



# A Natural Pelleting Lubricant & BTU Booster from Spent Coffee Grounds

## Background

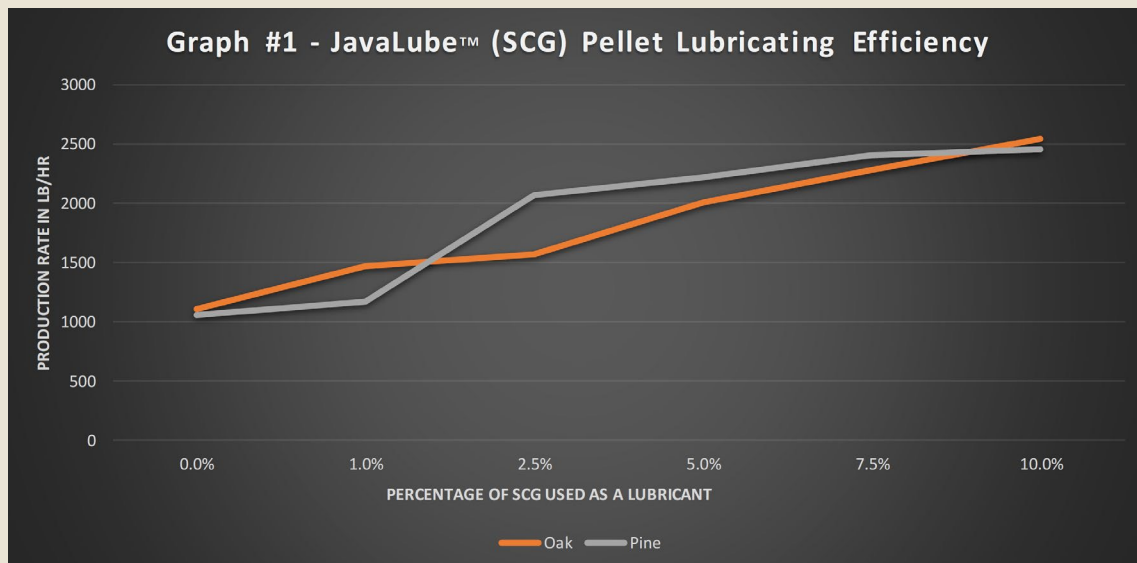
Spent coffee grounds (SCG) are a byproduct of the brewing process that delivers that delicious cup of coffee. SCG are one of earth's largest single source of waste organic residuals. Until recently, this abundant and valuable resource was typically disposed of in landfills across the United States. The Grounds are a unique organic material because of their high heating value and natural oil content. SCG not only have effective lubricant properties in pelleting, but they boost the BTU in the overall pellet. Using innovative technology, Sustainable Resources Group is now leading the challenge of upcycling organic residuals. Our coffee grounds are sourced directly from internationally recognized manufacturers of soluble coffee and are byproducts of the production of instant coffee.

*100% Sustainable and Renewable Source Material – Spent Coffee Ground*

## Increase Capacity & Save Money on Your Operation

Unique natural lubricating oils present in the residual coffee grounds

- Increases the hardwood pelleting rate from 30% to 130%
- Increases the softwood pelleting rate from 10% to 110%

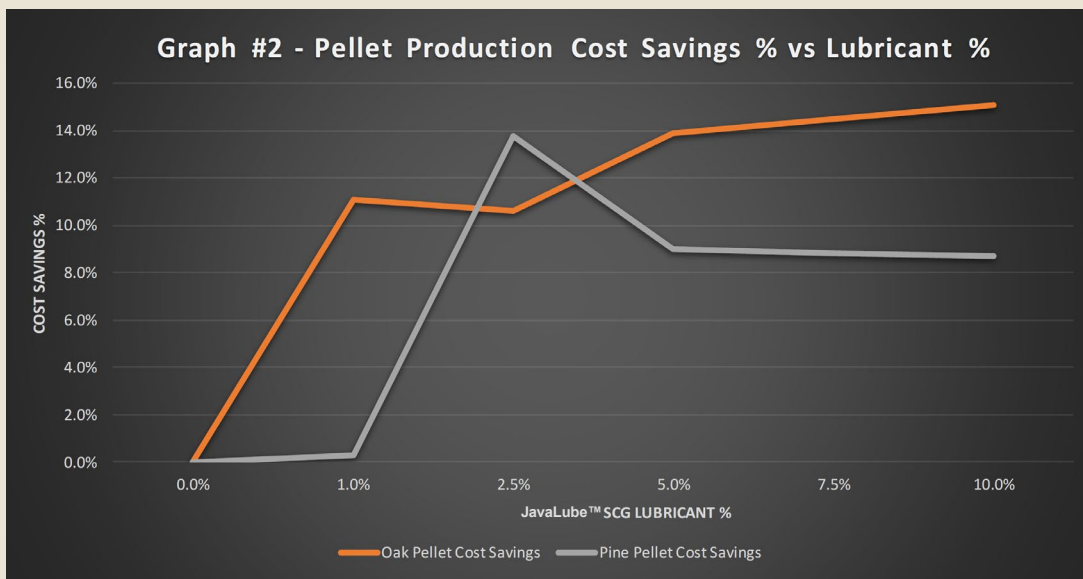


Note: Based on controlled tests using identical conditions varying only the JavaLube™ percentage of the mix. Table 1 provides the test parameters.

TABLE1 JavaLube™ (SCG) Lubricating Test Data						Production Rate Improvement			
Test Variables						Production Rate (lbs. per hour)		Pellet Bulk Density (lbs/ft <sup>3</sup> )	Production Rate
Test	Lubricant	Wood	Lube %	Pellet °F	Amps	w/ Fines	No Fines	(lbs/ft <sup>3</sup> )	% Increase
<b>Oak @ 12% Input Moisture</b>									
Test #1	NONE	Oak	0.0%	250	222-255	1,380	1,110	42.00	0%
Test #2	Vegetable Oil	Oak	1.0%	181	229-250	2,640	1,545	39.75	39%
Test #3	JavaLube™	Oak	1.0%	201	226-249	2,055	1,470	43.50	32%
Test #4	JavaLube™	Oak	2.5%	205	225-245	2,310	1,575	44.25	42%
Test #5	JavaLube™	Oak	5.0%	182	237-259	2,655	2,010	44.25	81%
Test #6	JavaLube™	Oak	10.0%	168	232-248	3,060	2,550	42.00	130%
<b>Pine @ 15% Input Moisture</b>									
Test #7	NONE	Pine	0.0%	221	168-193	1,200	1,065	44.25	0%
Test #8	Vegetable Oil	Pine	1.0%	185	167-193	1,350	1,095	44.25	3%
Test #9	JavaLube™	Pine	1.0%	208	164-192	1,500	1,170	44.25	10%
Test #10	JavaLube™	Pine	2.5%	151	168-193	2,130	2,070	43.50	94%
Test #11	JavaLube™	Pine	5.0%	200	167-191	2,370	2,220	43.50	108%
Test #12	JavaLube™	Pine	10.0%	139	167-192	2,580	2,460	43.50	131%
<b>Test Parameters</b>									
Hardwood - Oak					Softwood - Pine				
Moisture Content of Oak - 11%					Moisture Content of Pine - 15%				
Die Used: 8:1; 0.25" diameter					Die Used: 10:1; 0.25" diameter				
Hammer Mill - CME HMA 200					Hammer Mill - CME HMA 200				
Pellet Mill - CME R150 200HP					Pellet Mill - CME R150 200HP				
Moisture Input - 1% bringing to 12%					Moisture Input - 0% bringing to 15%				
Moisture of Finished Pellets < 10%					Moisture of Finished Pellets < 10%				
Ambient Temperature - 51-54 °F					Ambient Temperature - 51-54 °F				
Blending - Ribbon blender with 2-minute mix time					Blending - Ribbon blender with 2-minute mix time				
Batch Size - 500 lbs.					Batch Size - 500 lbs.				

Output per pellet mill increases proportionately reducing capital equipment costs and maintenance per ton of pellets produced

- Hardwood pellet production costs are reduced from 11% to 15% overall
- Softwood pellet production costs are reduced from 2% to 10% overall



Note: Graph is derived from data presented in Table 1 and Table 2

TABLE 2 Cost Savings Analysis Example with 5% JavaLube™ (SCG) in Oak Pelleting								
Pellet Mill Operating Costs				Cost As Is	Productivity Increase		Savings	
81% Productivity Increase				\$150	Ton Cost	\$126.92	Ton Cost	(\$/ton)
Raw Material	50%			\$75.00		\$75.00		-
Drying	8%			\$12.00		\$12.00		-
Grinding	4%			\$6.00		\$6.00		-
Energy	6%	Variable -----→	36% of Total Costs -----→	\$9.00	Costs Reduced -----→	\$5.36	Savings -----→	\$3.65
Labor	6%			\$9.00		\$5.36		\$3.65
R&M	3%			\$4.50		\$2.68		\$1.82
OP. Maintenance	3%			\$4.50		\$2.68		\$1.82
Other	2%			\$3.00		\$1.79		\$1.22
Cap. Equip.	18%			\$27.00		\$16.07		\$10.94
Total Cost of Sales				\$150.00		\$126.92		\$23.09
Operating Profit Gain				\$150.00		\$126.92		\$23.09
Cost Benefit of JavaLube™				Cost Savings				
5.00% JavaLube™ (SCG)				Incremental Savings		% Increase	Comments	
JavaLube™ (SCG) Cost	\$280/ton	@ 5%		\$ (14.00)/ton		(9.3)%	Price FOB Freehold	
Transportation Cost	\$40/ton	@ 5%		\$ (2.00)/ton		(1.3)%	Varies By Distance	
Total JavaLube™ Cost	\$320/ton			\$ (16.00)/ton		(10.7)%		
Wood	\$93/ton			\$ - /ton		-	Includes Drying/Grinding	
Current Lubricant	\$1,000/ton	1%		\$ 10.00/ton		6.7%	Vegetable Oil	
Savings w/ JavaLube™	5.00%	5%		\$ 23.09/ton		15.4%	See Above	
Net Operating Cost Savings				\$ 17.09/ton		11.4%	Total Cost Savings	
BTU Boost/Dry Ton				BTU/lb. Makeup		% Increase		
JavaLube™ (SCG)	11,500 BTU/lb.	5.0%		575 BTU/lb.			Dry basis BTU/lb.	
Wood	8,000 BTU/lb.	95.0%		7,600 BTU/lb.			Dry basis BTU/lb.	
Total BTU		100.0%		8,175 BTU/lb.		2.2%	BTU% Increase	
Added Value of BTU Content @ \$175/ton				\$3.83/ton		2.2%		BTU Boost Value
Operating Cost Benefit of JavaLube™ (SCG)				\$17.09/ton		11.4%		Net Operating Savings
Total Value Added Per Ton (Savings plus BTU)				\$20.91/ton		13.9%		

## A Niche Product to Differentiate Yourself in the Grilling Market

With the grilling industry booming, wood pellet manufacturers are flooding the market to each get a piece of the pie. The biggest challenge manufacturers are facing is DIFFERENTIATION. Some groups are looking to private label for pellet grill manufacturers while others are looking to create their own brand with fruitwood blends. Introducing JavaLube™, a true way to differentiate yourself in the market. JavaLube™ is derived from the coffee bean and is one of the largest wastes in the world. Sustainable Resources Group sources this waste and processes it into usable material for most wood pelleting equipment. In addition, we offer formulation services to develop the perfect boosted wood pellet for your customers.

## BTU Boosting

IT'S NOT A HARD DECISION to incorporate JavaLube™ into your grilling pellets as coffee grounds beat all woods in heat value and ash content. More importantly, you can adjust the premium based on the amount of coffee grounds utilized!

JavaLube™ has 35% more heating value and 60% less ash compared to hardwood pellets. That means more burn and less clean-up!

The table below illustrates the BTU increase from utilizing the JavaLube™ at different blend percentages of wood. With the wood at 8,100 BTU/lb. and 0.6% ash and the JavaLube™ at 11,170 BTU/lb. and < 0.2% ash.

<u>Blend Calculator</u>											
Wood (%)	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%
JavaLube™ (%)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Heat Value (BTU/lb.)	8,100	8,407	8,714	9,021	9,328	9,635	9,942	10,249	10,556	10,863	11,170
BTU Increase (%)	0.00%	3.79%	7.58%	11.37%	15.16%	18.95%	22.74%	26.53%	30.32%	34.11%	37.90%
Ash Content (%)	0.60%	0.56%	0.52%	0.48%	0.44%	0.40%	0.36%	0.32%	0.28%	0.24%	0.20%
Ash Decrease (%)	0.00%	6.67%	13.33%	20.00%	26.67%	33.33%	40.00%	46.67%	53.33%	60.00%	66.67%

## Implementation

It is simple to implement JavaLube™ into a preexisting facility. All that is needed is an additive induction system with a micro feeder to feed the material and a conditioner or mixer to blend the material. Once an implementation system is installed, the material metering can be tied into the overall controls, or a separate control panel can be installed to adjust the pellet composition.



Figure 1: Permanent Additive Induction System



Figure 2: Portable Additive Induction System