

Characterization of Colorado Sourced Commercial CBD Isolates

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Introduction

CBD is a non-psychoactive cannabinoid that is derived from hemp. It possesses beneficial properties for treatment of many ailments. Studies have used various sources, purities and dosages, and product consistency has been lacking. In this study, we examined purity of commercial CBD isolates to address safety.

Analytical Equipment

We use a diverse mix of simple to complex analysis tools, such as GC, LC, HPLC, HPLC-TOF-MS and NMR

Examination of Commercial CBD Isolates Analysis and Results

Cannabinoids	Mass % by LC-MS Normalized to CBD				Sum of Impurities	Purity by NMR %	Ext. Solvent
	THC	CBT	CBDV	CBK*			
CBD Isolate Sx	0.32	0.97	0.35	0.9	2.54	97.5	Ethanol
22-1			0.21		0.21	99.8	Ethanol**
22-2			0.32	0.73	1.05	99.0	Isopropanol
22-3			0.55	1.04	1.59	98.4	Isopropanol
22-4	0.25	0.17		1.18	1.6	98.4	Supercrit. CO2
22-5	0.26		0.38	3.44	4.08	96.3	Ethanol
22-6							

*Work needed to definitely identify CBK (exact mass 333.2424 for m+1)

**Proprietary purification step effectively removes THC and CBK

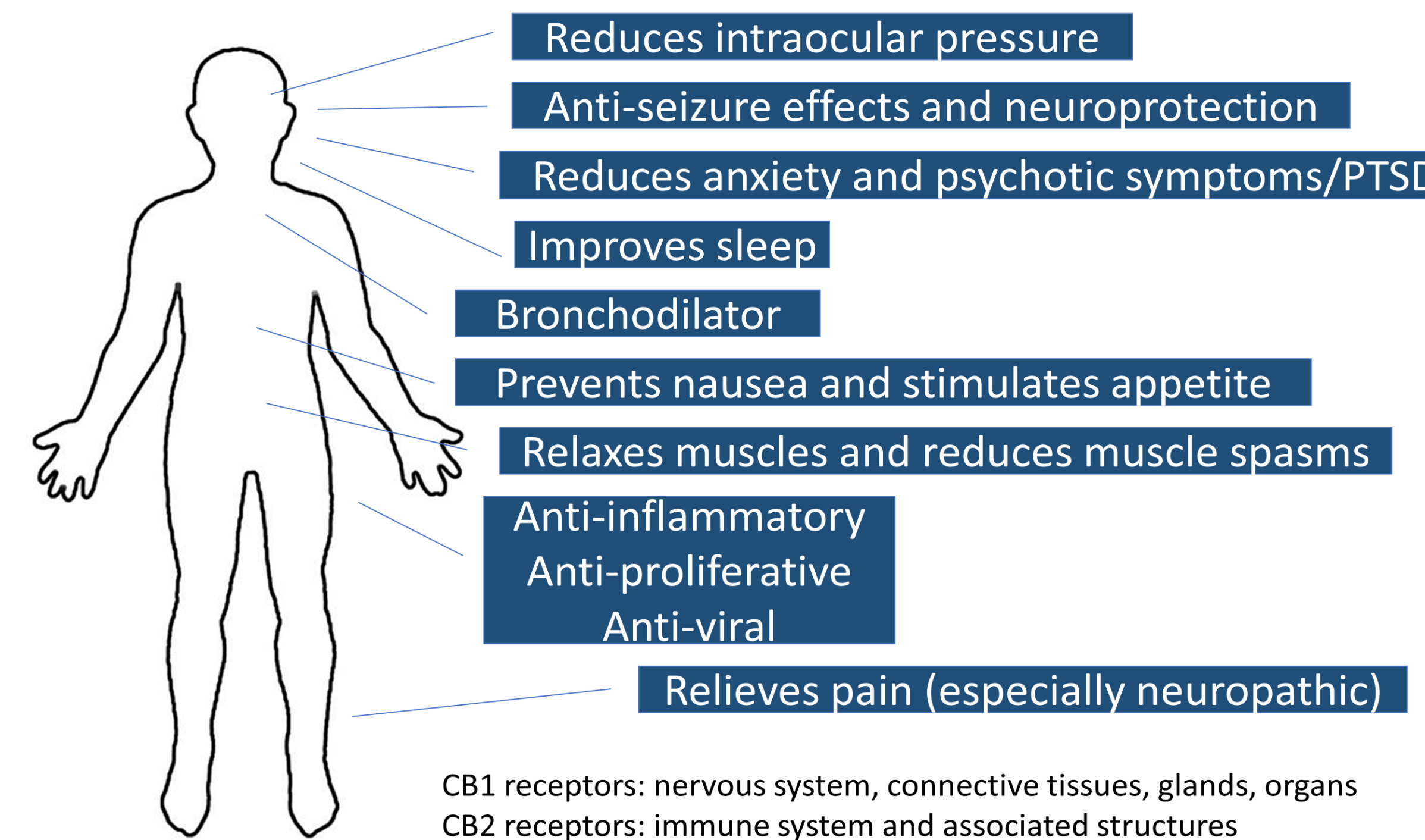
- LC-MS and NMR results are complementary and independently equivalent, neither requiring authentic standards
- Commercial CBD isolates are relative pure but can be improved
- Differences result from choice of starting material, as well as processing conditions and especially extraction solvent

Cannabinoid Research

Our interests span from farm to pharma, including:

- Plant genetics, cultivation
- Processing methods
- Environmental impacts

Physiologic Responses



<http://www.cancer.gov/cancertopics/pdq/cam/cannabis/patient/page1/AllPages/Print>

Summary and Conclusions

- CBD is a non-psychoactive cannabinoid useful for treating many ailments and which has become economically important
- Unfortunately, quality has taken a backseat in manufacturing and production as regulators struggle to catch up to market dynamics
- Product safety relies upon known quality and consistency and NMR and LC/MS are useful complimentary techniques
- Commercial CBD isolates are pure but can be made purer
- Supercritical CO₂ yields higher purity overall
- An unknown (CBK) with exact mass of 333.2424 for m+1 (C₂₁H₃₂O₃) is found in all commercial products
- We can remove CBK and we plan to use preparative techniques to isolate it for further characterization

Teamwork

Our research teams include a diverse range of skills and experiences, from undergraduate students to a full professor with a 40-year tenure at CU

Cannabidiol (CBD) Isolates



Commercial Samples from Colorado

Acknowledgements

We are grateful for funding from the Danny Alberts Foundation and support from CIRES and the Department of Chemistry