

ALKACEL 20X ws

Exogenous Enzyme for NSP in Corn Soy Diets of Broilers and Layers

ALKACEL 20X ws is a targeted exogenous enzyme preparation designed to hydrolyze the major NSP in corn soy rations, releasing and making available the trapped energy and proteins.

ALKACEL 20X ws improves digestibility of corn soy rations, effectively digesting and removing the negative digestive effects of NSPs in the corn soy diet

ALKACEL 20X ws exhibits pronounced, quantifiable and measurable **xylanase, cellulase and betaglucanase** activities, digesting the major NSP in corn-soy rations, directly improving FCR and feed costs.

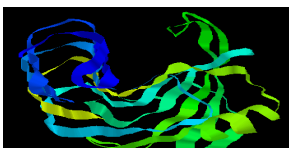
CONTENTS/kg: **Xylanase** 1.5 Million *U* , **Cellulase** 500,000 *U*

and **Beta-glucanase** 40,000 *U*

RECOMMENDED DOSE AND USE:

Broilers - one tsp (5gms) /10 liters of drinking water

Layers - one tsp/20liters of drinking water



Molecular View of Xylanase Enzyme



MAKING THE MOST OUT OF FEED!

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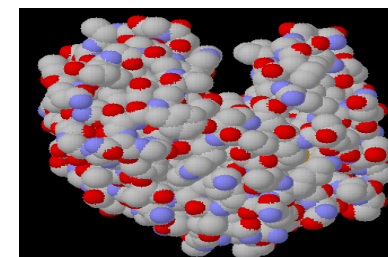
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NON-STARCH POLYSACCHARIDES (NSP)

*Impact on Feed Digestibility
and Feed Conversion*



ALKACEL 20X ws

Water Soluble Enzyme Supplement for
Corn -soy Rations of Broilers & Layers

Non-Starch Polysaccharides

Description, Digestive System Impact, Presence in Wheat and other Feedstuffs



Non-Starch Polysaccharides or NSP are the main storage forms of

sugars in aleurons (seeds) of some cereals and the endosperm (meats) of nuts. Although similar to starch in chemical formula, these polymers differ in the way the individual sugars are attached – “**beta**” linkages in NSP and “**alpha**” in starch. NSP are **indigestible** to monogastrics like pigs and poultry, as they lack the enzymes necessary to digest the “**beta**” type of linkages.

Effect of NSP in the Digestive Tract

1. Up to 60% of the total sugars and up to 40% of total proteins of NSP containing ingredients are bound and trapped by the NSP, rendering them indigestible and unavailable to the animal
2. NSP increase the viscosity of ingesta in the gut, effectively slowing down nutrient diffusion and hindering absorption of nutrients
3. NSP possess high water absorbing capacity, significantly increasing the ingesta volume once inside the gut, restricting feed intake .

Biochemical screening of common vegetable sourced ingredients reveal significant levels of NSP – beta-galactomannans, xylans, betaglucans, celluloses, among others.

ANALYZED NSP CONTENT OF COMMON FEEDSTUFFS

Ingredient	Acid Dig. Fiber %	HC %
Pollard	11	25
Wheat bran	13	29.1
Rice bran	13.9	9.8
Wheat, hard red	4	9
DDGS	12.8	30.2
Soybean meal	9.4	4.0
Corn	2.8	6.8
Copra meal	25	26
Palm kernel cake	39	21

From: USNRC 98, AGRlaccess data 2001–2008

ADF = Acid Detergent Fiber cellulose+lignin HC = hemicellulose

IMPLICATION

Although the energy and proteins in NSP carrying ingredients are analyzable, the trapped nutrients are not available to the organisms, This high percentage of NSP has been traced to be responsible for the reduced productive performance encountered in high usage of by-products(>10%), **due to reduced actual available nutrients, high heat increment (HI) resulting from high energy expense in digestion and utilization, increased viscosity of feed, and ability to restrict intake.**

Major NSP/Fiber Substrates Profile of Common Feedstuffs/Rations

Corn-soy Grains	Oil Seeds	Oil Nuts
wheat	soybean	copra meal
rice	canola meal	palm kernel meal
corn		guar

cellulose	cellulose	cellulose	cellulose
xylan	xylan	betamannan	betagalactomannan
betaglucan	betaglucan	betaglucan	betaglucan

The indicated enzymes therefore are CELLULASE, XYLANASE and BETA-GLUCANASE.

USE OF **ALKACEL 20X** vs IN CORN-SOY DIETS CONTAINING HIGH LEVELS OF NSP

ALKACEL 20X is a targeted exogenous enzyme capable of hydrolyzing the major **beta** bonds of cellulose, xylan and betaglucan in corn-soy and grains into the component parts – glucose, mannose, xylose, and other glucosides – the forms now recognizable and available to body cells:

1. Makes available to the animal most of the meals' carbohydrates and proteins trapped in the NSP
2. Removes the viscosity increase, nutrient absorption reduction and intake volume restriction effects of NSP.
3. Significantly reduces body energy expense in digestion and utilization and resulting HI
4. Allows maximized incorporation/usage of lower priced but nutrient dense brans, DDGS and related ingredients (>20%) with the least of the negative effects previously encountered.
5. Releases a minimum of 200kcal/kg of feed from trapped energy, available for animal use.

Major Sources:

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3. Enzymatic Method for Fiber Free Extraction. Molina et.al., J. Food Sci.38
4. Exogenous Enzymes Release Energy from Rice bran, Copra meal and Canola. Pluske, et.al.; Massey U., NZ.
5. Effect of Enzyme Supplementation of Diets Containing 20% Copra Meal On Performance of Broilers. Dingle, J. et.al.; U. of Queensland Gatton
6. Enzymatic Modification of Mannans and Cellulose Derivatives. Siika-aho Matti, et.al.;VTT Biotech and Food Res.
7. Small Animal Clinical Nutrition, 5th Ed. Hand, et.al.
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