Macedonian pharmaceutical bulletin, 69 (Suppl 1) 203 - 204 (2023)
Online ISSN 1857 - 8969
DOI: 10.33320/maced.pharm.bull.2023.69.03.100
Short communication

Post-harvest processes and methods for obtaining quality medicinal cannabis flower

Chedomir Cekikj

Purely Plant ltd., Street 9, number 9, Kjojlija, Petrovec, 1000 Skopje, R.N. Macedonia

Introduction

The processes involved in the processing of the collected medicinal cannabis flowers such as pruning, bucking and trimming must be carried out in an optimal period, quickly and efficiently after harvesting the plant in order to prevent the appearance of plant mold or wilt and to optimize the yield hence to obtain a material with defined quality. The plant must be processed in the fresh form and all of the processes must be carried out in an appropriate manner and conditions in order of keeping all the essential substances. After the medical cannabis plants are harvested, the flowers and leaves are separated from the stem and branches, manually or mechanically with the so-called bucking process (Xiao et al., 2017). Trimming is a process of removing, shortening the fan and sugar leaves from the flowers, in order to obtain the best manicured medical cannabis flowers (Green et al., 2001; Rodriguez& Munir, 2019) while drying process covers slow-gradual removal of the moisture level from the medical cannabis flowers under controlled ambient conditions of 20±3°C temperature and humidity of 40-50% (Challa et al., 2021; Chen et al., 2021; Coffman et al., 1974; Hawes et al., 2015). During curing, a post-drying process of maturing the dried medical cannabis the moisture level throughout the material (medical cannabis flower) equalizes (Green et al., 2001; Offers et al., 2019).

The aim of the study was to determine if the established previously described post-harvested processes and methods in the production of medicinal cannabis flower would result with a product of adequate quality.

Materials and methods

Medicinal cannabis flowers (*Cannabis sativa var. Sugar Bomb Punch*) were subjected to visual control immediately after harvesting for absence of foreign matters (Ph.Eur. method 2.8.2).

Moisture level in-process control during drying process was performed on samples taken from 3 pre-defined critical positions (loss on drying method, Eur. Ph. 2.2.32) once a day until requirements for 11-12% moisture (DAB 2018) were obtained.

Curing process was followed through the analysis of parameters included in the specification for quality of the medicinal cannabis flower such as:

- Loss on drying (Eur. Ph. method 2.2.32) ≤ 10%; performed on moisture analyzer (Ohaus MB90, USA) and vacuum drying oven (Memmert VO29, Germany);
- Cannabinoid profile identification was performed by HPLC method (Waters cannabis analyzer with binary pump equipped with photo diode array spectrophotometric detector, USA). Mobile phase was composed of water with 0.1% TFA and acetonitrile in ratio 41:59, filtered through a 0.45 µm PDFE filter. As stationary phase CORTECS Shield RP18 (2.7 µm, 4.6 mm x 150 mm) was used. Chromatographic conditions were: flow: 2.0 mL/min; temperature: 35°C; detection: 228 nm at 4.8 nm resolution; injection volume: 5 µL (Eur. Ph. 2.2.29; DAB 2018).
- Microbiological quality was determined as follows:
  - Total yeast & mold count (TYMC) $\leq 10^5$ CFU/g & Total aerobic microbial count (TAMC) $\leq 10^7$ CFU/g (Eur. Ph. method 2.6.12),
  - Tests for absence of bacteria such as Escherichia coli and Salmonella, absence/25 g (Eur. Ph. method 2.6.31),

*cedomir.cekikj@purelyplant.com

- Test for absence of Afla toxins $B_1 \leq 2$ μg/kg (Eur. Ph. method 2.8.18) and Ochra toxins A ≤ 20 μg/kg (Eur. Ph. 2.8.22).
- Tests for absence of pesticides (Eur. Ph. method 2.8.13)
- Test for absence of heavy metals (Eur. Ph. method 2.4.27).

Results and discussion

Harvested medicinal cannabis flowers (*var. Sugar Bomb Punch*) complied with the test for absence of foreign matters. Moisture level was gradually reduced from 78±0.78% at day 1 to 11.39±0.36% at day 7 (Fig. 1) thus pointing that the requirements for 11-12% moisture were met.

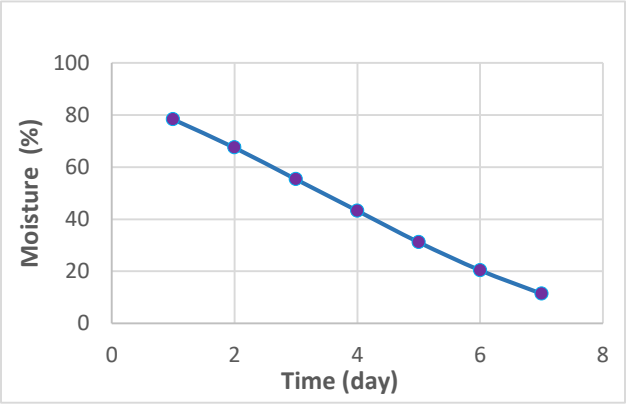

Figure 1. Moisture level of medical cannabis flower during drying process. SD bars are smaller than marker size and not visible

Loss on drying values after the curing process were 9.78±0.2% thus corresponding to the requirements of ≤10%.

Results from analysis of the parameters included in the specification for quality of the medicinal cannabis flower showed that medicinal cannabis flowers contained 17.83±0.36% THC and were characterized by absence of any microbial contamination, as well as any pollution with pesticides and heavy metals in the product after the curing processes thus meeting Eur. Ph. requirements.

Conclusion

All results from the conducted study pointed out that post-harvested processes and methods employed in medicinal cannabis flower production resulted with a product with adequate quality that met the official requirements of Eur. Ph. and DAB.

References

Challa, S.K.R., Misra, N.N., Martynenko, A., 2021. Drying of cannabis—State of the practices and future needs. Drying Technology, 39(14), 2055-2064. https://doi.org/10.1080/07373937.2020.1752230

Chen, C., Wongso, I., Putnam, D., Khir, R., Pan, Z., 2021. Effect of hot air and infrared drying on the retention of cannabidiol and terpenes in industrial hemp (Cannabis sativa L.). Industrial Crops and Products, 172, 114051. https://doi.org/10.1016/j.indcrop.2021.114051

Coffman, C., Gentner W., 1974. Cannabis sativa L.: Effect of drying time and temperature on cannabinoid profile of stored leaf tissue. Bulletin on Narcotics 26(1), 67-70.

DAB, 2018. German Pharmacopoeia (Deutsches Arzneibuch 2018), Monograph for Cannabis flos.

European Pharmacopeia, 11th ed. 2022. Council of Europe; Strasbourg, France: 2022. Monographs: 2.2.29. Liquid chromatography, 55-56; 2.4.27. Heavy metals in herbal drugs and herbal drug preparations, 168-169; 2.2.32. Loss on drying, 96; 2.6.12. Microbial enumeration tests, 217-221; 2.6.31. Microbiological examination of herbal medicinal products for oral use and extracts used in their preparation, 249-251; 2.8.2. Foreign matter, 321; 2.8.13. Pesticide residues, 324-325; 2.8.18. Determination of Aflatoxin B1 in herbal drugs, 327-328; 2.8.22. Determination of Ochratoxin A1 in herbal drugs, 332.

Green G., Kryptonite S., Chimera B., Ralpheme R., 2001. Harvesting and Curing Your Bud in the Cannabis Grow Bible. 4th ed..

Hawes, M.D., Cohen, M.R., 2015. Method of drying cannabis materials. U.S. Patent. https://patents.google.com/patent/US20150096189A1/en

Offers, J., 2019. Cannabis: beyond potency: fungi, mold and mycotoxins, Available at: https://manoxblog.com/2019/12/29/cannabis-beyond-potency-fungi-mold-and-mycotoxins/

Rodriguez, G., Munir, Z., 2019. Good Manufacturing Practices (GMP) Approach to Post-Harvest Activities for Cannabis. Journal of GXP Compliance, 23(6).

Xiao, K., Mao, X., Lin, Y., Xu, H., Zhu, Y., Cai, Q., Xie, H., Zhang, J., 2017. Trichome, a functional diversity phenotype in plant. Mol. Biol., 6(1), 183. doi: 10.4172/2168-9547.1000183