POTENTIAL BENEFITS

The competitive furfural synthesis process converts a low-value byproduct of corn ethanol production into a high-value chemical and a high-value feed residue. This easily implemented process may be incorporated alongside existing work flows to create additional revenue streams.

- May be implemented in existing plants
- Produces high-value furfural
- Converts bran or fiber to high-protein residue for added value in feed market
- No toxic by-products: only water
- High-yield furfural process
- Growing furfural market
- Large potential need for furfural production
- Extra revenue streams from waste products

SUMMARY

Los Alamos has developed an improved furfural process with high yields that produces high-protein bran residue suitable for animal feed, generates only treated water as its waste stream, and can be implemented with existing work flows that produce high-hemicellulose brans.

This new process takes a byproduct of ethanol production and converts it into a high-value industrial chemical at an estimated cost that is below the current market price. The process has the environmental advantages of consuming no mineral acids and producing furfural at higher yields than traditional methods.
OUR MARKET APPLICATIONS
This technology targets the existing grain ethanol production industry as well as other high-hemicellulose producing industries such as starch and grain oil productions. The ethanol market is expected to reach a size of $129Bn by 2027 with a CAGR of 4.8%. By leveraging this growth market and employing the Los Alamos furfural synthesis method, a company can increase its revenue stream by offering high-value furfural as a product and by incorporating the high-protein fiber residue into the dried distiller grain and solubles.

OUR COMPETITIVE ADVANTAGES
Non-US furfural producers are the most direct competitors for the new process. These producers use corn cobs and a mineral acid-based synthesis with low furfural yield and a high rate of chemical consumption. The new, Los Alamos-developed, competitive furfural process avoids mineral acid, which reduces chemical consumption; produces a high-protein fiber residue suitable for animal feed; and may be implemented alongside ethanol production to add value by utilizing bran as a starting material.

WHAT IS UNIQUE ABOUT THE TECHNOLOGY
The traditional feedstocks for furfural production are corn cobs and sugar cane bagasse, which have low hemicellulose content. Most current furfural processes use sulfuric acid as a catalyst. The feedstocks and processes have low yields, high energy use, and high chemical costs; and they produce a low value residue.

Los Alamos researchers devised a new furfural process that uses bran, a material rich in hemicellulose, as the feedstock and uses no mineral acids. The result is a process with higher yields and lower energy and chemical consumption. The solid residue from this process is suitable for feed. This new process could lead to economical domestic furfural production, especially when integrated with corn ethanol production.

WHAT’S BEHIND OUR TECHNOLOGY
The new furfural process uses corn bran or similar hemicellulose-rich material as the feedstock for an environmentally-friendly, high-yield, low-waste furfural production. Behind this technology is a team of experts in chemical conversion of biomass and process engineers who specialize in developing novel methods for green synthetic methods for both government/military and commercial purposes.

OUR TECHNOLOGY STATUS
The new furfural synthetic method has been developed and tested at bench scale, and it is ready for pilot-scale testing. Techno-economic analysis indicates that this process can be economically viable, but this assessment needs verification. Initial testing and analysis has been performed using corn bran, though the process should be amenable to other sources of hemicellulose such as sorghum. We are seeking either a CRADA partner to fund pilot level testing to be done at Los Alamos or at the partner location, or a direct licensing partner who is interested in scaling up the process for production of furfural.
To respond to this call, please submit a letter of interest for this technology. The Laboratory will acknowledge receipt of this written response and will then send a commercial plan template for consideration as a way to provide additional information on respondent’s strategy for engaging the Laboratory. The letter of interest is due by each interested respondent no later than 2/26/21. This information will be used in the evaluation process and will inform further engagement with respondents. All companies will receive a response.

Please send all correspondence to amymigliori@lanl.gov with “Competative furfural synthesis – Commercial Interest – Company Name” in the subject line.
REFERENCES AND DISCLAIMERS

Intellectual Property

The Competitive Furfural Synthesis system has various components, and capabilities, which are subject to different intellectual property protections. Additional intellectual property protection is currently being developed and pursued. In order to support the larger Competitive Furfural Synthesis system additional intellectual property will continue to be developed and pursued in parallel with this commercial call and any future development work. Existing, and future intellectual property, originating from the Lab independently of any technology transfer contract may be available for licensing.

This commercial call is an opportunity to engage with the Lab to develop economically viable domestic furfural synthesis methods, and to potentially license the intellectual property arising from a potential CRADA opportunity.

References

• U.S. Patent Pending Application number 63/118501
• https://www.forbes.com/sites/kelseyatherton/2020/05/29/corn-powered-tomahawk-missiles-are-coming/#13b72a4c6f98

THIS IS NOT AN OFFER. The information herein is for informational purposes only. The technology, research, and intellectual property described are subject to ongoing research and development at Los Alamos National Laboratory, as managed and operated by Triad National Security, LLC (Triad). Triad and its members, officers, employees, and agents, specifically disclaim any representation, warranty, or guarantee as to the safety, efficacy, usefulness, benefit, performance, success, or any particular outcome of the technology, research, or intellectual property relating hereto, in whole or in part.