

BISH



BISH
ENTERPRISES

Hemp Production From
Start to Finish
Proven Practices & Theory

Andrew Bish

Bish Enterprises / Hemp Harvest Works

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**Hemp Harvest
Works**

Who We Are



- Bish Enterprises has been providing innovative products for 40 years, serving farmers and dealers
- The current owner and CEO, Brad Bish, and his wife, Christy Bish, jointly purchased Harv's Farm Supply from Brads father (Harv) in 1997
- We are famous worldwide for our Header Adapters
- Additional products we're known for are the "Bish" branded harvest accessories



- Hemp Harvest Works is a design, engineering, research, and sales firm to help solve the mechanical needs of hemp producers
- We sell and distribute harvesting machinery designed to reduce the overall cost of production.
- We work to connect growers with custom harvesters and provide consulting services for growers and harvesters



Andrew Bish

- Andrew Bish is the COO of Bish Enterprises and the founder of Hemp Harvest Works.
- Exiting the retail management industry after 14 years, he rejoined the family business in 2012 and transitioned into the agriculture industry.
- Since 2015, he has been focusing on identifying and resolving the many issues currently facing hemp harvesting and processing.
- His goal is to provide equipment that helps standardize hemp farming practices while allowing growers to increase their scale of operation and decrease costs.





Hemp Harvesting in Early 1900's





Innovations of the Past

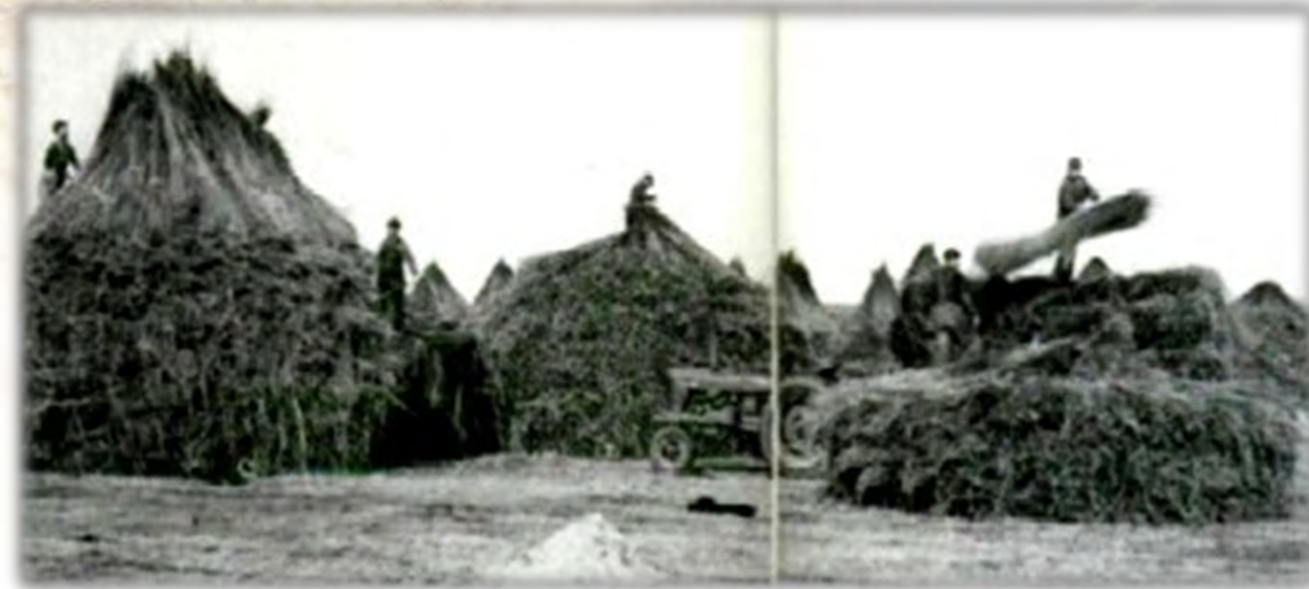


International Harvester hemp cutter in the teens



McCormick Farmall H Tractor and Hemp Binder

Innovations of the Past



Stockpiles of bundled hemp stalks



Hemp-turning machine





Hemp Harvest Plan Ahead

- **Begin now for 2020 Harvest.**
- **Do you have a sale for your crop?**
 - Grain
 - Oil
 - Fiber
 - Smokable
- **What condition does the customer want the crop?**
 - No stem
 - No seed
 - Size particle
 - When would they receive the material?



Multiple Commodity Types





Commodity Pricing

	Licesnsed Acres for 2019:	Licensed Indoor Sq. Footage	Licensed Growers	2018 - Year End	2018 - Year End	2018 - Year End	2018 - Year End	2018 - Year End	2018 - Year End
				Price/lb	Price/lb	Price/lb	Price/lb	Price/lb	Price/lb
<u>State</u>				<u>Flower (Biomass)</u>	<u>Flower Only</u>	<u>Seed Only</u>	<u>Grain</u>	<u>Food-Grade Grain</u>	<u>Fiber</u>
Colorado	80,000	9 Million	2,300	\$25-\$60	\$200-\$500	Unknown	\$ 0.90	Unknown	\$ 0.10
Kentucky	5,800	6 Million	1,047	\$25-\$40	\$200-\$400	Unknown	\$ 0.75	Unknown	Unknown
Minnesota	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	\$ 0.50	Unknown	Unknown
Montana	40,000	Unknown	250	\$40-\$60	\$200-\$400	Unknown	Unknown	Unknown	Unknown
Nebraska	Unknown	Unknown	10	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Nevada	9,145	1.27 Million	154	\$40-\$60	\$200-\$400	Unknown	Unknown	\$ 10.00	\$ 0.10
New York	5,000	N/A	278	\$40-\$75	\$200-\$500	Unknown	\$ 0.50	\$ 2.25	Unknown
North Carolina	11,572	4,540,925	933	\$40-\$120	\$250-\$700	Unknown	\$ 0.10	\$ 1.00	\$ 0.10
North Dakota	2,175	Unknown	38	N/A	N/A	Unknown	.45-.60	Unknown	Unknown
Oregon	51,313	7,741,934	1,449	\$35-\$100	\$275-\$800	Unknown	\$ 0.50	Unknown	Unknown
Tennessee	37,416	2,643	2,900	\$40-\$80	\$300-\$1,100	Unknown	\$ 1.00	Unknown	\$ 0.19
Texas	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Vermont	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	\$ 1.20	\$ 0.10
Wisconsin	16,100	Unknown	1,240	\$37-\$80	\$150-\$500	Unknown	Unknown	Unknown	Unknown
Wisconsin	16,100	Unknown	1,240	\$37-\$80	\$150-\$500	Unknown	Unknown	Unknown	Unknown



Crop Budgets – UNL Extension

Region 70-Sugarbeet Detail Yield 1500 lb Water Source 1500 lb
 Tillage System Cropping System Follows Legume?
 Crop Insurance 35 0

Hemp - Grain & Fiber, 1500 lb Yield

2020 Budget Hemp - Grain & Fiber, 1500 lb Yield

Field Operations	Times or Qty	Unit	Labor @ \$25.00/Hr	Fuel @ \$2.27 and Labor	Repairs		Ownership ^a		Total	Your Estimate
					Power	Imp.	Power	Imp.		
1 Hemp Harvesting Implement - Forage	1		6.82	4.98	11.45	2.49	108.34	21.78	155.86	
2 Disk	1		2.52	1.98	0.60	1.36	5.40	1.22	13.08	
3 Field Cultivation	1		1.83	1.43	0.63	1.43	1.97	1.62	8.91	
4 Drill	1		2.20	1.64	0.76	3.29	2.37	2.63	12.29	
5 Anhydrous Application	1		2.29	1.38	0.79	0.58	2.47	3.63	11.14	
6 Bale Large Round	1		2.29	0.63	0.79	0.89	2.47	1.19	8.26	
7 Turn Windrows	1		2.08	0.46	0.79	0.17	2.47	0.46	6.43	
8 Move Large Round	1		1.31	0.50	0.45	0.00	1.41	0.06	3.73	
Total for Field Operations			21.34	12.40	16.26	10.21	126.90	32.59	219.70	

		Operation	Percent	Application		Applied		Your
Materials & Services		Index	Acres	Rate	Unit	Price	Total	Estimate
Hemp Seed	Seed	1	100%	40 pound		4.50	180.00	
UAN	Additive	1	100%	800 pint		0.19	150.00	
	Crop Insurance					35.00	35.00	
Total Materials & Services							365.00	

Total listed costs for Field Operations and Materials and Services	584.70
Interest on Operations Capital \$ 425.21 cash expense @ 5.50% for 6.0 mo.	11.69
Total Operating and Use Related Ownership Costs	596.39

Overhead (accounting, liability insurance, vehicle cost, office expense)	20.00
Real Estate Opportunity ^a	0.00
Real Estate Taxes	0.00
Total Cost per Acre Including Overhead	616.39

Cash Cost per lb	0.30
Cost of production per lb	0.41

			Unit	Your Estimate
Revenue	Yield per acre	Unit	Price	Total
Hemp Grain	1500 lb		1.1 pound	1650
Hemp Fiber	1.24 tons		0.1 pound	248
Total Revenue				1898
Profit per acre				1281.61

Region 70-Sugarbeet Detail Yield 5 ton Water Source 5 ton
 Tillage System Cropping System Follows Legume?
 Crop Insurance 35 0

Hemp - Fiber, 5 ton Yield

2020 Budget Hemp - Fiber, 5 ton Yield

Field Operations	Times or Qty	Unit	Labor @ \$25.00/Hr	Fuel @ \$2.27 and Labor	Repairs		Ownership ^a		Total	Your Estimate
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Real Estate Opportunity ^a	0.00
Real Estate Taxes	0.00
Total Cost per Acre Including Overhead	616.39

Cash Cost per ton	91.38
Cost of production per ton	123.28

Revenue	Yield per acre	Unit	Price	Unit	Total	Your Estimate
Hemp Fiber	5	ton	0.10	Pound	1000	
Total Revenue					1000	
Profit per acre					383.61	
Profit per ton					76.72	

Biomass Spot Pricing - August 2019

Source: PanXchange

Region	Midpoint	Low	High
Colorado (per % CBD Content/lb.)	\$ 3.48	\$ 2.91	\$ 4.05
Kentucky (per % CBD Content/lb.)	\$ 3.62	\$ 2.73	\$ 4.50
Oregon (per % CBD Content/lb.)	\$ 3.34	\$ 2.85	\$ 3.82

Refined Product Pricing - August 2019

Product	Midpoint	Low	High
Colorado Winterized Crude (per kg.)	\$ 1,625	\$ 1,250	\$ 2,000
Colorado Full Spectrum Distillate (per kg.)	\$ 4,050	\$ 3,100	\$ 5,000
Colorado Isolate (per kg.)	\$ 3,650	\$ 2,800	\$ 4,500

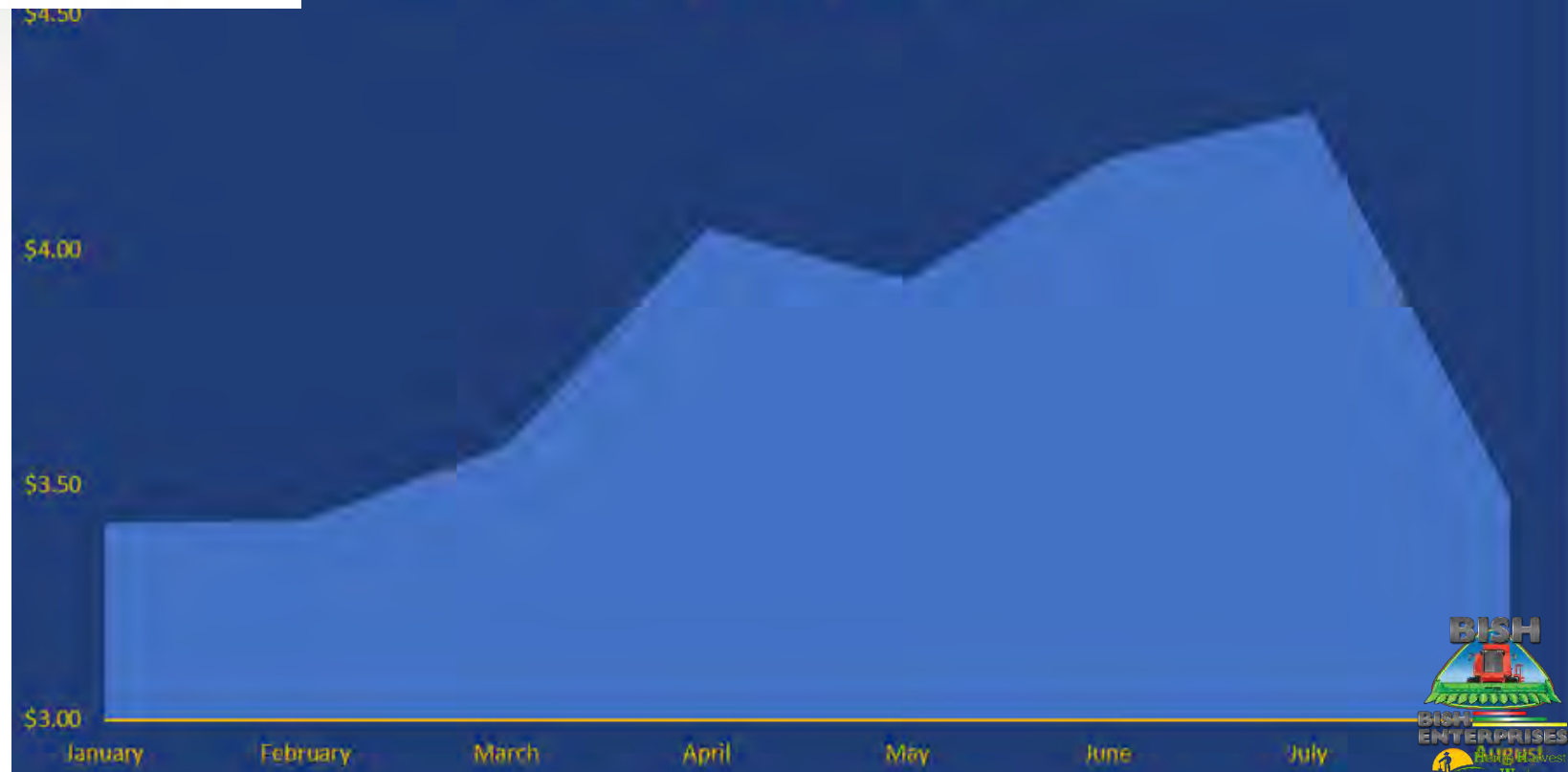
Source: PanXchange, Inc. Spot Prices

Spot Market Updates:

The spot biomass market throughout August has been transacting in the range of \$2.73 to \$4.50 per percentage point of CBD content (/point) as supply from the 2018 crop year is sporadic and early season crops are being harvested. The trend of biomass selling near the lower end of the range has continued from July, as those who are holding product from the 2018 have incentive to sell before large quantities of product enter the market from the 2019 crop year. Instances of this trend have increased in the last few days, depicting the eagerness to move product and exit positions.

August 2019 Hemp Report

Midpoint Biomass Spot Price (per % CBD Content/lb)
PanXchange Average Price Index



Biomass Spot Pricing - November 2019

Source: PanXchange

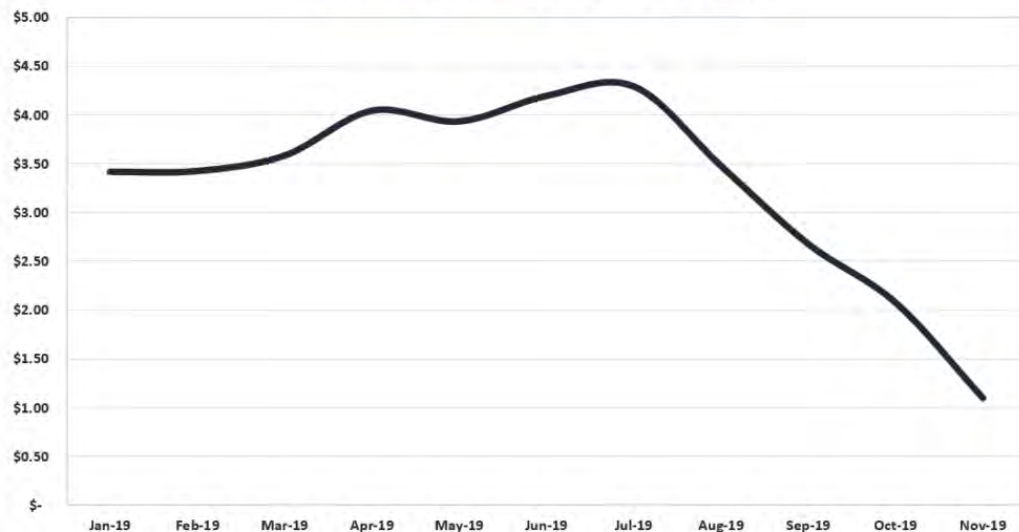
Region	Midpoint ▲	Low	High
Colorado (per % CBD Content/lb.)	\$ 1.14 -47%	\$ 0.93	\$ 1.35
Kentucky (per % CBD Content/lb.)	\$ 1.03 -53%	\$ 0.80	\$ 1.25
Oregon (per % CBD Content/lb.)	\$ 1.13 -45%	\$ 0.85	\$ 1.40

Refined Product Pricing - November 2019

Product	Midpoint ▲	Low	High
Colorado Winterized Crude (per kg.)	\$ 1,025 -16%	\$ 750	\$ 1,300
Colorado Full Spectrum Distillate (per kg.)	\$ 2,600 -15%	\$2,000	\$3,200
Colorado Broad Spectrum Distillate (per kg.)	\$ 4,450	\$3,900	\$5,000
Colorado Isolate (per kg.)	\$ 2,400 -20%	\$1,800	\$3,000

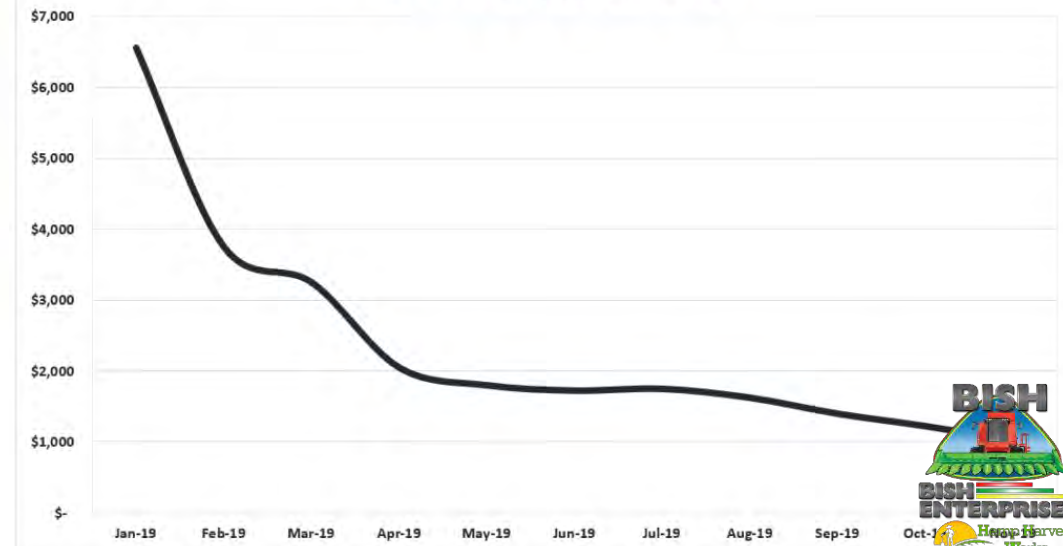
Source: PanXchange, Inc.

Midpoint Biomass Spot Price (per % CBD Content/lb)
PanXchange Average Price Index (CO,KY,OR)



November 2019 Hemp Report

Colorado Winterized Crude Midpoint (\$/kg)
PanXchange Average Price Index





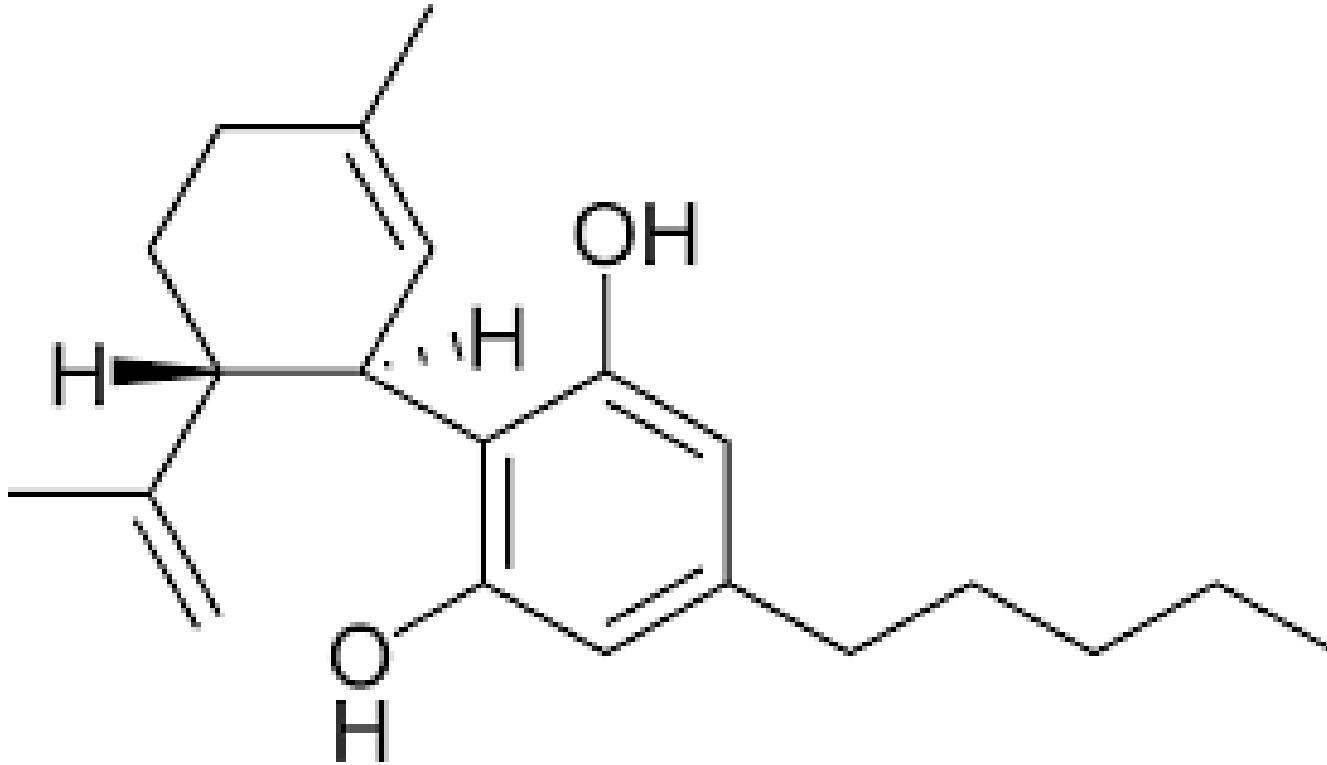
Where is YOUR Marketplace





What is CBD?

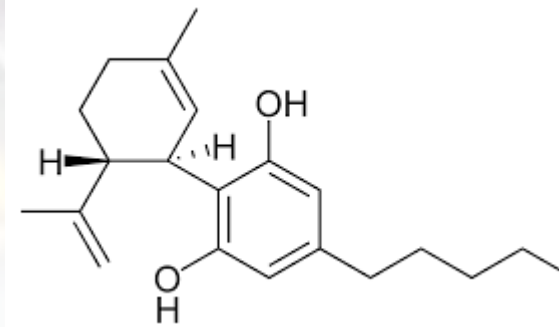
What is CBD?



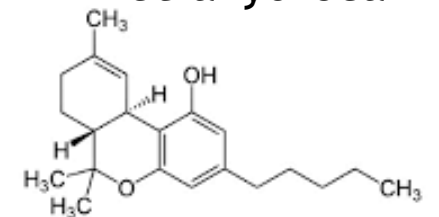
- Answer: Cannabidiol – one of many cannabinoids

What is a Cannabinoid?

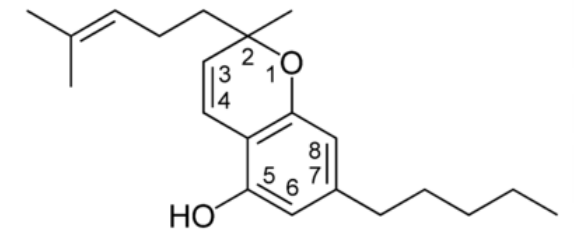
Cannabidiol



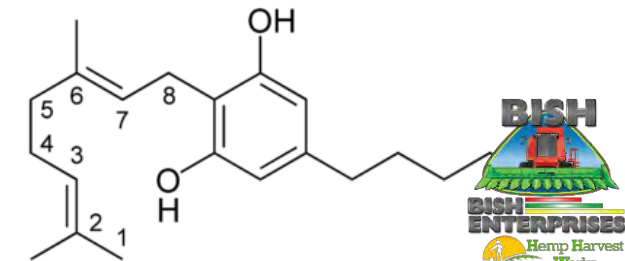
Tetrahydrocannabinol



Cannabichromene



Cannabigerol



Cannabinoids are the chemical compounds found in cannabis flowers that cause reaction in the human body when consumed.

These reactions have been reported to help with several medical conditions.

CBC RELIEVES: ✓ Anxiety ✓ Stress ✓ Inflammation	CBN RELIEVES: ✓ Anxiety ✓ Stress ✓ Inflammation	Myrcene RELIEVES: ✓ Anxiety ✓ Stress ✓ Inflammation	Pinene RELIEVES: ✓ Anxiety ✓ Stress ✓ Inflammation
Linalool RELIEVES: ✓ Insomnia ✓ Pain + Anxiety ✓ Psychosis	CBD RELIEVES: ✓ Anxiety ✓ Stress ✓ Inflammation	Caryophyllene RELIEVES: ✓ Anxiety ✓ Stress ✓ Inflammation	CBD-A RELIEVES: ✓ Anxiety ✓ Stress ✓ Inflammation
Humulene RELIEVES: ✓ Inflammation ✓ Hunger pains ✓ Tumor growth	Limonen RELIEVES: ✓ Anxiety ✓ Stress ✓ Inflammation	THC RELIEVES: ✓ Anxiety ✓ Stress ✓ Inflammation	THC-A RELIEVES: ✓ Anxiety ✓ Stress ✓ Inflammation

Where do we find Cannabinoids?



HOW CANNABINOIDS WORK



ENDOCANNABINOIDS

(By products of the brain)
Food products containing: Omega-3s and Omega 6s
Anandamide (AEA)



PHYTOCANNABINOIDS

(Plant by products)
Leaves, buds, tinctures, extracts...
THC, CBD, CBN, etc.



SYNTHETIC CANNABINOIDS

(Pharmaceutical laboratories)
Patented Synthesized THC
Compound (Marinol)

ENDOCANNABINOIDS RECEPTOR (Receptors in the brain)

CB1, CB2, etc.

The Endocannabinoid System (ECS) is involved in regulating a variety of processes including appetite, pain, pleasure, the immune system, mood and memory.



Your brain



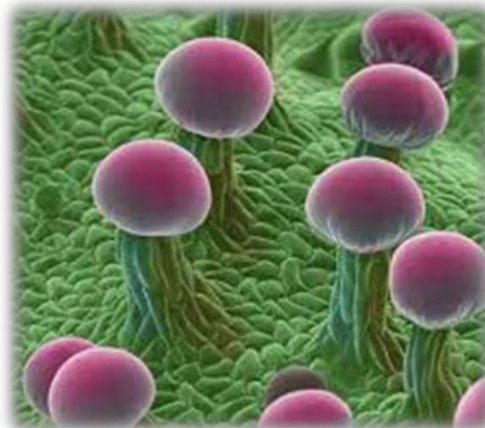
Cocoa

Echinacea

Where to find Cannabinoids

Phytocannabinoids & Trichomes

- **Trichomes** are “plant hairs” and exist on many types of plant species
- Cannabis trichomes exist at high levels on the female flowers
- Trichomes are filled with high concentrations of cannabinoids and terpenes
- Trichomes are physically delicate
- Can degrade by
 - Physical contact
 - Heat
 - Light
 - Oxygen
 - Time



Precision Film Planter



Cultivation

Forage Harvester Swathing



Transplanter



Direct Drill





C&M Transplanter



Hemp Mid-Season Cultivation



Pull Behind Crop Cultivator



Mower / Shredder



**Organic Chemical Application or
Beneficial Insect Application**



Field Labor



FarmersEdge™

Digital Crop Monitoring





Rantizo Drone Technology



**Organic Chemical Application or
Beneficial Insect Application**





Harvest





Clean-Cut Header



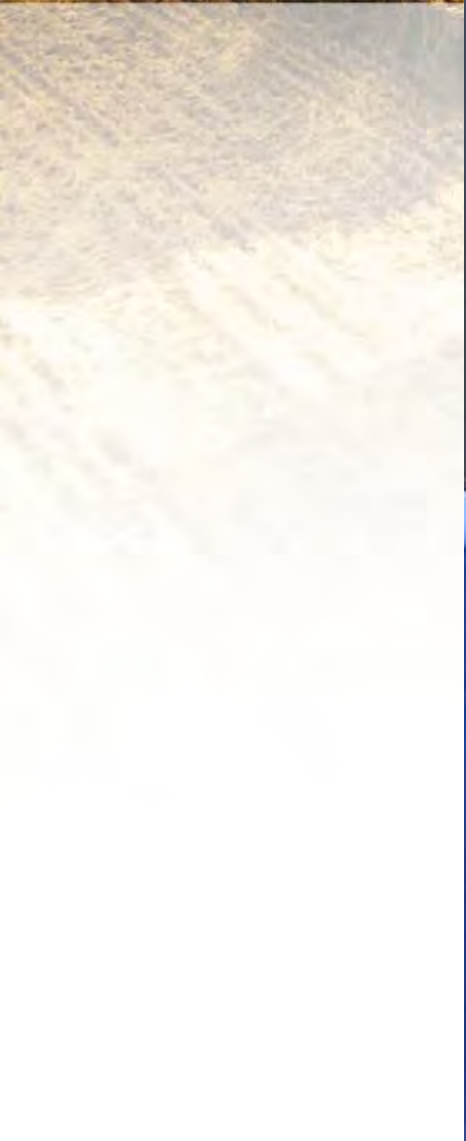
Flower Harvesting



Bish SuperCrop LP



Hemp Handler









Bish SuperCrop LP







Post Harvest







DryMODS

A portable solution to your drying and storage needs



- GAP and GMP Compliant
- Climate & humidity controlled
- Dries in as little as one week
- Stackable 8'x40' units
- Durable and Weatherproof
- Made to Transport
- Insulated to a value of R-21



Continuous Feed Drying



Turbine Drying



Dual Shaft Shredder



Processing

Hand Stripping



Twister Trimmer



Budd EZ - Bucker



Shredding



Dual Shaft Shredder



Dual Shaft Shredder

Shedding Hemp

10 HORSEPOWER MACHINE

Flower / Stem Separator







Trimming

- Gently trim leaf material away from the flower, leaving just the bud
- Compact tabletop small batch to high capacity models available – process up to 600 lbs per hour!
- Medical grade stainless steel
- 10-year manufacturer warranty





preserve the full value of your harvest

cultivation bags	features	turkey bags
✓ proprietary patent-pending formula designed for curing flowers and herbs	 made for	nylon bag is made for cooking
✓ contain protection from harmful uv rays	 uv protection	none. clear and translucent
✓ strong moisture / humidity barrier	 humidity control	minimal humidity control
✓ completely odorless and no leaching	 plastic smell	can leach into the flower affecting taste and smell
✓ anti-static - contents won't cling	 anti-static	static - the flower and trichomes cling and breakdown
✓ great for curing and long-term storage of flowers	 product preservation	no benefits to the flower
✓ clip / tie / heat seal	 closure	twist tie
✓ completely contains the odor	 odor level	some odor reduction
✓ biodegradable	 environmental impact	10,000-year half-life in a landfill
✓ strong! heat and puncture resistant	 wear and tear	becomes brittle in heat



Storage



hemp sac

Harvest Ready



protect the value of your harvest

hemp sac harvest-ready cultivation bags designed for curing, storing, and transporting hemp and other agricultural products.

Fiber Production





Cultivation

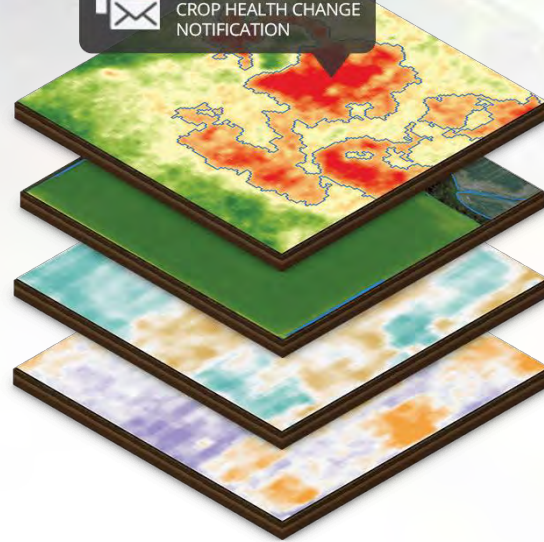


Direct Drill



Air Seeder

Hemp Mid-Season Cultivation



Digital Crop Monitoring



Harvest





Fiber Harvesting Equipment



Forage Harvester Swathing



3-Point Sickle Bar





Hemp Fiber Bales



Square Bale



Round Bale – Bill Billings



Processing



John Lupien

Fiber Trac Decortication Machinery



Grain Harvesting Equipment







Planting Under Film



Kentucky CBD Hemp Root Development at 11 weeks (RH film)

Kentucky CBD Hemp at 11 weeks (RH film)

Hemp Mid-Season Cultivation



Pull Behind Crop Cultivator



**Organic Chemical Application or
Beneficial Insect Application**



 **FarmersEdge™**

Digital Crop Monitoring



Harvest





Grain Harvesting Equipment



Combine







Combine Settings – Hemp Grain

- Settings need to be adjusted according to individual crop moisture and general conditions. Adjustments need to be made as the harvesting continues. Producers have found that canola, peas or bean settings for the cylinder and concave are a useful starting point for combining hemp. The air, sieve and chaffer are set similar to wheat, for a starting point.
- Proper setting of the combine improves the yield and quality of the grain and reduces wear on the combine. Experiment with ground speed, concave openings, air speed etc.
- Following is a suggested starting point to set a combine for harvesting of hemp.
 - Cylinder Speed - 450 - 600 rpm
 - Concave - 30 – 50 mm
 - Wind - 1070 rpm
 - Sieve - 3mm
 - Chaffer - 10mm







Storage



Multi-Crop Harvesting Equipment





Forage Harvester – Double Cut System



Combine – Double Cut System

Bish Enterprises Website

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 Cart | \$0.00

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Providing Growing & Harvesting Solutions for Today's Hemp Producers

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Thank
you