NATURAL COMPOUND EXTRACTS DIVERSITY AMONG GENUS

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ABSTRACT

A diversity analysis based on chemical composition of natural extract was conducted on five genuses Cacalia (compounds/species = 109/13), Dracocephalum (246/12), Jatropha (143/26), Saussurea (216/22) and Senecio (631/186). The Bootstrap method was applied to estimate the distributions of mean value for the number of chemical compounds (revealing the richness within species), biodiversity expressed through two entropies (Shannon and max-entropy) and one diversity measure (Simpson diversity index). The analysis was conducted to show what happen in population. The results are presented and the conclusions are highlighted.

AIM

The aim of present research was to evaluate the intrinsic diversity of genus based on chemical composition of natural extracts of its constituent species.

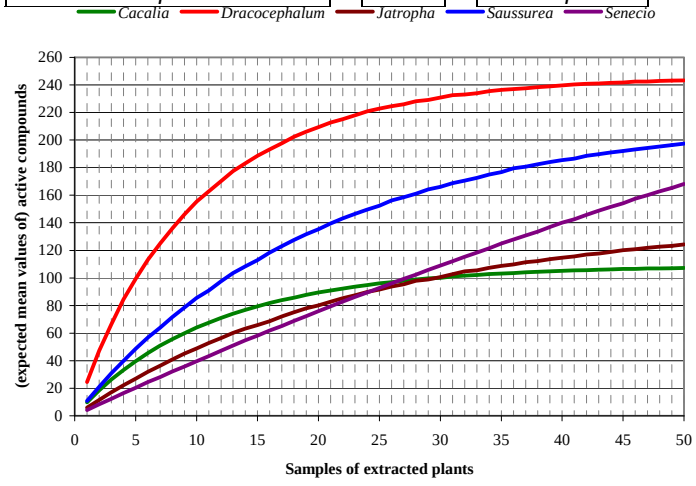
METHODOLOGY

Five genuses were included in analysis: *Cacalia* [1], *Dracocephalum* [2], *Jatropha* [3], *Saussurea* [4] and *Senecio* [5]. The number of known active compounds and the species where the compounds appear were taken from previous published materials. The Bootstrap method [6] was used to estimated based on independent observation (compounds obtained from plant extracts) the distributions of a series of statistics (such as mean number of chemical compounds, entropy (Shannon [7,8] and max-entropy [9,10]) and diversity (Simpson's diversity index [11]) for genus, number of plants and/or chemical compound) in order to illustrate what happen in population. The simulation study was conducted by 10,000 times for each number of plants varying from 1 to 50.

RESULTS

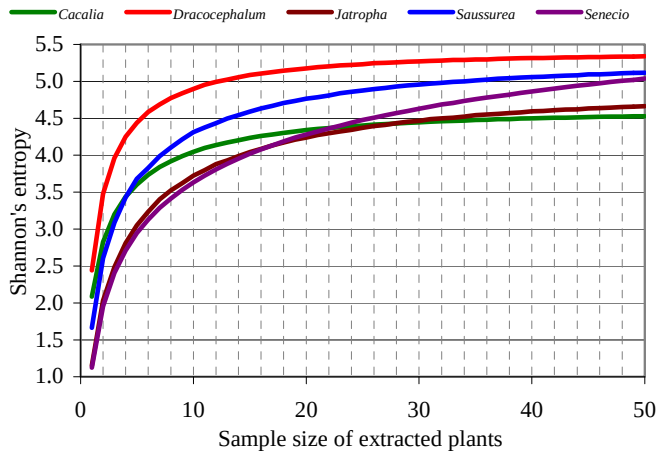
RICHNESS IN NATURAL ACTIVE COMPOUNDS

- The increase in number of active compounds varied from 0 (*Cacalia* and *Dracocephalum*) to 23 (*Dracocephalum*) with a minimum variation observed for *Senecio* (from 2 to 4).
- Three pathways were observed according to genus when the difference in number of active compounds was assessed relative to previous number of investigated plants: *Cacalia - Jatropha - Saussurea* & *Senecio* & *Dracocephalum*



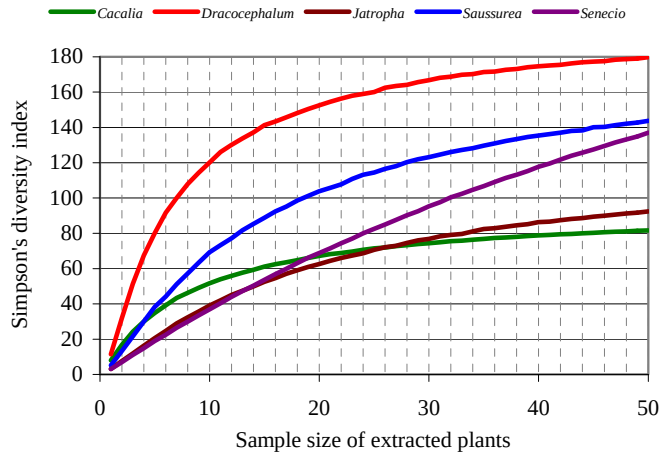
SHANNON'S ENTROPY

- Had values from 1.1259 (*Senecio* - n=1) to 5.3397 (*Dracocephalum* - n=50).
- Slightly increased with sample size but the increased proved not uniform when the differences were analyzed.
- Increase almost 2 times for n=2 compared with n=1 for Jatropha, Saussurea and Senecio, being the highest increase.



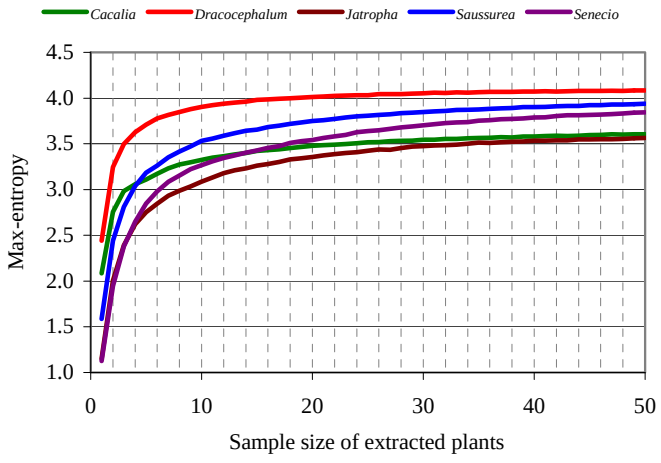
Simpson's Diversity on Genus

- Varied from 3.0830 (Senecio - n=1) to 179.8364 (Dracocephalum - n=50)
- Increased with increasing of sample size.
- Index range groups: relative small range (*Cacalia* with a range of 73.5009 and *Jatropha* with a range of 89.1564) and relative large range (*Senecio* - 133.9291, *Saussurea* - 138.4330 and *Dracocephalum* - 168.3506).



Max-Entropy on Genus

- The max-entropy systematically increased with sample size just for *Senecio*.
- The rule of increase of max-entropy with sample size was broken by 1 (*Saussurea*), 2 (*Jatropha*), 3 (*Cacalia*) and respectively 9 times (*Dracocephalum*).



CONCLUSION

The obtained results revealed that both in terms of richness in active compounds and weight of most frequent extracted compound *Dracocephalum* genus is most suitable for propagation being followed by *Saussurea*, *Cacalia* and *Jatropha* proved the lowest diversity in terms of active chemical compounds.

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