Physico chemical and pollen analyses of honeys from some regions in Algeria

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INTRODUCTION

In Algeria, the bee-keeping is practised in many areas, characterized by a remarkable richness of honey plants. The Algerian East is one of the zones of the most significant bee-keeping in the country. The production of honey will be in the process of one year progression with another. The quality and biochemical properties of natural complex food (honey) are related to honey maturity, weather conditions, processing and storage conditions, as well as the nectar source of the honey. However, quality and composition of honey are negatively affected by other factors such as overfeeding with sucrose and other sucrose variants, unhealthy storage conditions, and overused veterinary drugs. For that, the European and International Commissions proposed methods of analyses followed by standards of the food codex (*Codex Alimentarius*, 2001) or European Standards for the Honeys Quality Control.

There for, the present study was undertaken to characterise the physico-chemical properties and the botanical origin of the Northeast Algerians samples honey.

MATERIALS AND METHODS

***Honey samples: Seven honey samples produced in various stations of El -Tarf regions (North-East of Algeria) were collected (Fig. 1).**
The samples were analysed to determine:
-Physico-chemical quality of honeys (pH, Moisture, Electrical conductivity, HMF, Diastase activity, Lactones and total acidity, Apparent sucrose and The protein content).
The samples were analysed according to the European and the International Commission of Honey methods taking account in comparison the values proposed by the Codex Alimentarius (*Journal Officiel Français*, 1977; Codex alimentarius, 1981; AOAC, 1995; AOAC International, 2000; Codex Alimentarius, 2001).
-Melissopalynological analyses: to determine the botanical origin and floral appellations -of the honey samples (Maurizio & Louveaux, 1967; Louveaux *et al.*, 1978).

***Statistical analysis: COA (correspondence analysis) ADE4.**

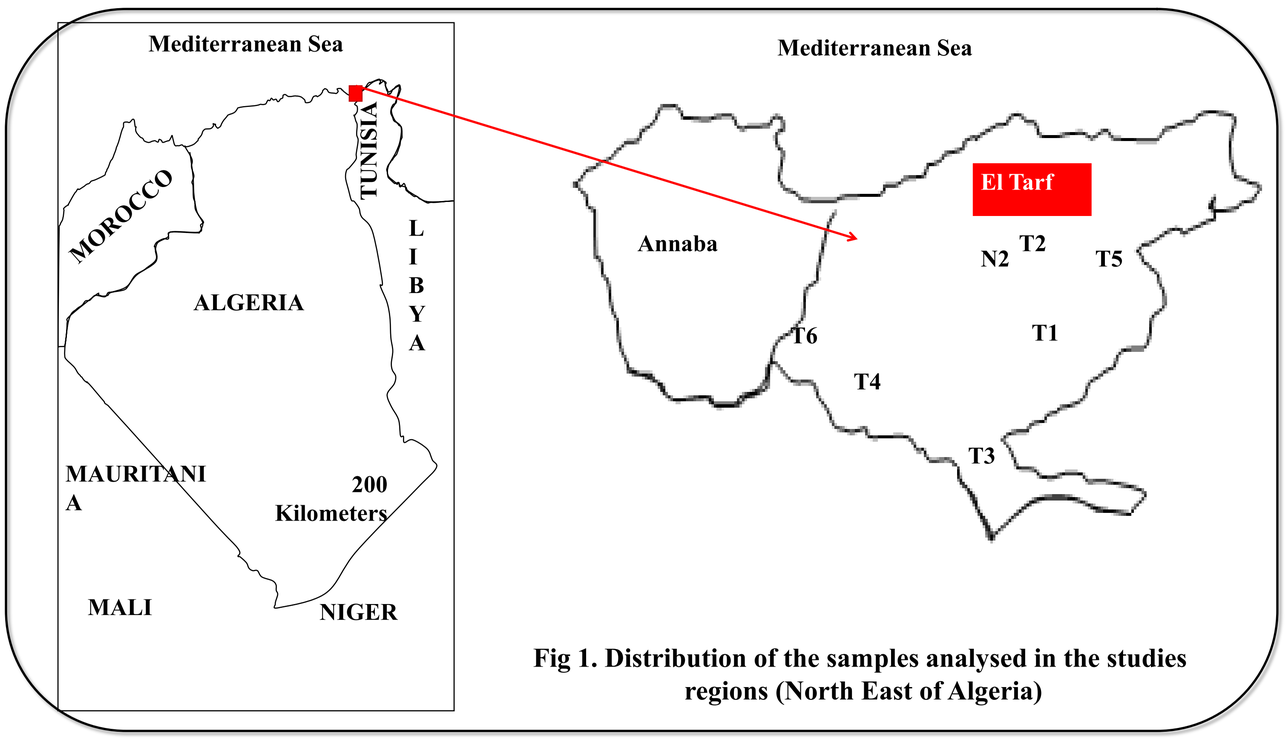

Fig 1. Distribution of the samples analysed in the studies regions (North East of Algeria)

RESULTS

Table 1. Results of some physicochemical parameters of honey samples (mean ± S.D.)

Sample	Density	Moisture (%)	E. C. (10^{-4}S/cm)	pH	Free acidity (meq/kg)	Lactone (meq/kg)	Total acidity (meq/kg)	Sucrose (%)	Proteins (%)	HMF (mg/kg)	Diastase (Schad)
T1	1.37 ± 0.01	19.6 ± 0.00	4.21 ± 0.2	3.29 ± 0.01	63.5 ± 0.32	23.96 ± 0.22	87.46 ± 0.49	11.02	0.92 ± 0.03	4.416 ± 0.14	25.21 ± 0.02
T2	1.40 ± 0.011	18 ± 0.27	3.55 ± 0.1	3.3 ± 0.3	38.5 ± 0.29	21.49 ± 0.28	59.99 ± 0.55	1.06	0.96 ± 0.06	2.304 ± 0.04	3.55 ± 0.04
N2	1.41 ± 0.00	16.4 ± 0.00	9.68 ± 0.6	3.86 ± 0.00	11.25 ± 0.00	6.25 ± 0.38	17.5 ± 0.00	4.71	0.93 ± 0.05	6.91 ± 0.189	4.4 ± 0.00
T3	1.46 ± 0.008	17 ± 0.29	2.01 ± 0.2	3.39 ± 0.01	27.25 ± 0.41	17.73 ± 0.28	44.98 ± 0.53	2.28	0.72 ± 0.01	6.72 ± 0.15	19.05 ± 0.35
T4	1.41 ± 0.008	17.6 ± 0.51	2.36 ± 0.0	3.82 ± 0.04	11.5 ± 0.32	25.99 ± 0.3	37.49 ± 0.62	9.14	0.87 ± 0.06	14.016 ± 0.05	114 ± 0.69
T5	1.4 ± 0.009	17.8 ± 0.24	2.96 ± 0.3	3.71 ± 0.02	12.25 ± 0.38	22.73 ± 0.27	34.98 ± 0.63	8.5	0.93 ± 0.03	5.184 ± 0.053	22 ± 0.06
T6	1.48 ± 0.01	16.8 ± 0.44	8.25 ± 0.6	4.09 ± 0.01	13 ± 0.31	3.75 ± 0.21	16.75 ± 0.49	2.92	0.63 ± 0.02	14.97 ± 0.0	6.86 ± 0.32

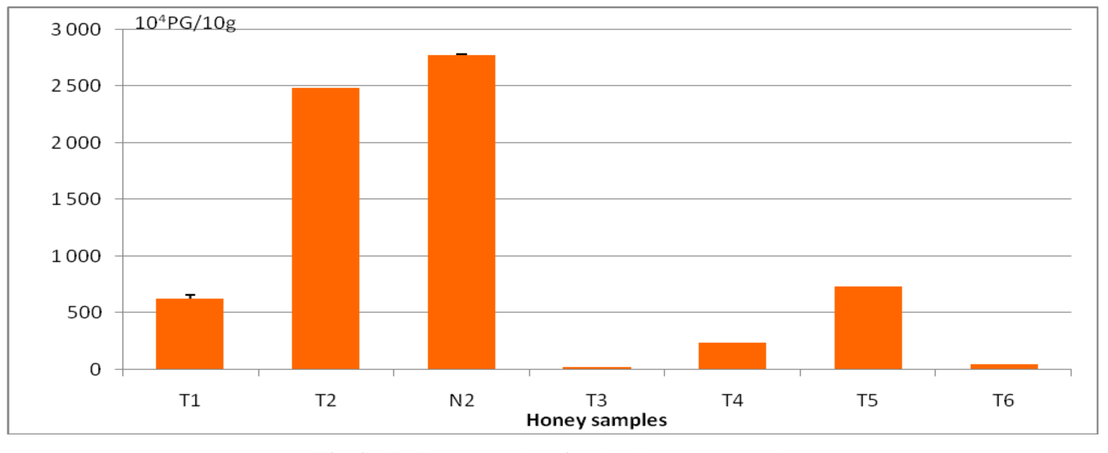

Fig.2: Pollen number in the honey samples

Table 2: Qualitative analysis of pollen types in honey sample (%).

Sample	Predominant Pollen (> 45%)	Secondary pollen (16 – 45%)	Minor pollen (3 – 15%)	Important minor Pollen (<3%)
T1	-	*Hedysarum coronarium* 24, *Eucalyptus* 22, Type Rosaceae 17	Apiaceae 15,*Thymus spp* 12 *Geranium* 7, Asteraceae 3	-
T2		*Eucalyptus camaldulensis* 33, *Daucus* 28, Urticaceae 16	*Eucalyptus sp10* *Trifolium spp* 7, *Rubus* 4	*Lavandula stoechas* 2
N2		*Eucalyptus* 35, *Hedysarum coronarium* 21, *Trifolium spp* 19	*Iris* 9, *Malva sylvestris* 7, *Prunus spp* 3	Chenopodiaceae 2 *Brassica* 2, *Euphorbia* 2
T3		*Hedysarum coronarium* 25 *Cistus spp* 20	*Rubus ulmifolius* 14, *Eucalyptus* 10, *Allium cepa* 8,*Ornithogalum* 10, *Asphodelus aestivus* 9	*Apium graveolens* 2 *Myrtus* 2
T4		*Eucalyptus* 34, *Cucurbita spp* 30	*Hedysarum coronarium* 12, *Trifolium spp* 8, *Allium spp* 6 , Iridaceae 4	*Myrtus communis* 2, *Potentilla spp* 2 *Taraxacum* 2
T5		*Eucalyptus* 37 *Pyrus /Malus* 29	Liliaceae 14 Euphorbiaceae 8, *Trifolium spp* 7, *Geranium* 3	*Anethum spp*, *Malva sylvestris*
T6		*Eucalyptus* 19	*Rubus* 15, *Daucus* 13, *Erica arborea* 13, *Foeniculum spp* 11, Liliaceae 10, *Citrus* 5, *Borago spp* 5, Euphorbiaceae 4	*Iris* 2, *Myrtus communis* 2, *Juniperus* 1

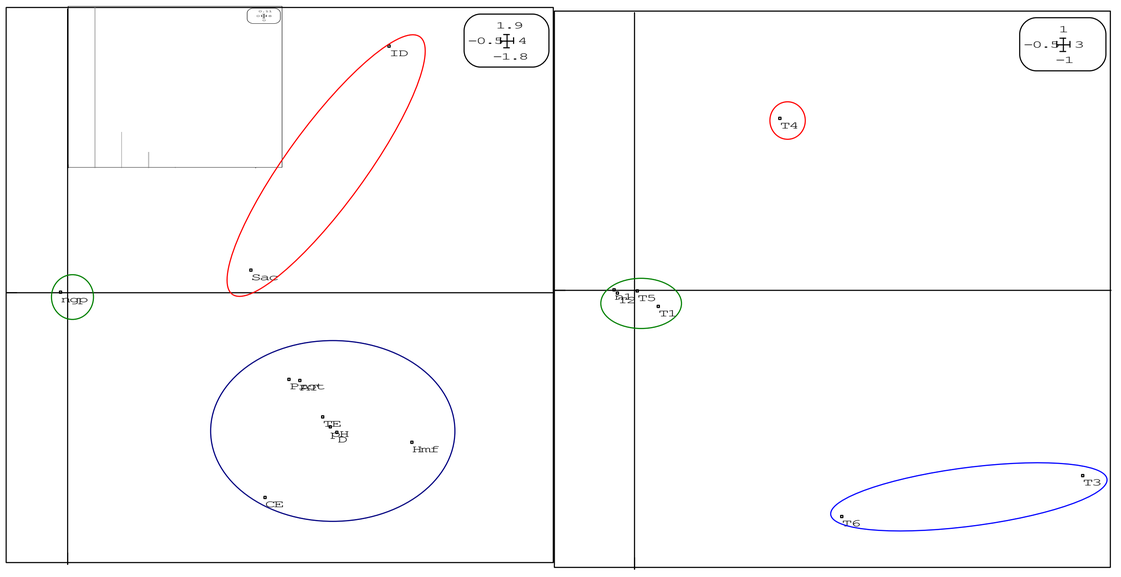

Fig.3: Correspondence Analysis of physico-chemical and pollen number parameters (Plan 1*2, relative inertia 0,76*0,17)

CONCLUSION

The honeys were studied are poly floral with wealth variable pollen. Two honeys (T2, N2) from the same source are richer in pollen with a number superior than 2480*10^4 PG/10g honey. Honeys T3 and T6 are poor pollen (24*10^4, 53*10^4PG/10g honey). Eucalyptus pollen was found in all samples with percentages ranging from 10% to 37% of the total pollen.

The chemical analysis allowed us to put away three honeys (T1, T4 and T5) because the sucrose content is higher (normally does not exceed 5%). The pH of honey (T1, T2 and T3) are low, making them vulnerable to the storage for a long period.

Statistical analysis separated three groups:
***Diastase is very higher in sample T4 (114 Schade),**
***T3 and T6 are poor in pollen and characterized by chemical almost identical values and acceptable,**
***The latter group characterized by the presence of a considerable wealth pollen.**

Cited references: AOAC (1995). 16th ed. AOAC. Section 980-23 ; Codex Alimentarius (1981). European Regional Standard. 12-1981; Codex Alimentarius Commission Standards (2001). CODEX STAN 12- 1981. Rev. 1 (1987), Rev. 2 ; Journal Officiel Français (1977). N.C. du 22/04/77 ; Louveaux *et al.* (1978). Int. Comm. Bee Bot. of I.U.B.S. *Bee World*, 59(4): 139-157; Maurizio et Louveaux (1967). *Rev. Palaeobot. Palynol.*, 3: 291-295.