improves intake and average daily gain in piglets

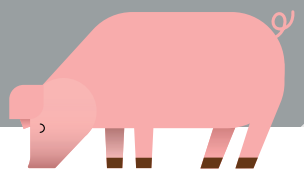
The research confirmed that in piglets fed with NHDC, the feed was highly consumed and lead to a higher average daily gain than in the control group. Batch 20 ppm showed statistically significant differences for both parameters when compared to the control group. [5]

Average daily intake in piglets fed different inclusion levels of NHDC



Reference 5

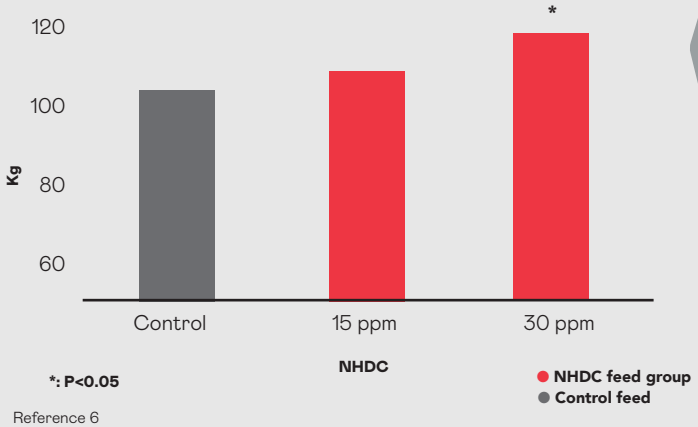
The addition of 20 ppm of NHDC to piglet's starter feed led to a higher average daily intake of 11% when compared to control group



NHDC improves feed consumption in calves

The results demonstrated a positive sweetening effect on the calves' diets. The test revealed a correlation between the NHDC dose in diet, feed consumption, and weight increase. Additionally, a statistical difference was identified between the control group and a NHDC group (30 ppm). [6]

Feed consumption in calves



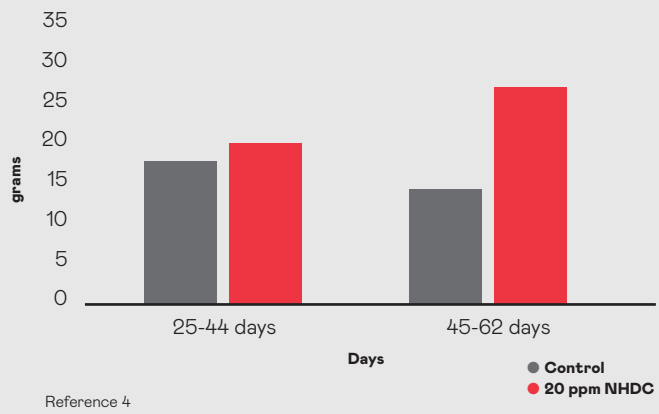
Reference 6

The results demonstrate the higher efficacy of the feedstuff with NHDC when compared to control group

Sea Bass and Trout prefer feeds with NHDC

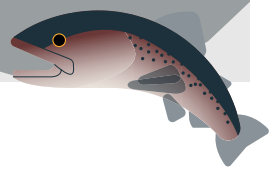
After an adaptation period, the experiment showed that in a free-choice situation using self-feeder dispensers, both trout and sea bass had a clear preference for feed containing 20 ppm of NHDC. [4]

Average daily feed intake in trout

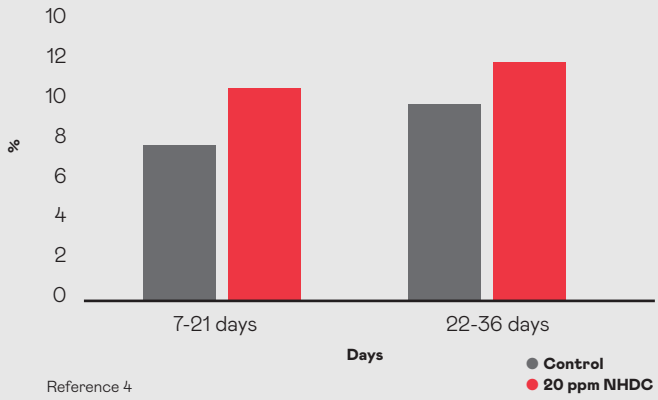


Reference 4

Average daily intake in trout increased 12.5% and 48% in both phases respectively when compared to control group

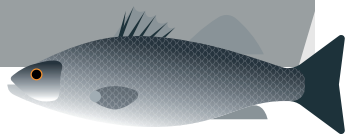


Average daily feed intake in sea bass



Reference 4

Average daily intake in sea bass increased 25% and 18.5% in both phases respectively when compared to control group



References:

REF 1: Schiffman, S.S., Booth, B.J., Carr, B.T. and Losee, M.L. 1995. **Investigation of synergism in binary mixture of sweeteners**.
REF 2: Blavi, L., Solà-Oriol, D., Crespo, J., Serra, M. and Pérez, J.F. 2015. **Neohesperidin Dihydrochalcone increases stevia preference in young piglets.**
REF 3: Costa-Batllori, P. and Marzo, I. 1994. **Essay about Sugarex 15 usage to maintain the intake level of medicated feeds in piglets.**
REF 4: Rueda, F., Sánchez-Vásquez, F.J., Zamora, S. and Madrid, J.A. 1995. **Effects of Neohesperidin Dihydrochalcone on food intake in two fish species (Sea Bass and Trout) using self-feeders.**
REF 5: Costa-Batllori, P. and Marzo, I. 2000. **Efficacy of Neohesperidin Dihydrochalcone as sweetener agent in piglet's feed used at different inclusion levels.**
REF 6: Costa-Batllori, P. 1994. **Neohesperidin Dihydrochalcone (NHDC) as sweetener in feedstuffs for calves.**

HTBA is the leading manufacturer of the intense sweetener and flavour enhancer Neohesperidin DC. **HTBA**'s expertise enables the design and manufacturing of a specific line of additives for animal feed, such as the **Sugarex product range** whose main ingredient is NHDC.

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General Information Neohesperidin DC

Chemical Name	Neohesperidin dihydrochalcone
Synonyms	NHDC, Neohesperidin DC
CAS Number	20702-77-6
Flavouring Compound Number	2b959
Molecular Weight	612
Caloric Value	2 Kcal /g
Legislation	European Legislation, Regulation (EC) 1831/2003 on additives for use in animal nutrition. Regulation (EU) 2015/264 of 18 February 2015 concerning the authorization of Neohesperidin Dihydrochalcone as a feed additive in piglets, pigs for fattening, calves, sheep, fish and dogs. US legislation, Association of American Feed Control Officials AAFCO OP (2016) 87.25 as flavouring agent in weaning pig's diets.
Dosage	Up to 35 ppm (EU) Up to 15 ppm (US)
Shelf life	5 years
Stability	Optimum stability at pH 2-6 Thermally Stable (UHT, Pasteurization, Extruder, Expander) Stable during the feedstuff's shelf life

Healthy feed, Healthy animals, Healthy people

Sweeteners, flavourings, intake promoters and natural enhacers

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