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EFFECT OF HARVESTING TIME ON CHANGE IN OIL QUALITY OF *Mentha piperita* L. CHEMOTYPES

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ABSTRACT

Evaluation for essential oil composition and to assess the change in quality of essential oil with age, harvesting time and maturation phase *M. piperita* clones namely MP-1 to MP12 were taken under study. It was found that nine cultivars with basic chromosome number 2n=72 , were best suited under fluctuating environments with respect to oil content and quality as well with more than 70 % menthol content.

KEYWORDS : *Mentha piperita*, Menthol, Acetocarmine, Menthone

Mentha piperita L. commonly known as peppermint is a chief genus of family lamiaceae (Labiatae) and is commercially valuable due to its essential oil which is used in cough syrups, toothpastes, pain relieving balms and creams, mouthwashes, shaving crème and chewing gums. The principle constituent in the oil of *Mentha* is Menthol which is reported to be converted from biosynthetic pathway of Pulegone –Menthone – Menthol –Menthyl acetate except for slow conversion rate of menthone to menthol in peppermint (Murray et al., 1972). The oil quality plays a vital role in its market value as it degrades after harvesting, while kept for certain period of time. The paper deals with role of harvesting time along with ploidy status on the oil quality and content as well.

MATERIALS AND METHODS

M. piperita clones namely MP-1 to MP12 were grown in RCBD (Randomized complete block design) in plot size 5x3 meters each with basal dressing. Crop harvested twice one after 70 – 90 days and other after 120 days of plantation. And oil distilled in Clevenger apparatus and were tested for its quality content using Perkin-Elmer's GLC apparatus. The essential oil was reported to possess well balanced aroma with 70 – 90 % menthol on an average with green herbage and oil yield. Somatic chromosome numbers were studied from root tips of plants using acetocarmine stain. Photomicrographs were taken from temporary slides using bright field phase contrast attachment of Zeiss Standard 16 research microscope.

RESULTS AND DISCUSSION

Oil yield is a function of oil content in green herbage as oil content increases when the crop has left for 24 hrs after harvest as the moisture loss results in oil content increase. But the oil quality which is the resultant of various other components get deteriorated as the time passed from morning to evening or vice-versa. Moreover ,the genotype and management conditions such as harvesting time,plant age and crop density also influence the qualitative characters of many aromatic plants (Marroti et al,1994) .The occurrence of polyploidy in the genus *Mentha* is common both at intra and interspecific levels(Harley and Brighton,1977;Singh and Sharma,1986).

From karyologic point of view *M. piperita* shows a large variation in chromosome number ranging from 2n=36 to 120 with base number x=12, owing to the change in the biosynthetic pathway resulting in the change of essential oil quality. The most common chromosome no. (2n=72)is associated with Menthol content ranging from 60-70 percent (Chemotype MP-1,2,3,4,6,8,10,11,12) while MP-9 AND MP-7 shows basic chromosome number 2n=36 and MP-5 with 2n=48 and Pulegone interaction in the essential oil. Further, Bhardwaj (1989) has reported that menthol content, an important constituent of essential oil was found significantly correlated with oil content as was found obvious from above table. Patra et al. (1988) have concluded that there exists a positive relationship between oil and menthol content. The variation in the amount and quality of oil produced from leaves of different ages on the same plant has been demonstrated in peppermint. The

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	Somatic Chromosome No. (2n=x=12)	Oil content (%)	Oil Yield (Kg/ha)	Menthol content (%)
Range	2n = 3x, 4x and 6x 36, 48 and 72	0.6 – 1 .0	314 - 400	65 - 80
Mean		P = ≥ 0.01 – 0.05		

variation was assumed to represent the effect of time on terpene synthesis (Battaile and Loomis, 1961). However, in the above results have been in conformity but the time variation may be attributed either due to maturation of oil glands with age or genetic factors that play role in hindrance of biosynthetic pathway resulted in accumulation of menthol or Pulegone the end product of terpene conversion.

Evaluation for essential oil composition revealed that seventy percent population synthesize terpenoids of maternal types (menthol and menthone). While the rest had those of paternal type (carvone pulegone) and related compounds. In the present study, as reported earlier(Kassahun et al.,2011) the efforts have been made to assess the change in quality of essential oil with age, harvesting time and maturation phase. It has been reported that nine cultivars were best suited under fluctuating environments with respect to oil content and quality as well with more than 70 % menthol contents.

REFERENCES

Aflatuni A., 2005. The yield and essential oil content of mint (Mentha spp.) in the Northern Ostrobothnia. Ph.D. Thesis, Fac. of Sci. Univ. of Oulustr. pp.

Battaile J. and Loomis W.D., 1961. Biosysnthesis of terpenes. II The site and sequence of terpene formation in peppermint Biochiem, Biophys Acta **51**:545-52.

Bhardwaj S. D., 1989. Correlation studies on oil yield and quality characters of essential oil in peppermint (*Mentha piperita* L.). Indian Perfumer, **33**:76-78.

Harle R. M. and Brighton C. A., 1977. Chromosome numbers in the genus *Mentha*. J. of Linn. Soc. **74**:71-96.

Kassahun B. M., Teixeira J. A., Dasilva and Mekonneu S. A., 2011. Agronomic characters, leaf and essential oil yield of peppermint as influenced by harvesting age and row spacing. Med. And Arom. Plant Sci. and Bio Tech.

Marroti M., Piccagla R., Glovanelli E., Deans S.G. and Eagle S.E., 1994. Effects of planting time and mineral fertilization on peppermint (*Mentha piperita* L.) essential oil composition and its biological activity. Flav. And Frag. Jour. Vol. **9**:125-129.

Murray M.J., Lincoln D.E. and Marble P.M., 1972. Oil composition of *Mentha aquatica* X M. spicata F1 hybrids in relation to the origin of *M. piperita*. Can. J. Genet. Cytol. **14**:13-28.

Patra N.K., Chauhan S.P. and Mandal S., 1988. Stability analysis in peppermint. Crop improvement **15**(2):187-191.

Singh T.P. and Sharma A.K., 1986. *Mentha* Taxonomic studies as interpreted through cytology, genetics and phytochemistry. Ind. J. Genet. **46**:198-208.