



ENVIRONMENTAL PROTECTION AGENCY

(6560-50-P)

[EPA-HQ-OAR-2015-0092; FRL-9930-50-OAR]

Notice of Opportunity to Comment on an Analysis of the Greenhouse Gas Emissions Attributable to Production and Transport of Cotton (*Gossypium spp.*) Seed Oil for Use in Biofuel Production

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: The Environmental Protection Agency (EPA) is inviting comment on its analysis of the greenhouse gas (GHG) emissions attributable to the production and transport of *Gossypium spp.* seed oil (“cottonseed oil”) feedstock for use in making biofuels such as biodiesel, renewable diesel, and jet fuel. This document explains EPA’s analysis of the feedstock production and transport-related components of the lifecycle GHG emissions of biofuel made from cottonseed oil, including both direct and indirect agricultural and forestry sector emissions. This notice also describes how EPA may apply this analysis in the future to determine whether biofuels produced from cottonseed oil meet the necessary GHG reductions required for qualification as renewable fuel under the Renewable Fuel Standard program. Based on this analysis, we anticipate that biofuels produced from cottonseed oil could qualify as biomass-based diesel or advanced biofuel if typical fuel production process technologies are used.

DATES: Comments must be received on or before **[insert date 30 days after publication in the Federal Register]**.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA-HQ-OAR-2015-0092, by one of the following methods:

- <http://www.regulations.gov>. Follow the on-line instructions for submitting comments.
- Email: a-and-r-docket@epa.gov, Attention Air and Radiation Docket ID No. EPA-HQ-OAR-2015-0092.
- Mail: Air and Radiation Docket, Docket No. EPA-HQ-OAR-2015-0092, Environmental Protection Agency, Mail code: 28221T, 1200 Pennsylvania Ave., N.W., Washington, DC 20460.
- Hand Delivery: EPA Docket Center, EPA/DC, EPA WJC West, Room 3334, 1301 Constitution Ave., NW, Washington, DC, 20460, Attention Air and Radiation Docket, ID No. EPA-HQ-OAR-2015-0092. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to Docket ID No. EPA-HQ-OAR-2015-0092. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at www.regulations.gov, including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through www.regulations.gov or e-mail. The www.regulations.gov website is an "anonymous access" system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through www.regulations.gov, your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment,

EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD-ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses. For additional information about EPA's public docket visit the EPA Docket Center homepage at <http://www.epa.gov/epahome/dockets.htm>.

Docket: All documents in the docket are listed in the www.regulations.gov index. Although listed in the index, some information is not publicly available, e.g., CBI or other information for which disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in www.regulations.gov or in hard copy at the Air and Radiation Docket, EPA/DC, EPA WJC West, Room 3334, 1301 Constitution Ave., NW, Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the Air and Radiation Docket is (202) 566-1742.

FOR FURTHER INFORMATION CONTACT: Christopher Ramig, Office of Transportation and Air Quality, Mail Code: 6401A, U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue, NW, 20460; telephone number: (202) 564-1372; fax number: (202) 564-1177; email address: *ramig.christopher@epa.gov*.

SUPPLEMENTARY INFORMATION:

This document is organized as follows:

- I. Introduction
- II. Analysis of GHG Emissions Associated with use of Cottonseed Oil as a Biofuel Feedstock
 - A. Feedstock Description, Production, and Distribution
 - 1. Production of Cottonseed Oil-Based Biofuels
 - 2. Cottonseed Oil Production Economics
 - 3. Replacement of Cottonseed Oil in Vegetable Oil Markets
 - 4. Upstream GHG Implications of Cottonseed Oil Use as a Biofuel Feedstock
 - B. Summary of Agricultural Sector GHG Emissions
 - C. Fuel Production and Distribution
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I. Introduction

As part of changes to the Renewable Fuel Standard (RFS) program regulations published on March 26, 2010¹ (the “March 2010 rule”), EPA specified the types of renewable fuels eligible to participate in the RFS program through approved fuel pathways. Table 1 to 40 CFR 80.1426 of the RFS regulations lists three critical components of an approved fuel pathway: (1) fuel type; (2) feedstock; and (3) production process. Fuel produced pursuant to each specific combination of the three components, or fuel pathway, is designated in Table 1 to 40 CFR 80.1426 as eligible for purposes of the Clean Air Act’s (CAA) requirements for greenhouse gas (GHG) reductions to qualify as renewable fuel or one of three subsets of renewable fuel (biomass-based diesel, cellulosic biofuel, or advanced biofuel). EPA may also independently approve additional fuel pathways not currently listed in Table 1 to 40 CFR 80.1426 for participation in the RFS program, or a third-party may petition for EPA to evaluate a new fuel pathway in accordance with 40 CFR 80.1416.

¹ See 75 FR 14670.

Pursuant to 40 CFR 80.1416, EPA received a petition from the National Cottonseed Products Association (NCPA), requesting that EPA evaluate the lifecycle GHG emissions for biofuels produced using *Gossypium spp.* seed oil (“cottonseed oil”), and that EPA provide a determination of the renewable fuel categories, if any, for which such biofuels may be eligible. EPA’s lifecycle analyses are used to assess the overall GHG impacts of a fuel throughout each stage of its production and use. The results of these analyses, considering uncertainty and the weight of available evidence, are used to determine whether a fuel meets the necessary GHG reductions required under the CAA for it to be considered renewable fuel or one of the subsets of renewable fuel. Lifecycle analysis includes an assessment of emissions related to the full fuel lifecycle, including feedstock production, feedstock transportation, fuel production, fuel transportation, fuel distribution, and tailpipe emissions. Per the CAA definition of lifecycle GHG emissions, EPA’s lifecycle analyses also include an assessment of significant indirect emissions, such as indirect emissions from land use changes, agricultural sector impacts, and production of co-products from biofuel production.

In this document, we are describing EPA’s evaluation of the GHG emissions associated with the feedstock production and feedstock transport stages of the lifecycle analysis of cottonseed oil when it is used to produce a biofuel, including the indirect agricultural and forestry sector impacts. We are seeking public comment on the methodology and results of this evaluation. For reasons described in Section II below, we believe that, as a conservative estimate, it is reasonable to apply the GHG emissions estimates we established in the March 2010 rule for the production and transport of soybean oil to cottonseed oil.

If appropriate, EPA will update its evaluation of the feedstock production and transport phases of the lifecycle analysis for cottonseed oil based on comments received in response to this action. EPA will then use this feedstock production and transport information to evaluate facility-specific petitions, received pursuant to 40 CFR 80.1416, that propose to use cottonseed oil as a feedstock for the production of biofuel. In evaluating such petitions, EPA will consider the GHG emissions associated with the production and transport of cottonseed oil feedstock as described in this document, including the potential indirect impacts. In addition, EPA will determine – based on information in the petition and other relevant information, including the petitioner’s energy and mass balance data – the GHG emissions associated with petitioners’ biofuel production processes, as well as emissions associated with the transport and use of the finished biofuel. We will then combine our assessments into a full lifecycle GHG analysis and determine whether the fuel produced at an individual facility satisfies CAA renewable fuel GHG reduction requirements.

II. Analysis of GHG Emissions Associated with use of Cottonseed Oil as a Biofuel

Feedstock

EPA has evaluated the production and transport portion of the lifecycle GHG impacts of using cottonseed oil as a biofuel feedstock, based on information provided in the petition and other data gathered by EPA. Based on this evaluation, EPA believes that new agricultural sector modeling is not needed to evaluate this portion of the lifecycle GHG impacts of using cottonseed oil as a biofuel feedstock. As explained below, our analysis makes the conservative assumption that cottonseed oil diverted from the vegetable oil markets for food and industrial use to biofuel

production will be replaced with soybean oil rather than result in additional production of cottonseed oil or any other vegetable oil. Therefore, in this analysis, we are applying the same agricultural sector impacts for soybean oil to cottonseed oil on a per-pound-of-feedstock basis. Based on this analysis (described below), we propose to evaluate the agricultural sector GHG emissions impacts of using cottonseed oil in responding to petitions received pursuant to 40 CFR 80.1416 by assuming that GHG emissions are similar to those associated with the use of soybean oil for biofuel production. We invite comment on this proposed approach.

A. Feedstock Description, Production, and Distribution

1. Production of Cottonseed Oil-Based Biofuels

Cottonseed oil is the fourth most produced vegetable oil in the U.S., after soybean oil, corn oil, and canola oil respectively. It is the seventh most consumed vegetable oil in the U.S., behind soybean oil, canola oil, palm oil, corn oil, coconut oil, and olive oil respectively. It accounts for about 2.5-4 percent of U.S. production and about 1.5-2.5 percent of U.S. consumption of vegetable oil.² Internationally, cottonseed oil is the sixth most produced and consumed vegetable oil, representing about 3-3.5 percent of global production and consumption.³ Over the last decade, annual U.S. cottonseed oil production has averaged just under 800 million pounds.⁴ If this entire supply were used for biodiesel and/or renewable diesel production, which

² United States Department of Agriculture, “National Oil Crops Yearbook 2014”, available at: <http://www.ers.usda.gov/data-products/oil-crops-yearbook.aspx> (Last Accessed: January 14th, 2015). United Nations Food and Agriculture Organization, “FAOSTAT”, available at: <http://faostat.fao.org/> (Last Accessed: January 29th, 2015).

³ Ibid.

⁴ Ibid.

is highly unlikely for reasons discussed below, it would generate approximately 100 million gallons of fuel. Since U.S. biodiesel and renewable diesel production was approximately 1.5 billion gallons in 2014, the potential contribution of cottonseed oil is relatively small in comparison to the overall biodiesel and renewable diesel market.

Cottonseed oil is preferred for a number of specialty uses by certain producers, including the frying of potato chips and the preservation of smoked shellfish. According to industry experts in government and the private sector consulted by EPA, many producers strongly prefer cottonseed oil over its alternatives, believing that the type of oil used for these products has a very significant impact on the quality of the product itself. Market experts also noted to EPA that these producers have historically been willing to pay a significant premium to maintain their supply of cottonseed oil when supplies become limited.⁵

This behavior is supported by available historical data. Figure II.A.1-1 below illustrates one of multiple examples from recent history. In the 2012/13 crop year, cottonseed oil production was near the ten-year average.⁶ However, in the 2013/14 crop year, cottonseed oil production was down significantly, about 20 percent below the ten-year average.⁷ Conversely, these two crop years were both good for soybean oil, with production levels just above the ten-

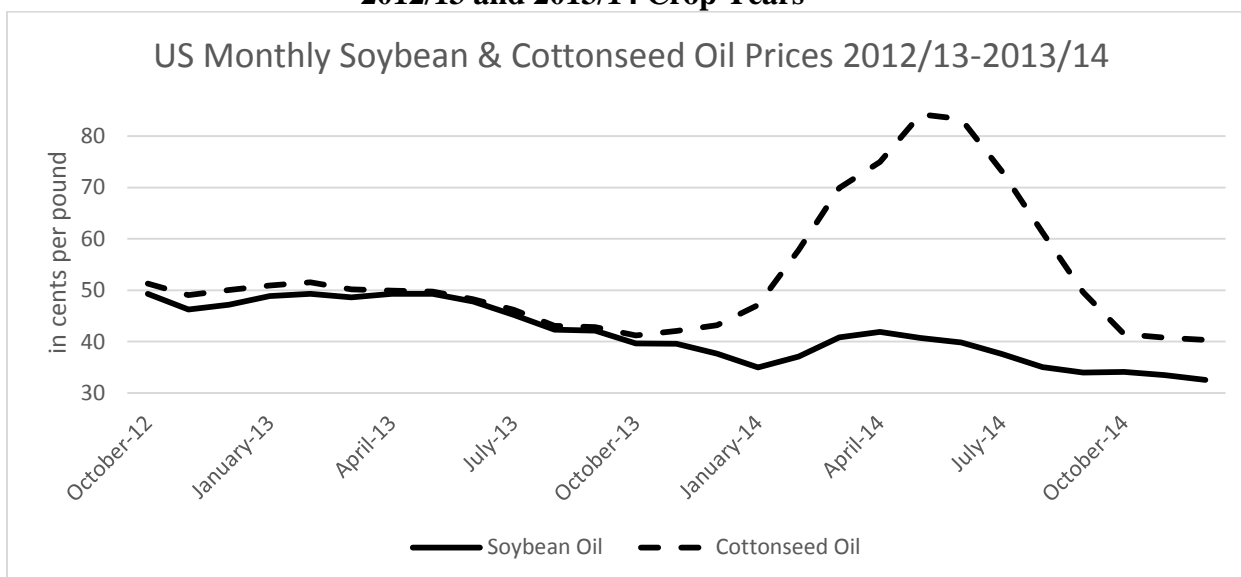
⁵ Based on conversations with Michael Dowd of the USDA Agricultural Research Service on December 30th, 2014 and June 17th, 2015.

⁶ In the USDA data considered here, crop years begin in October of the first year listed and end in September of the second year listed.

⁷ U.S. cottonseed oil production has averaged about 800 million pounds since the 2003/04 crop year. According to the USDA Oil Crops Yearbook 2014, production in 2012/13 was also about 800 million pounds and production in 2013/14 was approximately 630 million pounds.

year average.⁸ In 2012/13, when both oilseeds produced around their recent averages, the peak monthly price spread between soybean oil and cottonseed oil was about 3 cents per pound.⁹ However, in 2013/14 when cottonseed oil supply was heavily constrained, the monthly average price spread grew to as much as 43.5 cents per pound.¹⁰

Figure II.A.1-1 – Monthly Average Prices of Soybean Oil and Cottonseed Oil in the 2012/13 and 2013/14 Crop Years



Source: USDA Oil Crops Yearbook¹¹

As Figure II.A.1-1 illustrates, cottonseed oil can approach price parity with soybean oil at times of average or above-average supply of cottonseed oil. However, the price trend shown above for 2013 should not be taken as representative of the full historical record. Cottonseed oil does not often achieve actual price parity with soybean oil. According to historical monthly

⁸ U.S. soybean oil production has averaged about 19.5 billion pounds since the 2003/04 crop year. According to the USDA Oil Crops Yearbook 2014, production in 2012/13 was about 19.8 billion pounds and production in 2013/14 was approximately 19.7 billion pounds.

⁹ This occurred in December 2012, when, according to USDA data, soybean oil averaged 47.16 cents per pound and cottonseed oil averaged 49.05 cents per pound.

¹⁰ This occurred in May of 2014, when, according to USDA data, soybean oil averaged 40.68 cents per pound and cottonseed oil averaged 84.25 cents per pound.

¹¹ United States Department of Agriculture, “National Oil Crops Yearbook 2014”, available at: <http://www.ers.usda.gov/data-products/oil-crops-yearbook.aspx> (Last Accessed: January 14th, 2015).

price data from the U.S. Department of Agriculture (USDA), the national average monthly price for cottonseed oil was approximately equal to or below that of soybean oil in only 23 of the last 180 months (15 years).¹² Even in the middle months of 2013, when soybean oil and cottonseed oil prices appear to converge in Figure II.A.1-1, cottonseed oil actually maintained a small premium over soybean oil, though in a few months of 2013 this premium was less than a cent per pound. In only one month out of the last fifteen years, September 2004, was the monthly average price of cottonseed oil more than one cent per pound cheaper than that of soybean oil. For the majority of the recent historical record, cottonseed oil has maintained a significant price premium over soybean oil, averaging approximately 7 cents per pound over the last 15 years.

Based on information from USDA vegetable oil market experts, demand for cottonseed oil for specialty uses like those cited above is extremely inelastic, meaning that demand for this volume of cottonseed oil would not be significantly impacted by an increase in the price of cottonseed oil.¹³ It is therefore highly unlikely that biofuel producers could bid cottonseed oil away from such specialty uses. This inelasticity of demand dramatically shrinks the potential amount of cottonseed oil that might be utilized for biofuel production and the potential impact that approving a pathway for cottonseed oil might have on vegetable oil markets. The data suggest that, in most years, cottonseed oil would not be price competitive with soybean oil for biofuel feedstock use in most locations. This suggests that cottonseed oil is unlikely to be used for biofuel production except in years where cottonseed oil prices are significantly lower than

¹² USDA Agricultural Marketing Service, “Monthly Feedstuff Prices and Milling and Baking News”, multiple editions. In this example, by “approximately equal” we mean that there was less than a 1 cent difference between the prices of cottonseed oil and soybean oil.

¹³ Based on conversations with Michael Dowd of the USDA Agricultural Research Service on December 30th, 2014 and June 17th, 2015.

normal relative to soybean oil. Even then, as discussed below, cottonseed oil is likely to be used as a feedstock predominantly by biofuel production facilities located near cottonseed crushing facilities.

Conversely, the data also suggest that in some circumstances, cottonseed oil may achieve approximate price parity with soybean oil. This trend in pricing indicates cottonseed oil could compete on price with soybean oil as biofuel feedstock in times of abundant supply, or possibly in a year with low soybean oil production but normal cottonseed oil production, both of which might be expected to narrow the normal price gap. This trend also indicates that, when cottonseed oil prices are relatively low, the U.S. market values cottonseed oil at about the same price as soybean oil, rather than cheaper alternatives like palm oil or waste oils and greases or more expensive alternatives like sunflower seed oil. In other words, the historical pricing data available indicates that the primary competitor of cottonseed oil under these circumstances is soybean oil, since the prices converge, or at least nearly converge, under such circumstances.

Based on consultation with USDA and private sector vegetable oil industry experts and given the historical data presented above, we believe that the actual potential for biodiesel and non-ester renewable diesel production from cottonseed oil is considerably smaller than the 100 million gallons noted above.¹⁴ Based on a conversation with NCPA we believe that the actual potential is more likely in the range of 20 million gallons of biodiesel per year (representing roughly 150-160 million pounds of cottonseed oil), and could be considerably smaller than that

¹⁴ Based on conversations with Michael Dowd of the USDA Agricultural Research Service on December 30th, 2014 and June 17th, 2015; based also on memo from NCPA [EPA-HQ-OAR-2015-0092-0001; EPA-HQ-OAR-2015-0092-0002].

depending on market conditions.¹⁵ As noted above, this is largely due to the inelastic nature of cottonseed oil demand for specialty uses, which have demonstrated their willingness to pay prices for cottonseed oil that would be prohibitive to biofuel producers when forced to compete for limited supplies of cottonseed oil. Except in years with high levels of cottonseed oil production or uncharacteristically low demand from specialty users (for example, if potato chip production were to be unusually low in a particular year), we do not expect that there will be significant quantities of cottonseed oil available at prices that biodiesel producers would consider competitive. As a result, were EPA to approve pathways for cottonseed oil-based fuels and begin registering producers, we would not expect it to have a significant impact on U.S. biofuel production or U.S. vegetable oil production, consumption, and trade patterns.

2. Cottonseed Oil Production Economics

The methods of producing cottonseed oil are nearly identical to those of other vegetable seed oils. The seeds are crushed, oil and meal are separated, and the two products are sold separately into the vegetable oil and animal feed markets respectively. However, the production of the cotton oilseed is unique among major oilseeds because the seed itself is not a primary crop product. Rather, it is generally considered a byproduct of the production of cotton lint for fiber. Fiber production is the primary purpose of cotton farming, representing approximately 85 percent of the value of the average U.S. acre of cotton, and it drives the decisions of farmers

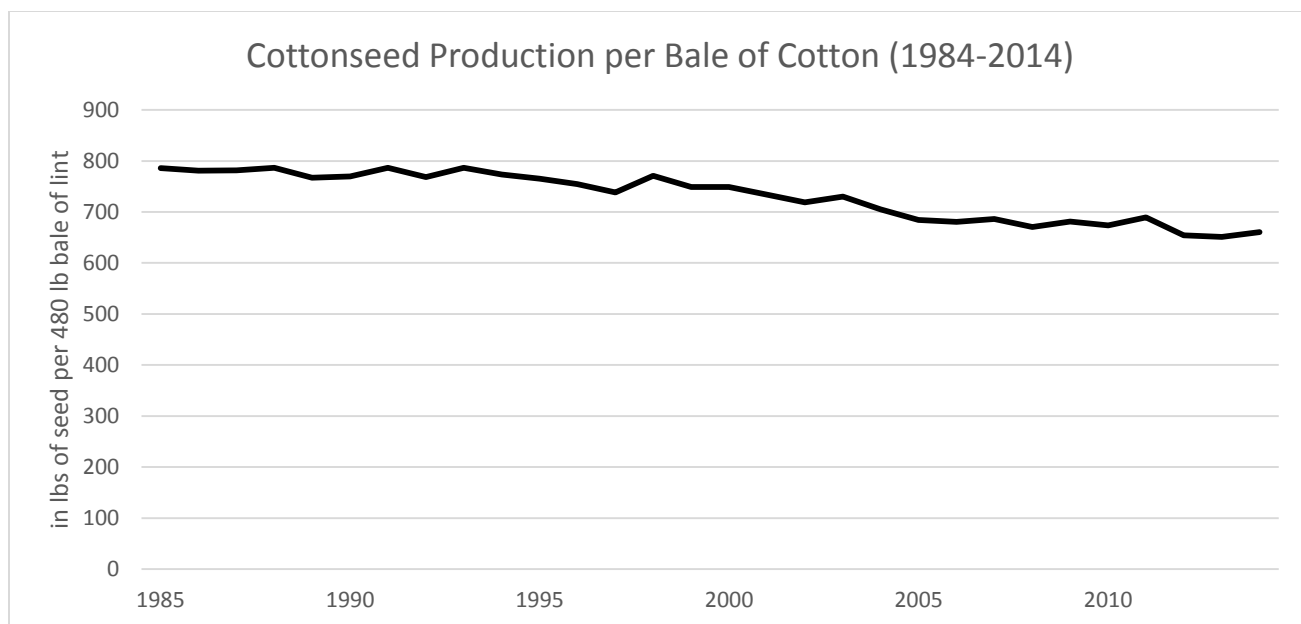
¹⁵ Based on memo from NCPA [EPA-HQ-OAR-2015-0092-0001; EPA-HQ-OAR-2015-0092-0002].

regarding whether to plant cotton and what types of farming practices to utilize.¹⁶ The cotton seed and its products represent the remaining approximately 15 percent of average value per acre. Conversely, for soybeans and other major oilseeds, the seed itself comprises nearly 100 percent of the value per acre.

While cottonseed does have value and provides farmers with a secondary revenue stream, most cotton farmers consider it to be a byproduct of producing cotton lint. The efforts of cotton breeders over a long time period to maximize lint yields relative to seed yields, demonstrated by yield trends in cottonseed and cotton lint, support this hypothesis. Since 1985, the U.S. average cottonseed yield per bale of cotton lint produced has declined from nearly 800 pounds per bale to less than 700 pounds per bale (See Figure II.A.2-1 below).

Figure II.A.2-1 – Historical Cottonseed Production per Bale of Cotton

¹⁶ According to the USDA NASS database, cotton lint has represented about 85 percent of revenue per acre fairly consistently since at least the year 1980. (Source: United States Department of Agriculture, “National Agricultural Statistical Service Database”, available at: <http://quickstats.nass.usda.gov/> [Last Accessed: January 14th, 2015]).

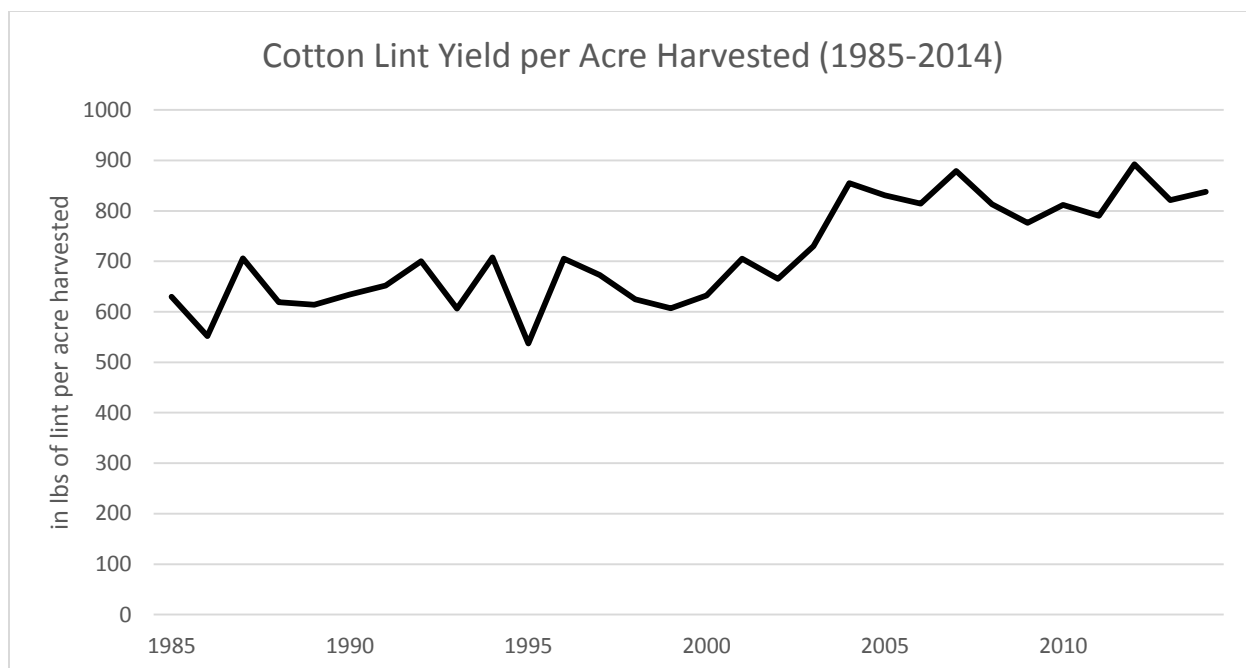


Source: USDA NASS Database¹⁷

Conversely, over that same period, the U.S. average cotton lint yield has increased from 630 pounds per acre harvested to over 800 pounds per acre harvested.

Figure II.A.2-2 – Historical Cotton Lint Yield per Acre

¹⁷ United States Department of Agriculture, "National Agricultural Statistical Service Database", available at: <http://quickstats.nass.usda.gov/> (Last Accessed: January 14th, 2015).



Source: USDA NASS Database¹⁸

The secondary nature of cottonseed production for cotton farmers has significant implications for our study of the impacts of cottonseed oil production for use in making biofuels. In a given year, weather conditions may reduce lint yields and force farmers to rely more on seed revenue. But when making decisions about what to plant, when to plant, and what types and quantities of crop inputs to utilize, lint yields are the first priority of cotton farmers. Further, the fact that cottonseed oil will only be competitive as a biofuel feedstock under certain relatively uncommon and unpredictable circumstances makes it even more unlikely that establishing pathways for cottonseed oil-based fuels under the RFS would have any impact on planting decisions. While farmers will seek to maximize the price they receive for cottonseed, it is highly

¹⁸ United States Department of Agriculture, “National Agricultural Statistical Service Database”, available at: <http://quickstats.nass.usda.gov/> (Last Accessed: June 2nd, 2015).

unlikely that an increase in cottonseed value would have any significant impact on the behavior of cotton farmers.

Because changes in cottonseed oil prices are unlikely to affect overall cotton production decisions, it is highly unlikely that the use of cottonseed oil as a biofuel feedstock will significantly affect cottonseed production or the supply of cottonseed oil in the U.S. vegetable oil markets. Imports of cottonseed oil are approximately zero. We do not expect demand for cottonseed oil as biofuel feedstock to change this, since the costs of creating and operating new trade routes would make cottonseed oil uncompetitive with alternative oil feedstocks, especially soybean oil. Instead, we expect that, in the rare instances when cottonseed oil prices approach parity with soybean oil prices, biofuel producers might utilize some quantity of cottonseed oil. Since, in most previous historical instances of this near price parity, cottonseed oil is still somewhat more expensive than soybean oil, we would expect to only see this behavior amongst biofuel producers with renewable fuel production facilities near cottonseed crushing locations, since this oil could be sourced with minimal transport costs. If some quantity of cottonseed oil is diverted from the vegetable oil markets to the biofuel market, any unfilled demand for vegetable oil will most likely be met with increased consumption of other vegetable oils, for the reasons outlined in the next section.

3. Replacement of Cottonseed Oil in Vegetable Oil Markets

As noted in Section II.A.1 above, cottonseed oil demand in the U.S. tends to be inelastic until the needs of specialty consumers are fully met, and the amount of cottonseed oil that could

be bid away from such users for biofuel production is likely small until that threshold is reached. Whether or not any of this remaining cottonseed oil will actually be used for biofuel production will depend on the price of cottonseed oil relative to soybean oil at that time.

In the event that cottonseed oil is used as a biofuel feedstock, the small volume likely to be available in any given region makes it highly unlikely that cottonseed oil could meet the total feedstock needs of a biofuel production facility. Rather, we expect that U.S. biofuel producers who are already utilizing vegetable oil feedstocks and are located near cottonseed crushing facilities will have the option to include some amount of cottonseed oil in their mix of feedstocks when the price is right.

There are two likely ways that biofuel producers may include some amount of cottonseed oil in their feedstock mix. First, biofuel producers may at times substitute cottonseed oil for some amount of soybean oil and produce the same volume of fuel as before. Second, they may at times use low-priced cottonseed oil to increase their total volume of fuel production. While the market response is likely to be some combination of both scenarios, for this analysis we have assumed the more conservative scenario from a lifecycle GHG perspective. This second scenario is more conservative because in the first scenario the displaced soybean oil could backfill in other vegetable oil markets for the cottonseed oil consumed for biofuel production and total vegetable oil production is unlikely to change. In the second scenario, where total biofuel production increases, cottonseed oil is being diverted away from some other use, creating a shortfall in vegetable oil supplies for some portion of the market. Either prices for vegetable oil will rise (in which case it is less likely that biofuel producers would still consume the cottonseed

oil, since they were only purchasing it because of the low price) or additional vegetable oil will need to be supplied. In either case, the GHG emissions will be greater in the second scenario, where there is an incentive to expand crop production. If the results of analyzing the conservative scenario associated with greater GHG emissions indicates that biofuels produced from cottonseed oil satisfy the 50 percent lifecycle GHG emissions reduction requirement for biomass-based diesel and advanced biofuels, we can conclude that the threshold determination would be the same under the less conservative but more likely scenario.

If the use of cottonseed oil for biofuel does create an increase in total demand for vegetable oil, we believe the direct result will be a corresponding increase in soybean oil consumption in the United States. As we established above, cotton farmers are unlikely to respond to increased demand for cottonseed oil. Instead, we are likely to see an increase in production of the vegetable oil most competitive with the cottonseed oil being diverted to biofuel feedstock use. Based on consultation with oilseed market experts at USDA and recent historical data (see Section II.A.1), which shows cottonseed oil prices tracking soybean oil prices, the marginal users of cottonseed oil are largely indifferent between cottonseed and soybean oil when they approach price parity.¹⁹ Therefore, it follows that if vegetable oil is needed to backfill for cottonseed oil used as biofuel, soybean oil would be the most likely vegetable oil to meet this demand in the United States.

To the extent that soybean oil is used to satisfy U.S. domestic demand for vegetable oil that would have otherwise been met with cottonseed oil, there would likely be secondary impacts

¹⁹ Based on conversations with Michael Dowd of the USDA Agricultural Research Service on December 30th, 2014 and June 17th, 2015.

on the production and consumption of other vegetable oils internationally and the agricultural sector more broadly. In the modeling we conducted for the March 2010 rule, we projected that the use of soybean oil for biofuel feedstock would cause a global increase in vegetable oil production. In that analysis, we projected that the majority of this increase would come in the form of additional soybean oil production, but that additional canola, palm, peanut, and sunflower oil production would also occur in some parts of the world, with secondary impacts on other parts of the agricultural sector.²⁰ Therefore, by assuming that cottonseed oil would have similar indirect impacts on other vegetable oils, our analysis takes into account the ripple effects in the vegetable oil and other agricultural markets resulting from an increase in biofuel demand in the U.S. We invite comment on this approach.

4. Upstream GHG Implications of Cottonseed Oil Use as a Biofuel Feedstock

Our analysis indicates that the most likely market impact of the use of cottonseed oil as biofuel feedstock is some feedstock swapping between cottonseed oil and soybean oil and some increase in total biofuel production from vegetable oil, as explained in the previous section. However, as a conservative assumption, we assume in our analysis that any use of cottonseed oil as biofuel feedstock will result in an increase in total biofuel production and that there would be a corresponding increase in U.S. demand for vegetable oil. In such a hypothetical situation, the alternative product used by marginal U.S. consumers of vegetable oil is likely to be soybean oil. We do not expect any shift in the supply of cotton or cottonseed oil. The GHG emissions associated with cottonseed oil at the feedstock production and transport stages of the lifecycle are

²⁰ See EPA-HQ-OAR-2005-0161-3173.9 and EPA-HQ-OAR-2005-0161-3173.10 for more information.

likely to be similar to or less than those we have previously estimated for soybean oil on a normalized basis.²¹ Therefore, we are proposing to use the upstream GHG emissions associated with an increase in soybean oil in our lifecycle analysis for cottonseed oil. In the March 2010 rule, we determined that the GHG emissions associated with soybean oil at the feedstock production and transport stages of the lifecycle were approximately 646 grams of carbon dioxide equivalent (gCO₂e) per pound of soybean oil.²² Based on our evaluation, we believe that it is reasonable, as a conservative estimate, to apply the same value for the emissions associated with cottonseed oil at the feedstock production and transport stages of the lifecycle. We invite comment on this approach.

²¹ EPA's lifecycle analysis of soybean oil biodiesel for the March 2010 RFS rule evaluated the GHG impacts for a scenario with increased soybean oil biodiesel production compared to a control case. To calculate the results on a normalized basis for the scenario evaluated, we divide the increase in GHG emissions by the increase in the amount of soybean oil used for biodiesel production, which gives the normalized results in units of gCO₂e per pound of soybean oil. The lifecycle GHG analysis that EPA conducted for the March 2010 RFS rule for biofuel derived from soybean oil feedstock is described in section 2.6.1.3 (Biodiesel Results) of the Regulatory Impact Analysis for the March 2010 RFS rule (EPA-420-R-10-006).

²² EPA's soybean oil biodiesel assessment uses a biodiesel conversion efficiency of 7.76 pounds of soybean oil per gallon of biodiesel, and biodiesel lower heating value of 118,000 British Thermal Units (Btu) per gallon. Therefore, GHG emissions of 646 gCO₂e/lb soybean oil converts to 41,247 gCO₂e per million Btu of soybean oil biodiesel. This value includes the emissions associated with soybean oil delivered to a biodiesel production facility, including the emissions from growing and harvesting the soybeans, transporting the soybeans to a crushing facility, extracting the soybean oil, transporting the soybean oil to a biodiesel facility, and all of the significant indirect emissions such as from land use change.

B. Summary of Agricultural Sector GHG Emissions

Based on our comparison of cottonseed oil to soybean oil, EPA proposes to apply the estimate of upstream soybean oil feedstock production and transport emissions, including indirect agricultural and forestry sector impacts, to future evaluations of petitions proposing to use cottonseed oil as a feedstock for biofuel production. We believe this approach will provide a conservative estimate of potential emissions associated with the production and transport of cottonseed oil. EPA solicits comment on this proposed approach.

C. Fuel Production and Distribution

Cottonseed oil has physical properties that are similar to soybean oil, and is suitable for the same conversion processes as soybean oil feedstock. In addition, the fuel yield per pound of oil is expected to be the same for each of these feedstocks. After reviewing comments received in response to this action, we will combine our evaluation of agricultural sector GHG emissions associated with the use of cottonseed oil feedstock with our evaluation of the GHG emissions associated with individual producers' production processes and finished fuels to determine whether any proposed pathway satisfies CAA lifecycle GHG emissions reduction requirements for RFS-qualifying renewable fuels. Each biofuel producer seeking to generate RINs for non-grandfathered volumes of biofuel produced from cottonseed oil will first need to submit a petition requesting EPA's evaluation of their new renewable fuel pathway pursuant to 40 CFR 80.1416 of the RFS regulations, and include all of the information specified at 40 CFR 80.1416(b)(1). Because EPA is evaluating the greenhouse gas emissions associated with the

production and transport of cottonseed oil feedstock through this action and comment process, petitions requesting EPA's evaluation of biofuel pathways involving cottonseed oil feedstock will not have to include the information for new feedstocks specified at 40 CFR 80.1416(b)(2).²³ Based on our evaluation of the lifecycle GHG emissions attributable to the production and transport of cottonseed oil feedstock, EPA anticipates that fuel produced from cottonseed oil feedstock through the same transesterification or hydrotreating process technologies that EPA evaluated for the March 2010 RFS rule for biofuel derived from soybean oil and the March 2013 RFS rule for biofuel derived from camelina oil would qualify for biomass-based diesel (D-code 4) renewable identification numbers (RINs) or advanced biofuel (D-code 5) RINs.²⁴ However, EPA will evaluate petitions for fuel produced from cottonseed oil feedstock on a case-by-case basis.

²³ For information on how to submit a petition for biofuel produced from cottonseed oil see EPA's web page titled "How to Submit a Complete Petition" (<http://www.epa.gov/otaq/fuels/renewablefuels/new-pathways/how-to-submit.htm>) including the document on that web page titled "How to Prepare a Complete Petition." Petitions for biofuel produced from cottonseed oil should include all of the applicable information outlined in Section 3 of the "How to Prepare a Complete Petition" document, but they do not need to provide the information outlined in section 3(F)(2) (Information for New Feedstocks).

²⁴ The transesterification process that EPA evaluated for the March 2010 RFS rule for biofuel derived from soybean oil feedstock is described in section 2.4.7.3 (Biodiesel) of the Regulatory Impact Analysis for the March 2010 RFS rule (EPA-420-R-10-006). The hydrotreating process that EPA evaluated for the March 2013 rule for biofuel derived from camelina oil feedstock is described in section II.A.3.b of the March 2013 rule (78 FR 14190).

III. Summary

EPA invites public comment on our analysis of GHG emissions associated with the production and transport of cottonseed oil as a feedstock for biofuel production. EPA will consider public comments received when evaluating the lifecycle GHG emissions of biofuel production pathways described in petitions received pursuant to 40 CFR 80.1416 which use cottonseed oil as a feedstock.

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