**Different types of non-starch-polysaccharides (NSPs) are present in variable proportions in the cell walls of all vegetable ingredients.**

The major NSPs are:
- arabinoxylans
- cellulose
- β-glucans
- pectins

Monogastric animals don’t have the enzymes needed to breakdown NSPs, thus limiting the digestibility of feedstuffs.

NSP enzymes act on cell walls, allowing better access to nutrients for the animal digestive enzymes, thereby decreasing intestinal viscosity and increasing digestibility of sugars. Rovabio® is the only multi-synergistic enzyme containing at least five groups, all produced by *Penicillium funiculosum*.

Rovabio® has a proven efficacy on corn DDGS thanks to its unique combination of 19 enzyme activities that work on all major ingredients.

**NSP content is concentrated in corn DDGS**

Corn DDGS are being formulated at increased levels into many diets. Corn DDGS have variable composition, but consistently have high NSP content.

DDGS’s high NSP content (mainly arabinoxylans and cellulose) provides substantial substrate for the xylanase and cellulase found in Rovabio®. It is important to note that Adisseo consistently tests for cellulase and xylanase content in every single batch.

*tested for minimal levels on each batch*
Rovabio® enhances the use of corn DDGS in broiler diets, increases the feeding value of corn DDGS in broiler diets and by reformulation allows feed cost savings. Like major ingredients, the improvement of metabolizable energy for broilers can be assigned to corn DDGS from table values. From our experiments, the energy uplift with Rovabio® is about 5.5% for corn DDGS matrix value.

In vitro trial: +30% DM degradability on average
Corn DDGS samples have been incubated with and without Rovabio® in order to compare DM (Dry Matter) degradability across DDGS samples. DM degradability being defined as:

\[ \text{DM degradability} = \left( \frac{\text{Initial weight} - \text{Final weight}}{\text{Initial weight}} \right) \times 100 \]

The in vitro data shows that the average increase in degradability is +30%. Rovabio® always led to improved degradability because it is a combination of 19 enzyme activities.

In vivo digestibility trial: ME uplift of 105 kcal/kg DDGS
The improvement of corn DDGS energy value has been evaluated in a digestibility trial. In this DDGS sample, metabolizable energy was improved by 105 kcal/kg or 5.9%.

In vivo growth trial: less 130 kcal/kg diet on broiler males fed a corn-soyabean diet with 12% corn DDGS
The trial carried out by a U.S. research facility, shows that energy content of a standard broiler diet containing 12% DDGS can be reduced by 130 kcal/kg if supplemented with Rovabio® without compromising performance. In this case, Rovabio® allowed a reduction of fat inclusion by 60% on average, which realized substantial feed cost savings.

<table>
<thead>
<tr>
<th>Met. Energy uplift</th>
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<tbody>
<tr>
<td>Corn DDGS</td>
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<tr>
<td>Corn</td>
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<tr>
<td>Soybean meal</td>
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Rovabio® enhances the use of corn DDGS in broiler diets, increases the feeding value of corn DDGS in broiler diets and by reformulation allows feed cost savings. Like major ingredients, the improvement of metabolizable energy for broilers can be assigned to corn DDGS from table values. From our experiments, the energy uplift with Rovabio® is about 5.5% for corn DDGS matrix value.