



Pectinase - Why is it Important?

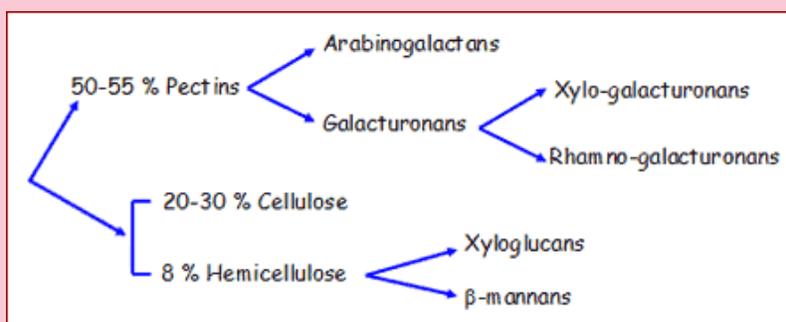
Pectinases are enzymes that are probably unfamiliar to many people, as they are not as commonly offered in commercial NSP-degrading enzymes with the exception of multi-enzyme products. Very few pure or cocktail-type NSP degrading enzymes express pectinase activity. However, as pectins make up a large portion of the NSPs present in poultry rations, the importance of pectinase should not be overlooked.

Pectins are NSPs commonly associated with vegetable proteins. They are present in cereal grains as well, although to a much lesser extent. For instance, of the NSPs present in corn, only about 5-7% is made up of pectins.

	Carbohydrates	Corn	Barley	Wheat	Rye
NSP		9.9	18.7	11.9	15.3
Pectins	Rhamnose	-	-	-	-
	Galactose	0.5	0.3	0.4	0.5

Bach-Knudsen, Knud Erik, 1997. Carbohydrate and lignin content of plant materials used in animal feeding. Anim. Feed Sci. Tech. 67: 319 - 338.

However, pectins account for the largest majority of the NSP content in soybean meal, as about 50-55% of the NSPs in soybean meal exists in the form of pectins.



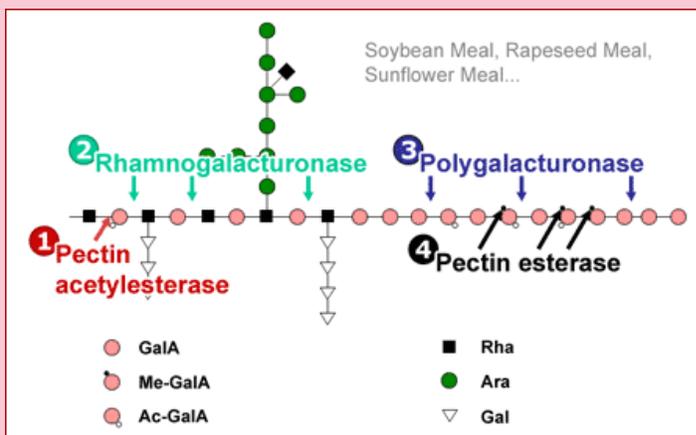
Brillouet & Carré, 1983; Bach-Knudsen, 1997; Huisman et al., 1998.

Pectinase - Why is it Important? (cont'd)

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Pectins exist as rhamnogalacturonans, arabinans, galactans and arabinogalactans. The majority of pectins present in the oilseeds typically used in monogastric diets are rhamnogalacturonans and arabinogalactans. As with other NSPs, monogastric animals possess no endogenous enzymes capable of digesting pectins.

Similar to other NSPs, pectins require multiple enzymatic activities to be broken down. This is because pectins exist as complex structures with highly-substituted and variable side chains (see next page). For example, for rhamnogalacturonase to have access to its target substrate, first pectin acetylase must cleave the acetyl group attached to the polysaccharide. As such, NSP-degrading enzymes which express multiple pectinase activities should have a higher potential for improving the digestibility of oilseeds.



1. Pectin acetylase releases the acetyl residue linked to the galacturonic acid.
2. Rhamnogalacturonase cuts the bonds between galacturonic acid and rhamnose in the rhamnogalacturonan region.
3. Polygalacturonase cuts the linear chain of galacturonic acid in the homogalacturonan region.
4. Pectin esterase releases the methyl residue linked to the galacturonic acid.