Extraction, Purification and Characterization of oils from Wild Apricot (*Prunus davidiana*)

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INTRODUCTION: *Prunus davidiana*

- Wild apricot/Khanboo-Rosaceae family.
- Native to China and North Western Nepal.
- Distribution-1000-4000 m.
- Fruits-sour.
- Most seeds -thrown away-difficult to separate kernels manually.
- Some seeds-utilized for extraction of kernel oil manually.
- Cooking, burning lights, arthritis, joint pain.

Literature Review: *Prunus davidiana*

- No scientific literatures available on *P. davidiana* of Nepalese origin.
- Liu et al (2014)-quantification of linoleic and oleic acids in *P. davidiana* collected from different locations of China.

Liu, W., Wang, Z. Z., Qing, J. P., Li, H. J., & Xiao, W. (2014). Classification and quantification analysis of peach kernel from different origins with near-infrared diffuse reflection spectroscopy. *Pharmacognosy magazine*, *10*(40), 441–448.

Literature Review: *Prunus armeniaca*

- 11.7-22.2% seeds.
- 30.7-33.7% kernels
- 40-50% oil.
- Yield of oil - method of extraction.
- Solvent extraction.
- Oil expeller.
- source of unsaturated and polyunsaturated fatty acids.
- cosmetics, moisturizing creams, hair oil, baby oil, lip balm , massage oil.
- Bitter kernels-two cyanogenic glycosides-amygdalin and prunasin-remain in the oilcake.

RATIONALE

- Vegetable oils-essential element of human diet-functional food-fatty acids.
- Significant role in pharmaceutical and cosmeceuticals industries.
- *P. armeniaca*-good commercial value.
- *P. davidiana*-available in abundant in KSL Nepal.
- local people-unaware about their values.
- Not processed commercially into any profitable value added products.
- Investigation-make rational utilization of *P. davidiana.*

OBJECTIVES

- Extraction and purification of oil
- Physico-chemical characteristics of oil.

METHODOLOGY

- **Sample collection**
- **Extraction of oil**
- Crushed kernel (50 g)-Soxhlet extraction hexane, ethyl acetate, methanol (150 ml, 5 hours)- solvents evaporated.

PHYSICOCHEMICAL PARAMETERS

- Determination of specific gravity-(Ranganna 1997).
- Determination of saponification value- (Shrestha et al.2013).
- Determination acid value (Shrestha et al. 2013).
- Determination iodine value (Ranganna 1997).
- Determination of antioxidant activity using DPPH free radical

Ranganna, S. 1997. Handbook of analysis and quality control for fruits and vegetable products. 2nd ed. Tata McGraw Hill Publishing Co. Ltd. New Delhi, India. p. 1112.
Shrestha, S., Nyaupane, D. R. Yahara**,** S., Rajbhandari, M.**,** Gewali, M. B. 2013. Quality Assessment of the Essential oils from *Artemisia gmelinii* and *Oreganum majorana* of Nepali Origin. Scientific world 11, 77-80.

RESULTS

Extracts	Hexane	Ethyl acetate	Methanol
Yields in g	14.78	5.19	8.49
Visual appearance of oil	Pale yellow	Yellow	Reddish
Specific gravity g/cc at 25 °C	0.90	-	1.09
Saponification value mg KOH/g oil	112.00	84.00	84.00
Acid value mg KOH/g oil	6.40	16.00	12.80
Iodine value g Iodine/100 g oil	98.84	91.94	5.84
Antioxidant activity µg/ml	536	-	-

DISCUSSION: For hexane extract

- Yield-quite low in comparison to reported value for *P. armeniaca* 43.03% (Sharma et al. 2004).
- Specific gravity-close to reported value for *P. armeniaca* 0.912 g/cc (Sharma et al, 2019).
- Saponification value- close to reported value for *P. armeniaca* 123.4 (Singh et al, 2010).

Sharma, P. C., Sharma, R., Kamboj, P. 2004. Methodology for extraction of kernel oil-practical manual. Dr. Y. S. Parmar University of Horticulture and Forestry, Solan (H.P.) India pp. 1-23.

Sharma, P. C., Tilakratne, B. M. K. S., Gupta, A. 2010. Utilization of wild apricot kernel press cake for extraction of protein isolate. *Journal of Food Science and Technology*. 47(6), 682–685.

DISCUSSION: For hexane extract

- Iodine value- close to reported value for *P. armeniaca* 96.39 (Singh et al, 2010).
- Acid value- very low in comparison to reported value for *P. armeniaca* 38.6 (Singh et al, 2010).
- Antioxidant activity-not significant

Singh, R., Gupta, S., Joshi, D. D., N. Nainwal, N. 2010. Wild apricot (Prunus armeniaca) kernel oil: A strategic alternative to value added fatty acids. International Journal of Essential Oil Therapeutics (2010) 4, 1-5.

DISCUSSION

- High saponification value-high content of triglycerides.
- High iodine value- high content of unsaturated fatty acids.
- Low acid values-triglycerides not hydrolyzed-good stability of oil.
- High saponification and iodine values-presence of a large number of fatty acids-have great commercial importance.

CONCLUSIONS

- Based on the physicochemical parameters, the quality of *P. davidiana* oil from the Himalayan region of Nepal is close to the quality of *P. armeniaca* oil from the Himalayan region of India.
- Minor differences-due to the difference in species, environmental factors and growth conditions.
- Oil extraction-open an avenue for the value addition to abandoned natural resources.

ACKNOWLEDGEMENT

- KSLCDI for financial support.