

BEEKEEPING HIVE TECHNOLOGY VIS-Á-VIS HONEY QUALITY IN KENYA

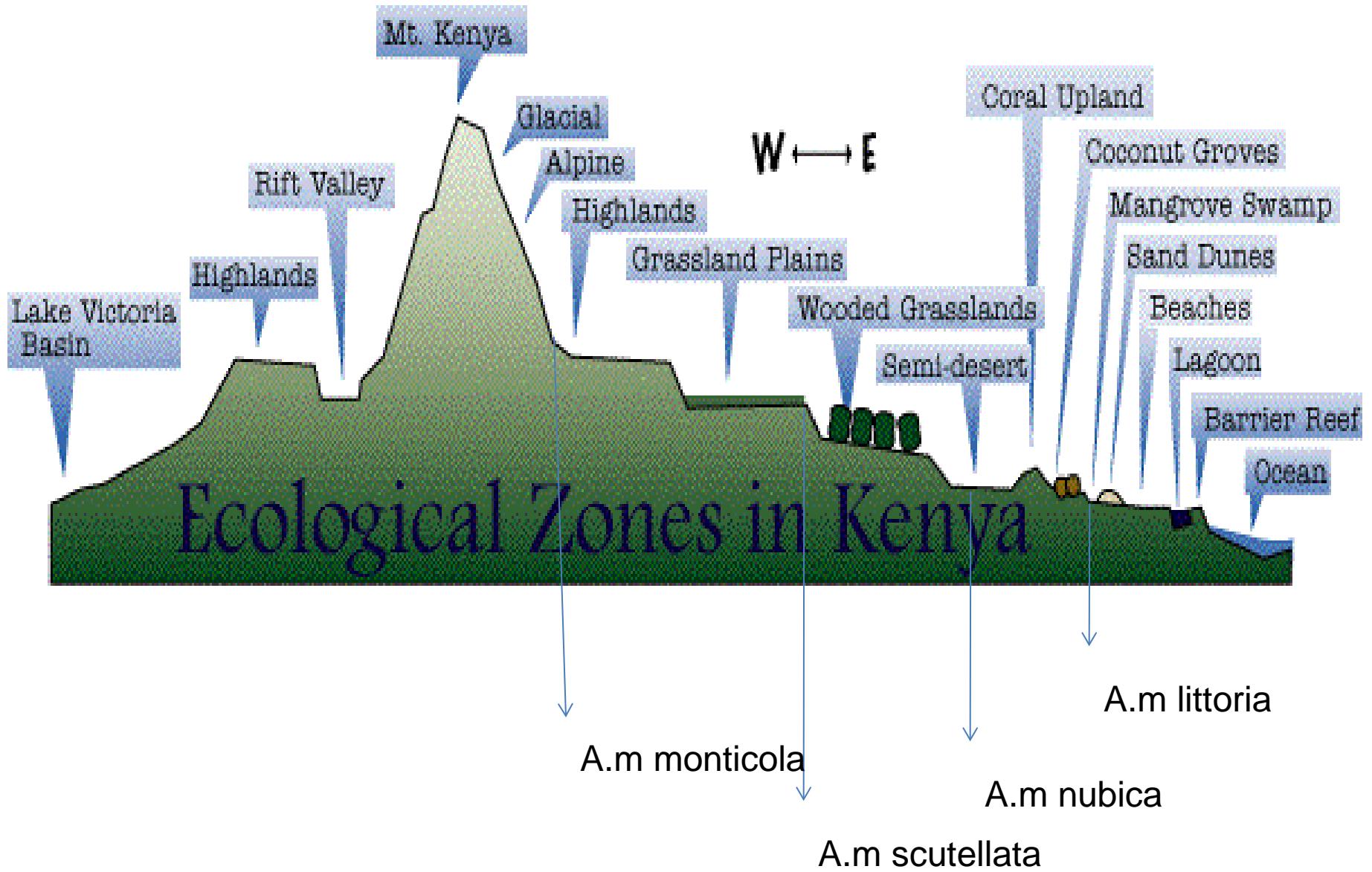
A PRESENTATION TO APIMONDIA, 29TH SEPTEMBER-4TH OCTOBER 2013, UKRAINE

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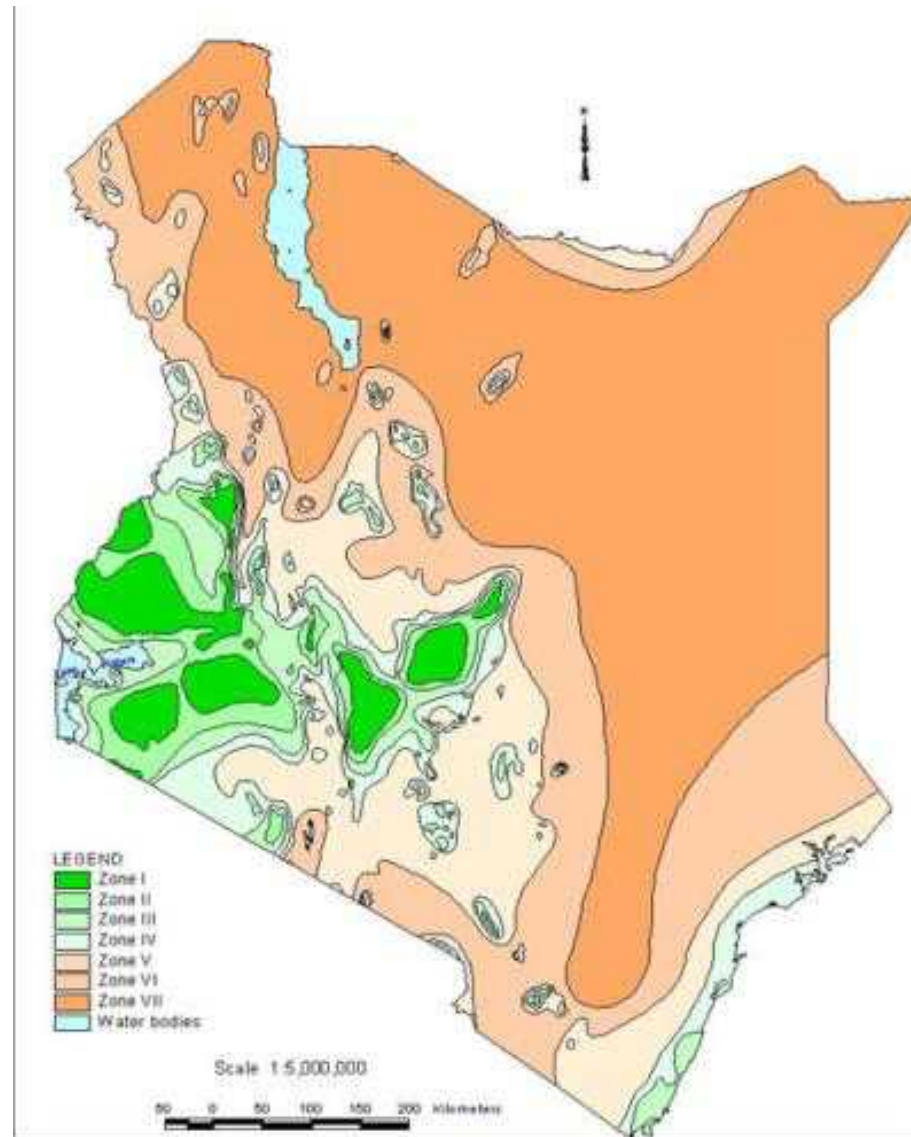
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INTRODUCTION

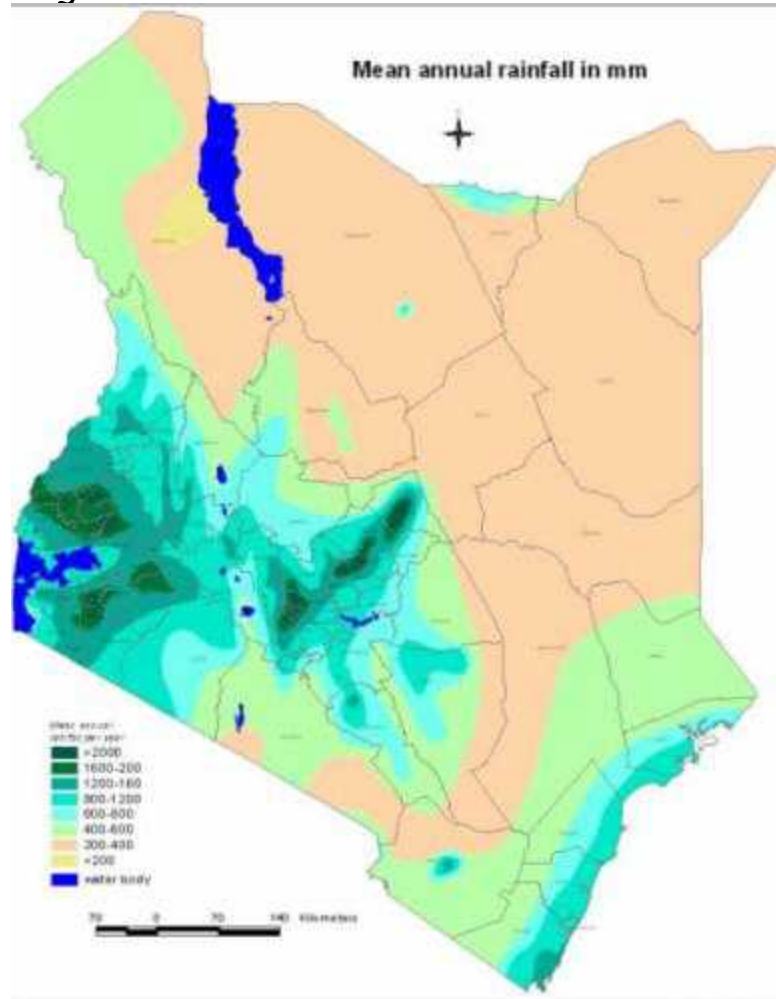
Bees are multi-habitual, with different races occupying different habitat types. In Kenya, four races were identified: *Apis mellifera scutellata* (grassland), *Apis mellifera littoria* (coastal lowland), *Apis mellifera monticola* (high grounds/mountains) and *Apis mellifera nubica* (very arid areas, desert).



Agro-climatic zones of kenya



Kenya: Mean annual rainfall

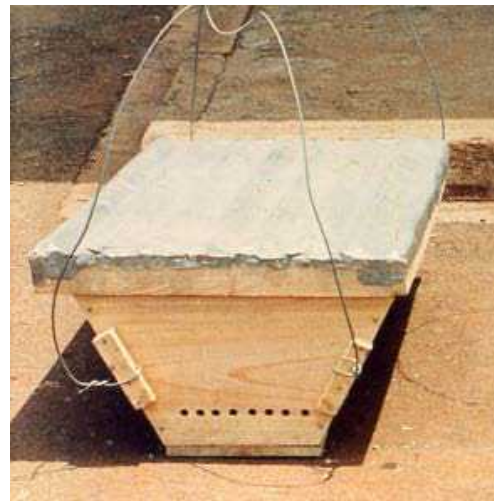


Between the year 2000-2011, a select total of 503 samples were analyzed from 37 localities in 4 agro-climatic zones (zone II,III,IV and V). Most of the honey analyzed was sourced from zone III, and production based on A.M Scutellata race.

HIVE TYPES IN KENYA



Log hive
10-20 kg/harvest,
optimum 30kg.
76% of total hive
population.



Kenya Top Bar Hive
20-30 kg/harvest,
optimum 40kg.
24% of total hive
population.



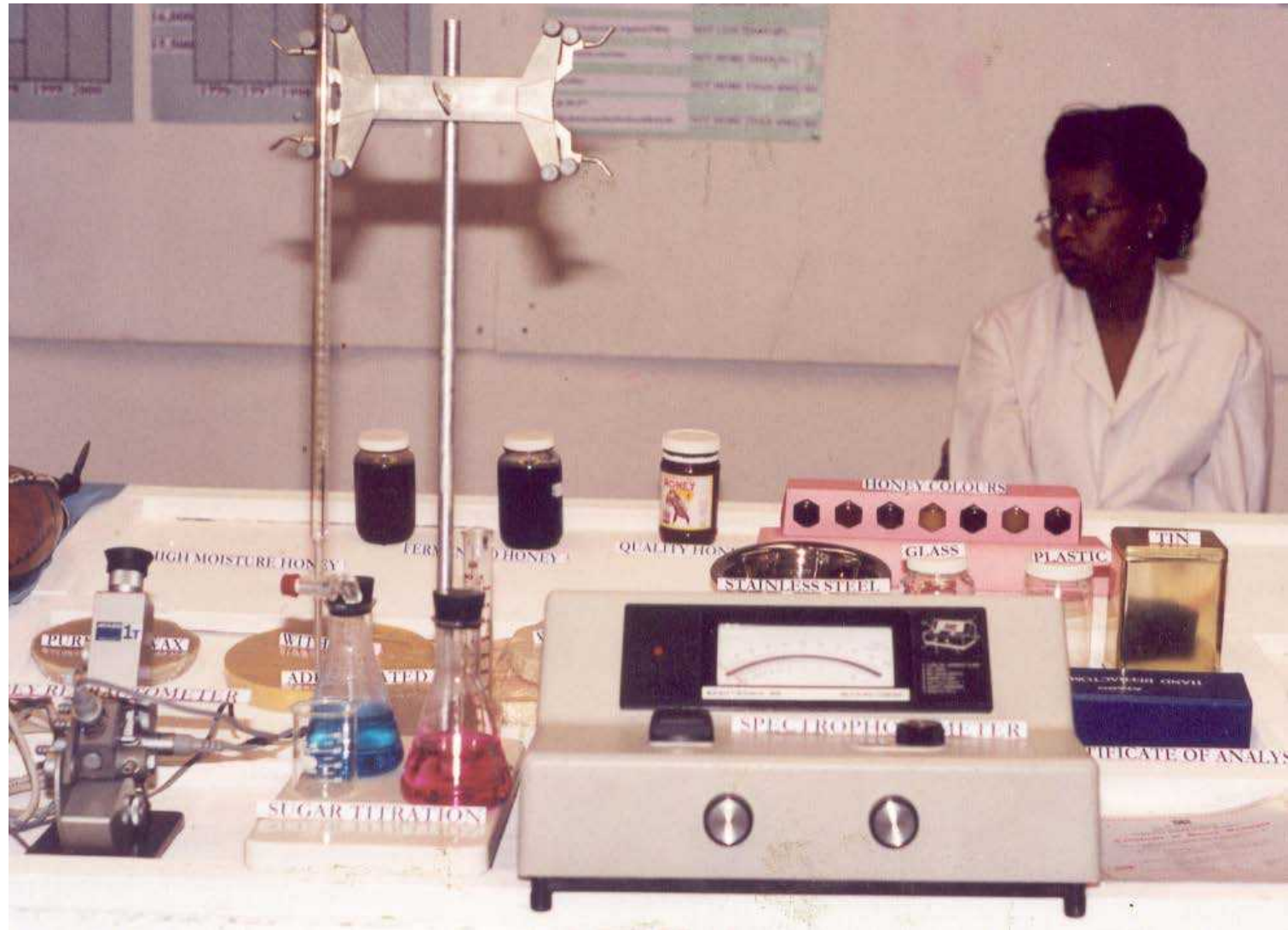
Langstroth hive
30-40 kg/harvest,
optimum 60kg.
24% of total hive
population.

METHODOLOGY

CHEMICAL ANALYSIS

Components	Recommended % content
1. Water/moisture	Not more than 20%
2. Total Reducing Sugars (TRS)	Not less than 65%
3. Apparent sucrose	Not more than 5%
4. Acidity	Not more than 40 mg/kg
5. HMF (burnt sugars) (Hydroxymethylfurfuraldehyde)	Not more than 40mg/kg

HONEY ANALYSIS



HONEY COLOUR GRADER



DESK AND HAND REFRACTOMETER



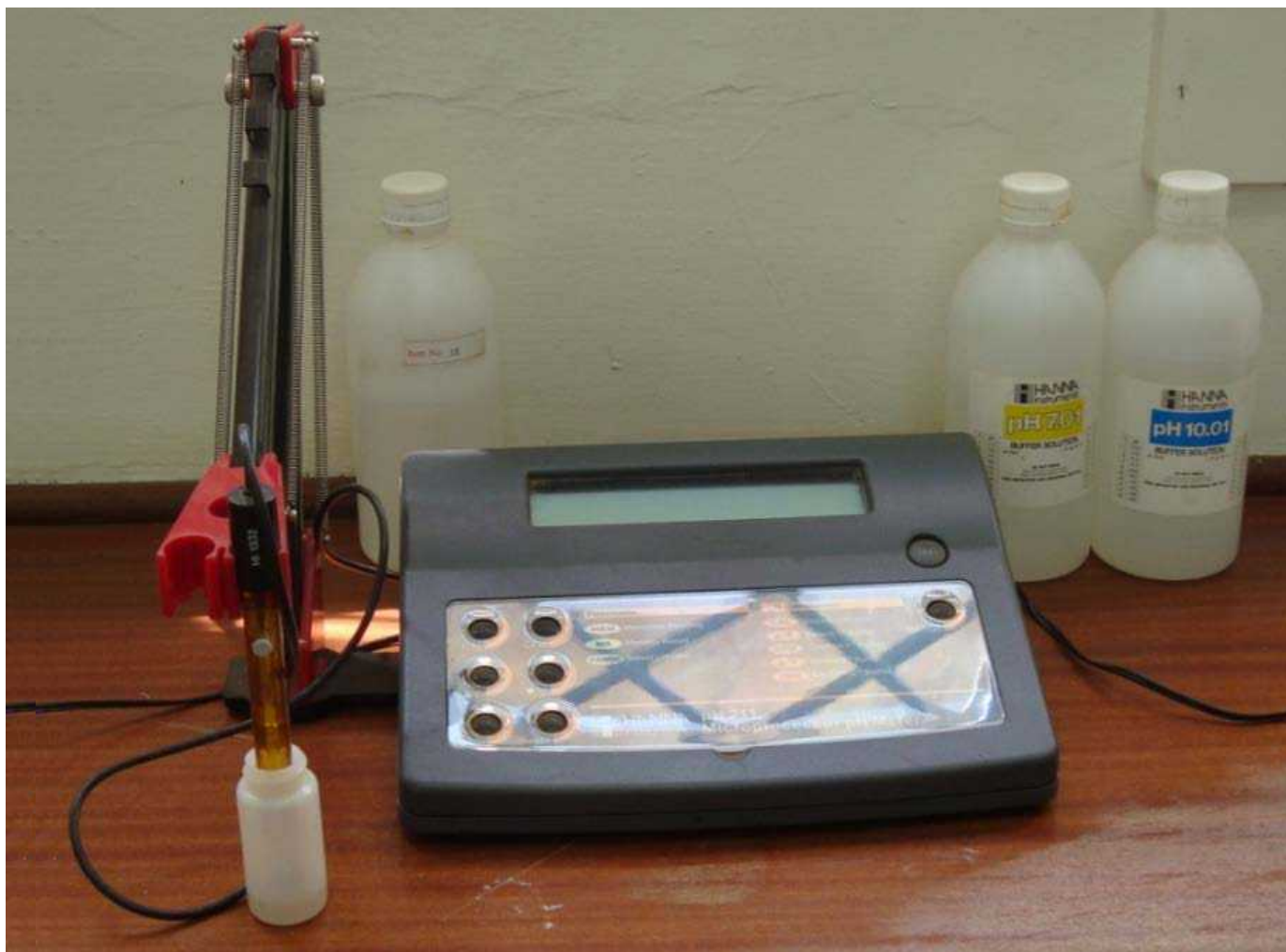
TITRATION



UV-SPECTROPHOTOMETER



THE PH METER



HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

EQUIPMENT USED IN HONEY RESIDUE ANALYSIS (HPLC)



ATOMIC ABSORPTION SPECTROMETER

EQUIPMENT USED IN HONEY RESIDUE ANALYSIS (AAS)



RESULTS

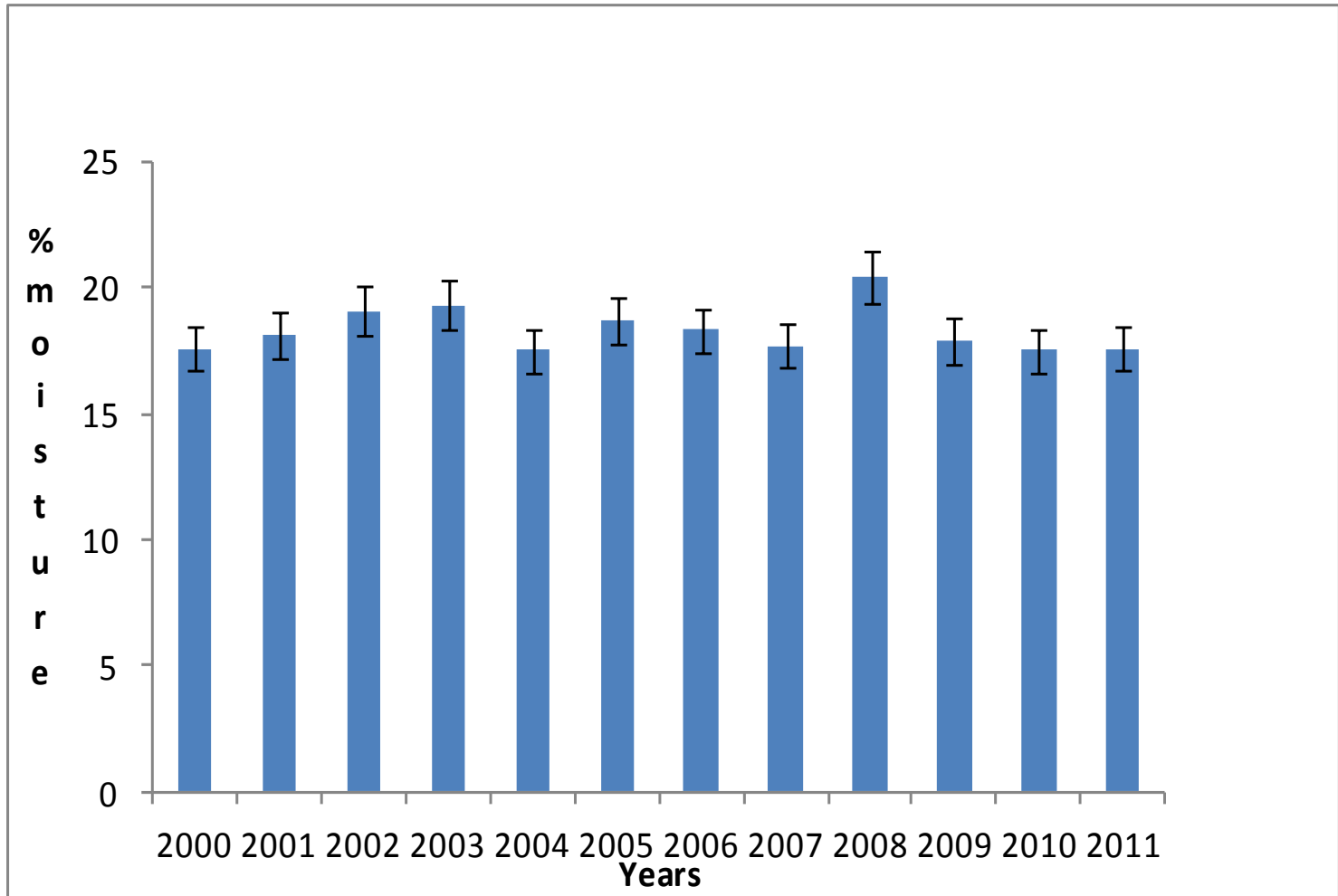
HONEY COLORS

Honey color	Total	%
Amber	235	16332.4
Light amber	163	16.885
Dark amber	85	46.7235
Light yellow	5	0.95
Yellow	1	0.11
Golden	5	0.95
Water white	6	1.16
Dark brown	1	0.11
Light white	1	0.11
White	1	0.11
Total	503	100

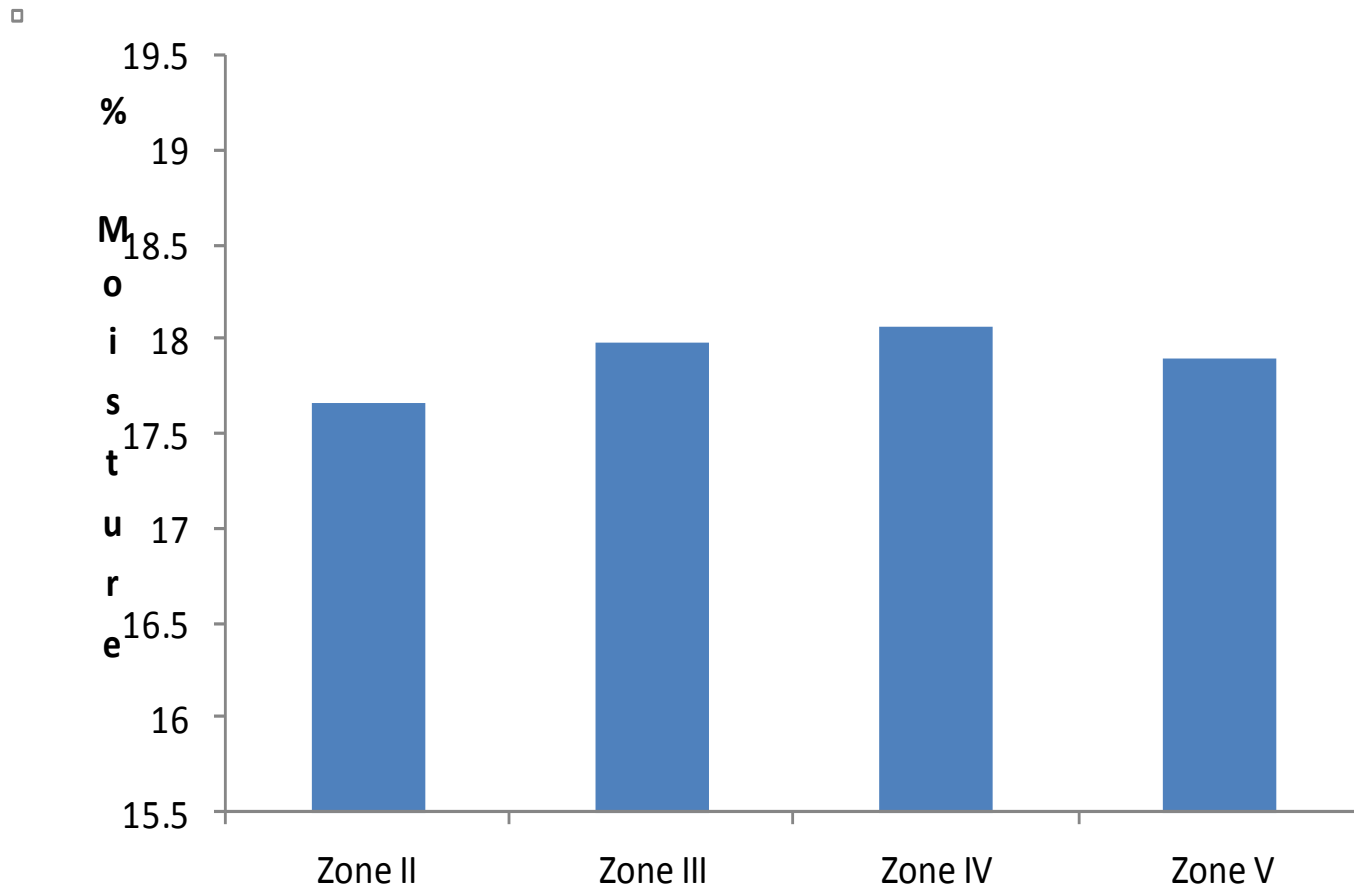
VARIOUS SHADES OF AMBER COLOR IN HONEY



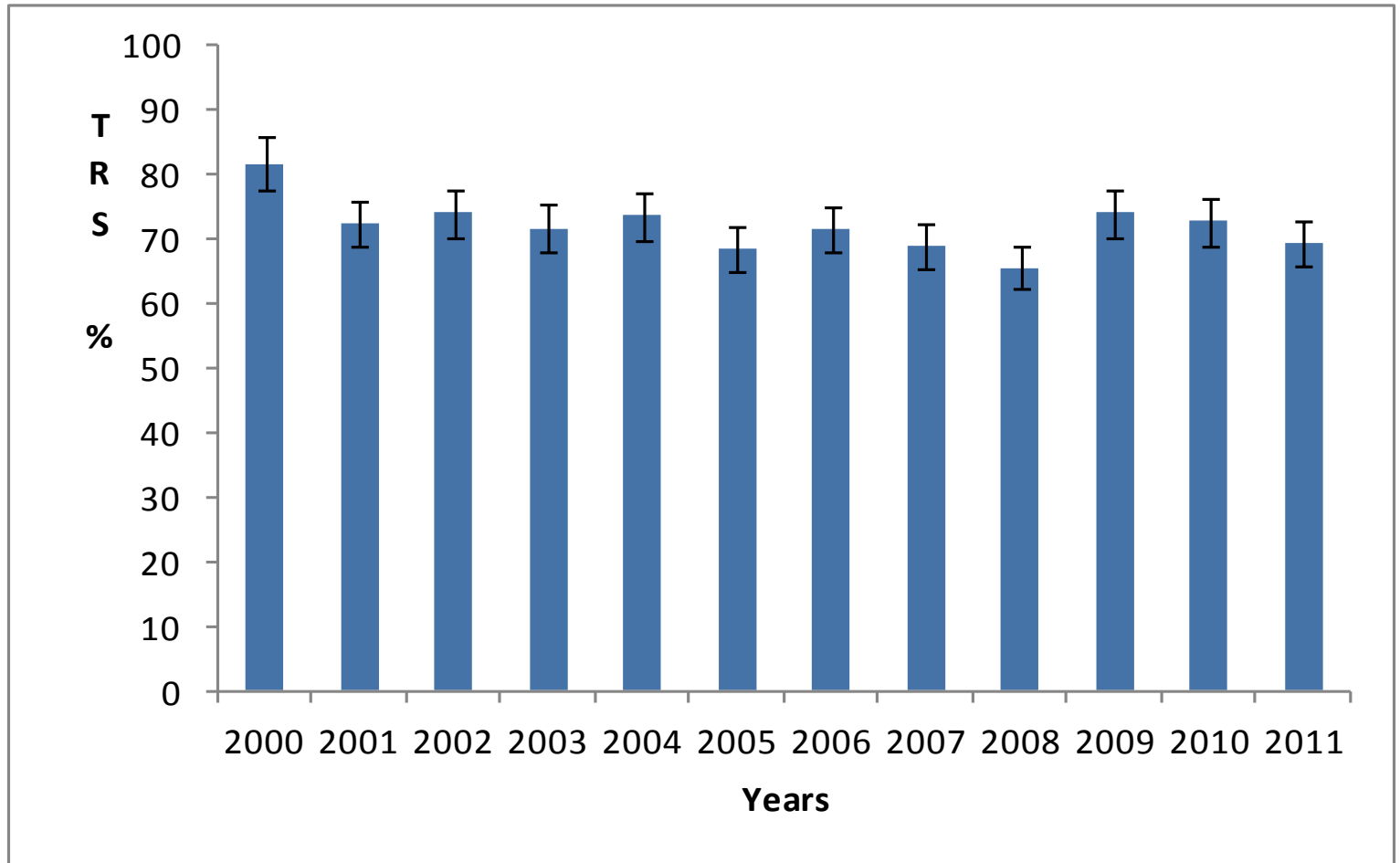
Water content found in the honey samples analyzed between 2000-2011



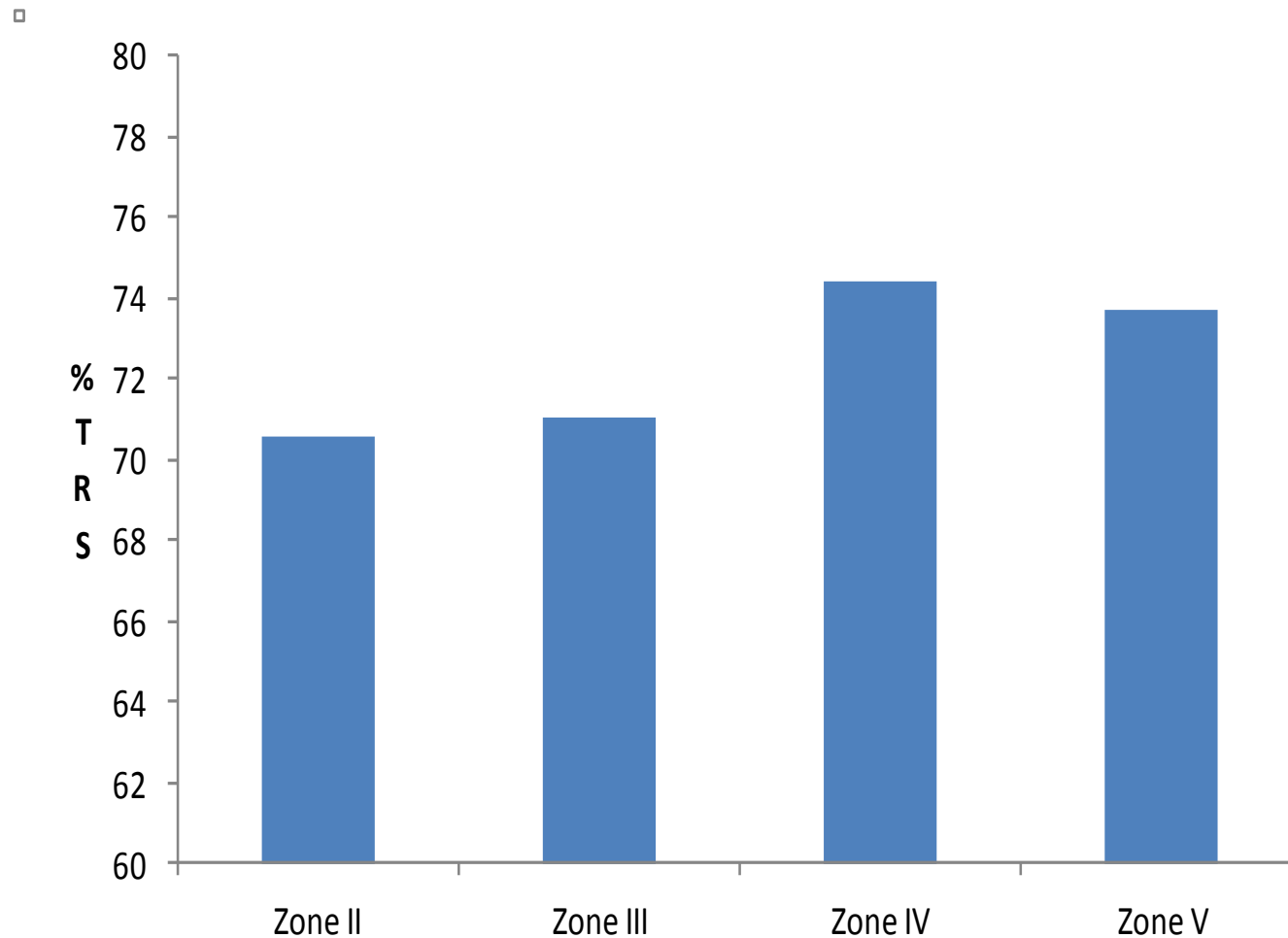
Moisture levels in honey from agro-climatic zones , II,III,IV and V



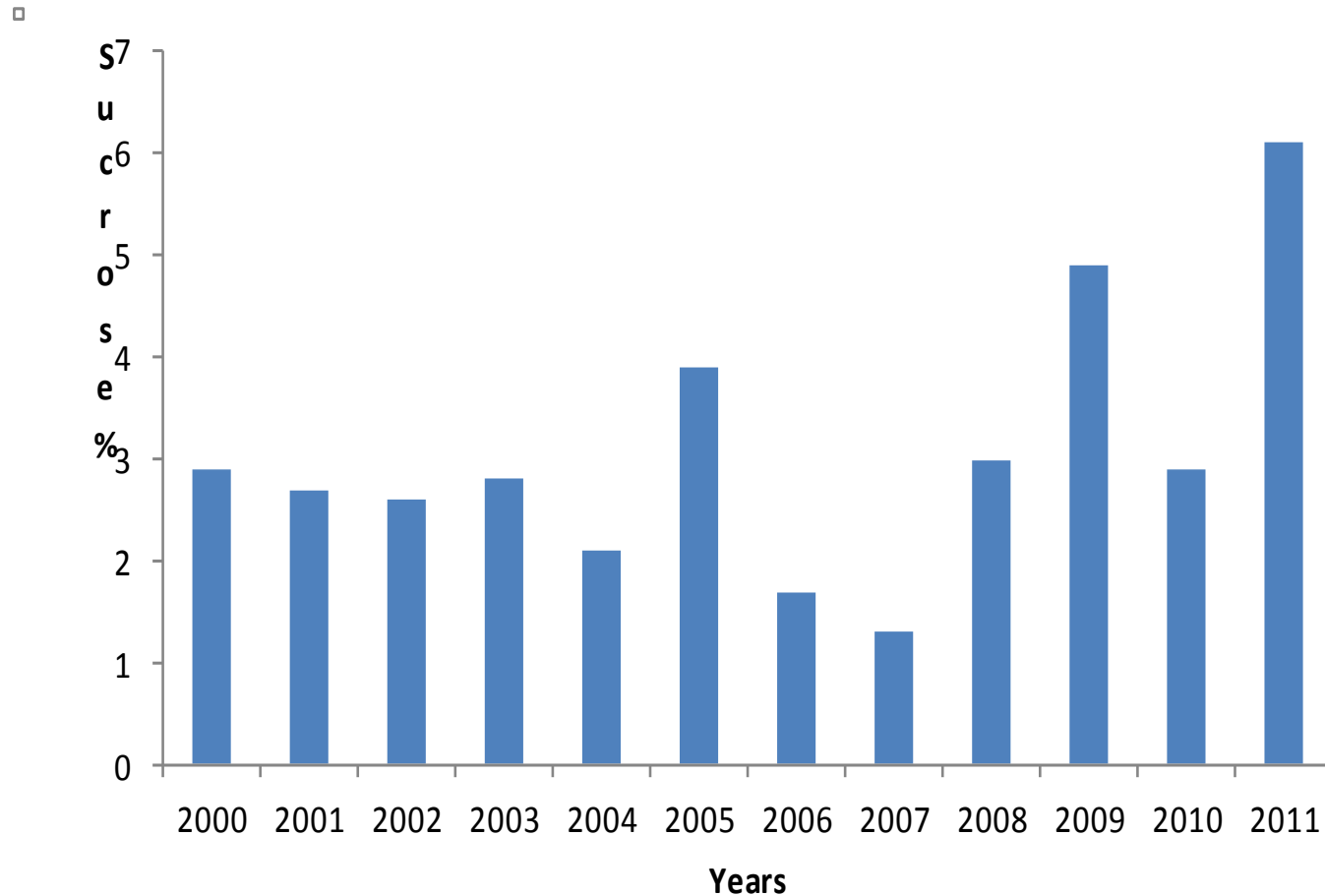
TRS content in the honey samples analyzed between 2000-2011



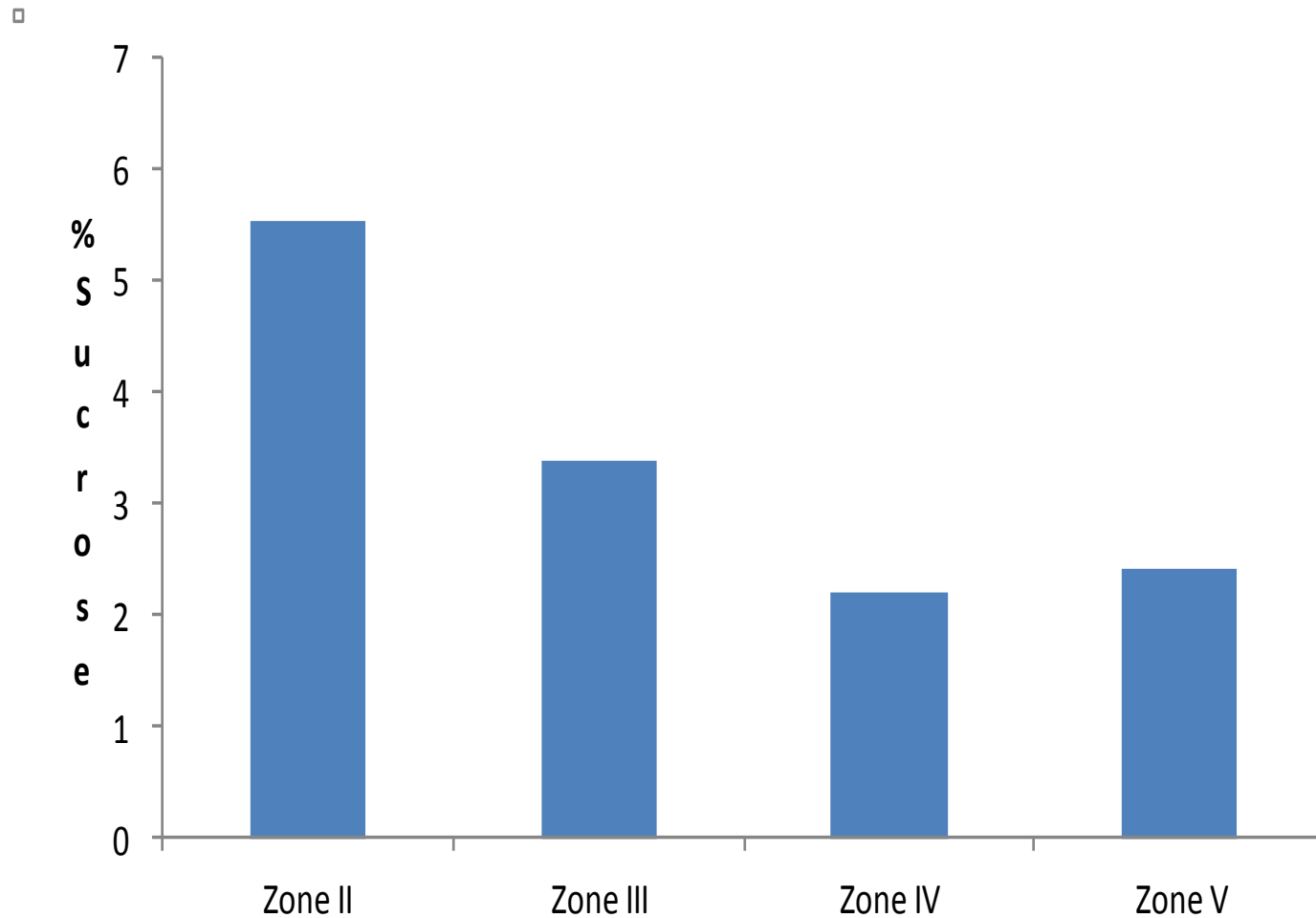
TRS of honey from agro-climatic zones II, III, IV and V



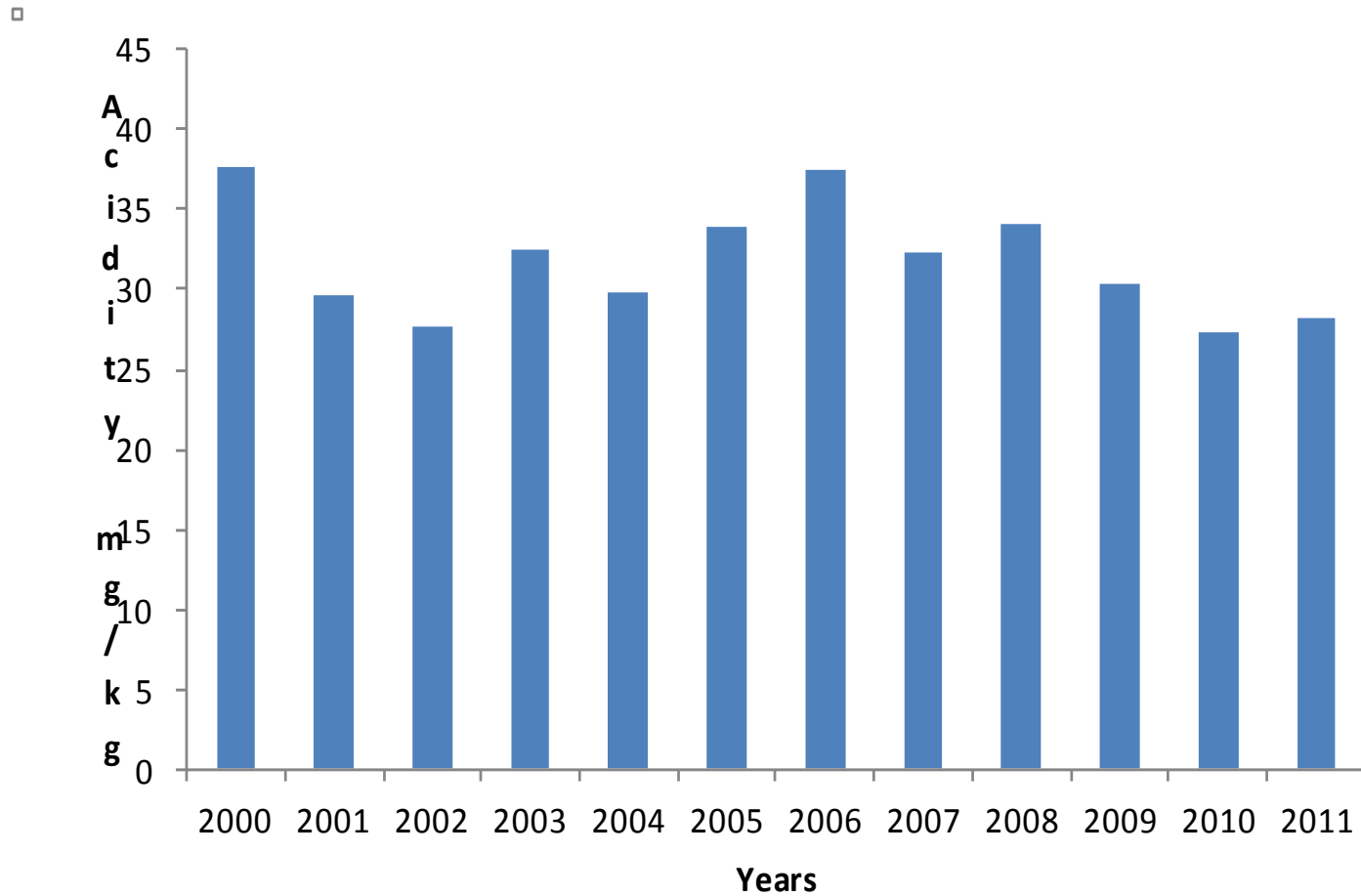
Sucrose content in the honey analyzed between 2000-2011



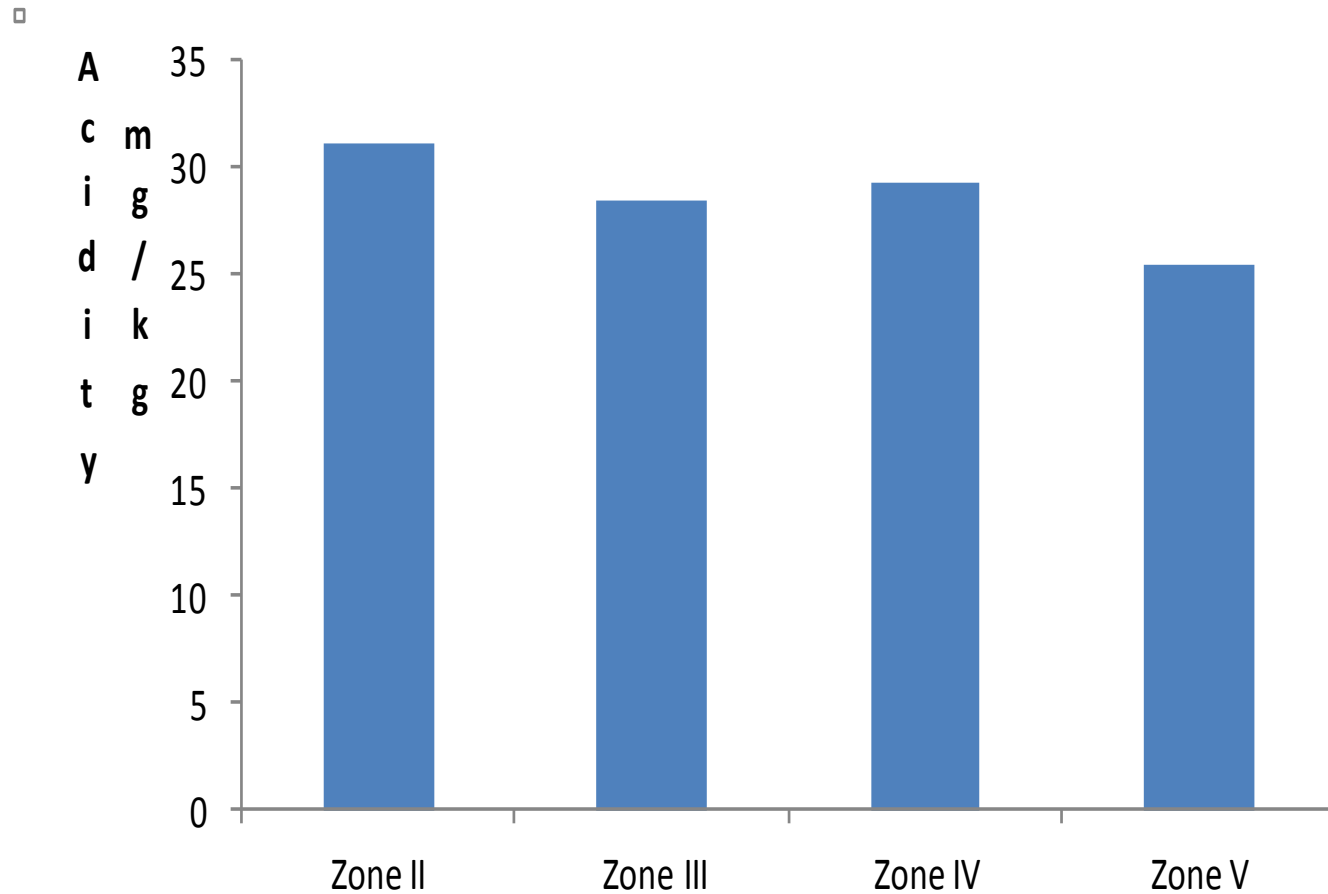
Honey sucrose from agro-climatic zones II, III, IV and V



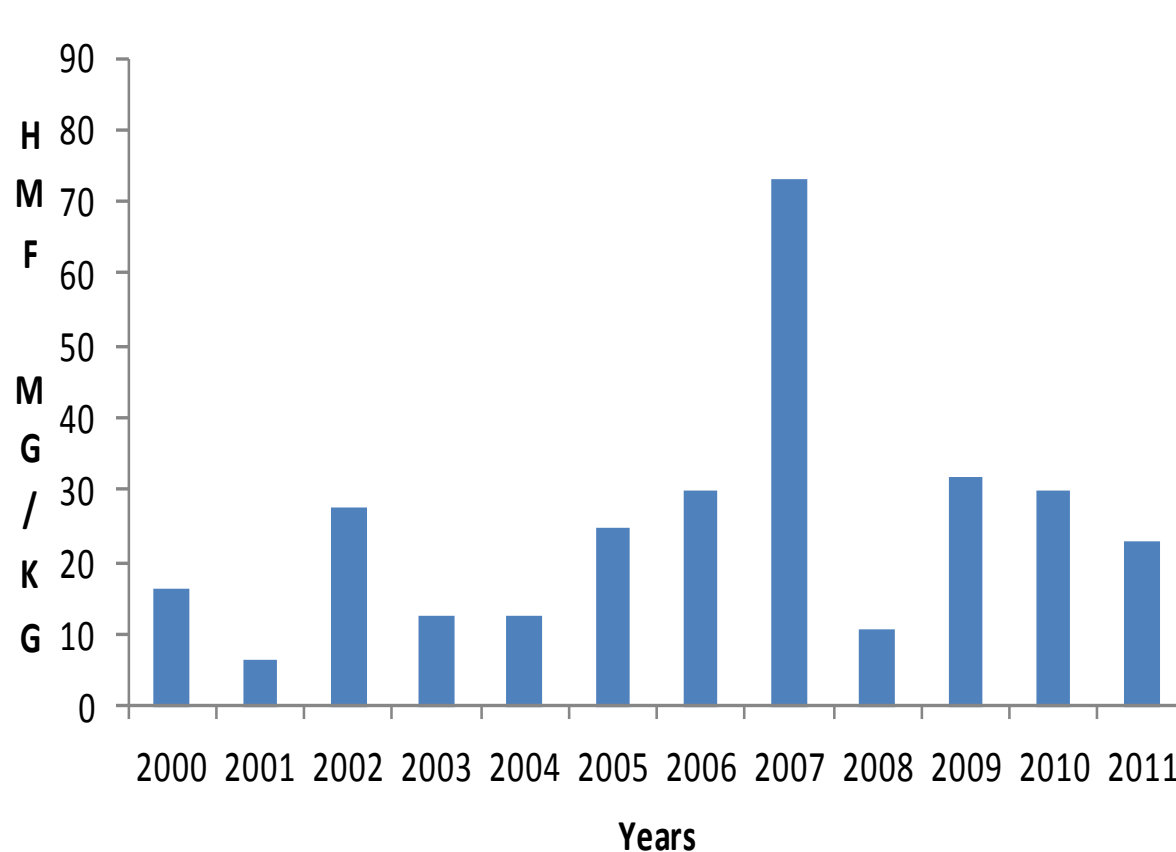
Acidity in honey analyzed between 2000-2011



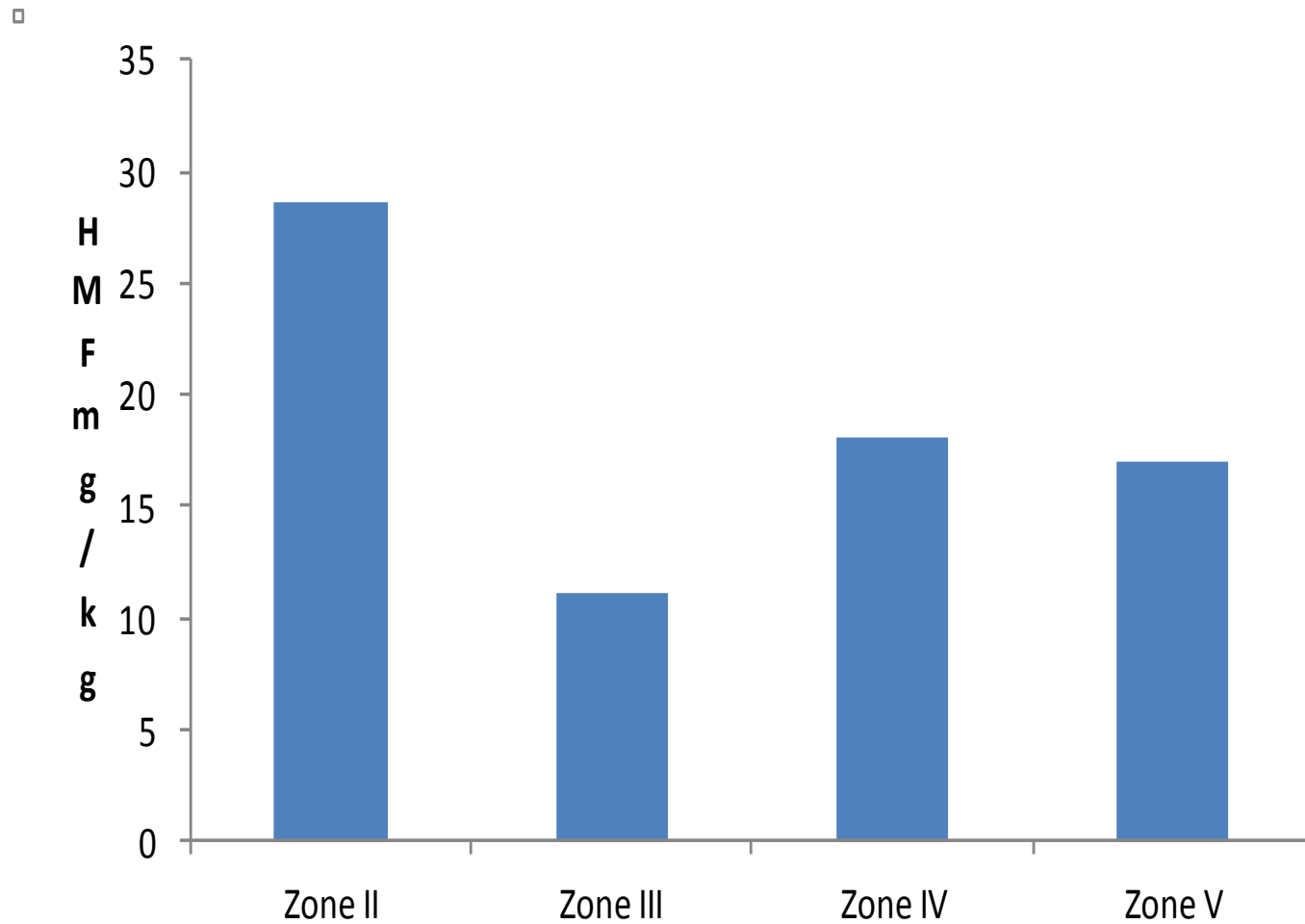
Acidity in honey from climatic zones II, III, IV and V



H.M.F content found in honey samples analyzed between 2000-2011.



HMF in honey analyzed from agro-climatic zones II, III, IV AND V



SUMMARY OF PARAMETERS FOR QUALITY OF HONEY ANALYZED FROM 2000-2011

Year	Moisture	TRS	Sucrose	Acidity	HMF
	%	%	%	Mg/kg	Mg/kg
2000	17.6	81.7	2.9	37.6	16.3
2001	18.1	72.4	2.7	29.6	6.6
2002	19.1	74	2.6	27.6	27.7
2003	17.8	71.8	2.8	32.5	12.4
2004	17.5	73.6	2.1	29.8	12.5
2005	18.7	68.7	3.9	33.9	24.6
2006	18.3	71.7	1.7	37.5	29.9
2007	17.7	69	1.3	32.4	73.3
2008	20.4	65.6	3	34.1	10.5
2009	17.9	74.2	4.9	30.3	31.8
2010	17.5	72.7	2.9	27.4	30.1
2011	17.6	69.3	6.1	28.2	22.6
Means	18.2	72.1	3.1	31.7	24.9

MEAN PARAMETERS FOR HONEY ANALYSIS FROM SOURCES IN AGRO- CLIMATIC ZONES II, III, IV AND V

	Moisture	TRS	Sucrose	Acidity	HMF
Zone II	17.66	70.58	5.53	31.13	28.69
Zone III	17.98	71.06	3.39	28.42	11.03
Zone IV	18.06	74.45	2.21	29.37	18.08
Zone V	17.9	73.7	2.4	25.4	17

DISCUSSION

Most of the honey analyzed was sourced from zone III

Amber colours were most common implying a diversity of flora source.

Hive technology does not directly contribute to poor quality honey, rather the handling and storage

RECOMMENDATION

Training on the relevant honey handling and processing skills, with focus on possible points of honey contamination/adulteration, along the value chain, to maintain the required honey quality within the hive and across market establishments

ACKNOWLEDGMENTS

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