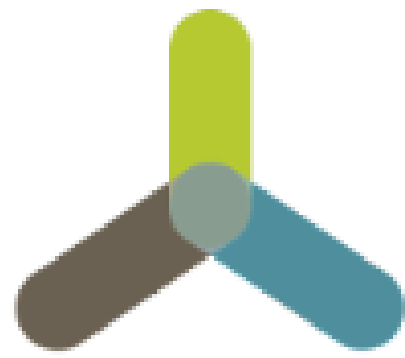


# Impact of Feedstock on Biochar Surface Properties: Practical Application of Boehm's and Potentiometric Titration

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## INTRODUCTION

Biochar is a material created through the pyrolysis of different kind of biomass. On the basis of last research reports, it was found, that the kind of used biomass influences on surface properties of biochar. These properties are of key importance in effectiveness of biochar as a soil sorbent.

The aim of the research was an investigation the effects of feedstock kind on surface properties of biochar.

## MATERIALS AND METHODS

The experiments were carried out using three biochars derived from: tobacco, sweet corn cobs and vineyard which are produced by the "double-barrel" method.

- ❖ The content of surface functional groups (carboxylic, phenolic and lactonic) by Boehm alkacimetric titration.
- ❖ The determination of variable surface charge (Q) and the distribution of surface functional groups from the potentiometric titration.



Fig. 1. Titrino 702 SM (an automatic titrator).

Table 1. Surface properties of biochars

Type of feedstock	Lactonic groups	Phenolic groups	Carboxylic groups	Q
	[cmol/kg]			[cmol/kg]
Tobacco	53	200	69	191
Sweet corn cobs	46	162	92	68
Vineyard	46	185	46	162

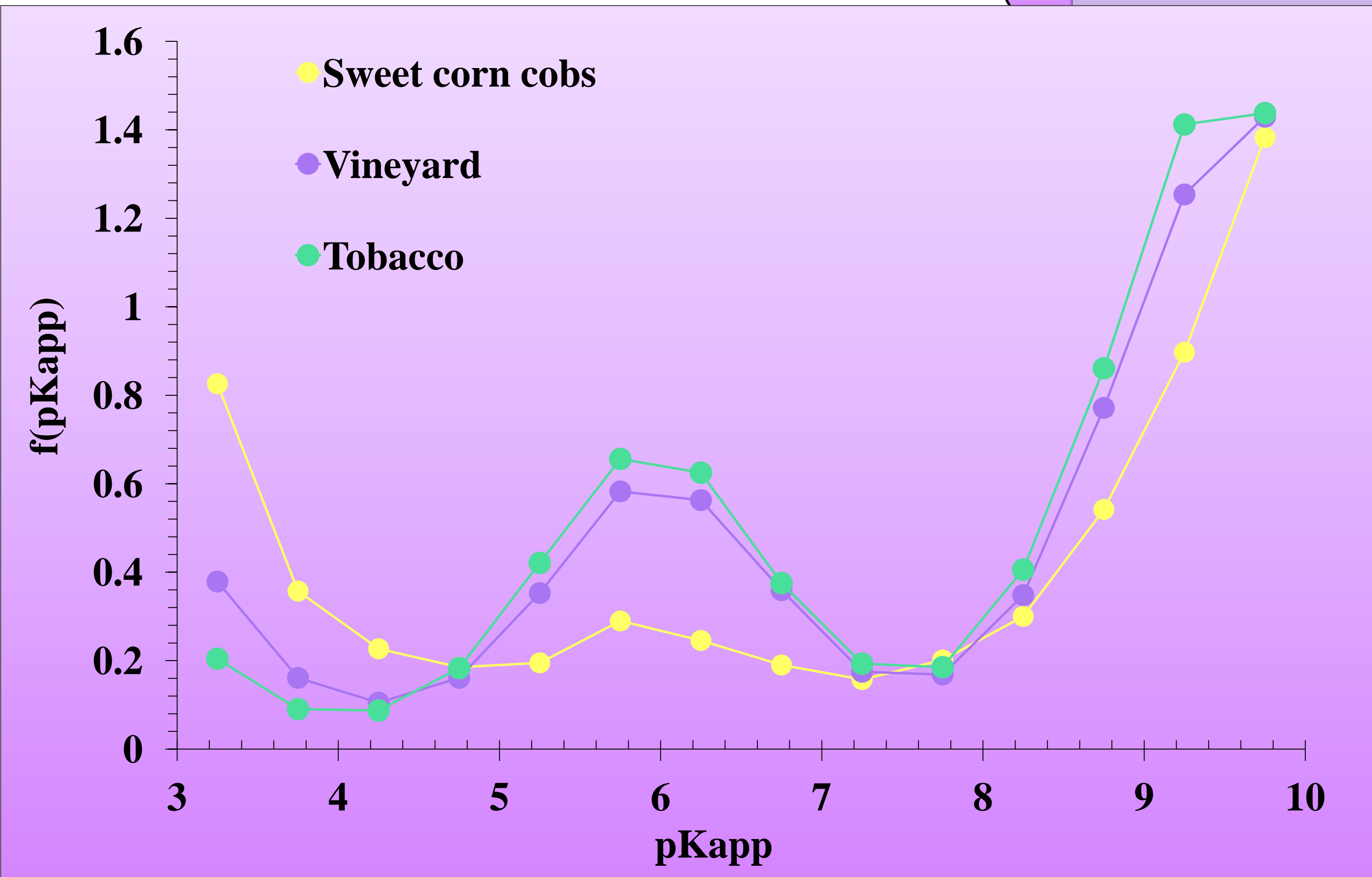


Fig. 2 Feedstock effect on distribution of surface functional groups of biochars.

## CONCLUSIONS

- ✓ Biochar samples exhibit a high variable surface charge (Q) and content of surface functional groups.
- ✓ Tobacco has the highest Q and content of acidic groups, while sweet corn cobs - the lowest one.
- ✓ The distribution of surface functional groups exhibits the existence of 3 peaks, which indicate the presence of acidic groups (carboxylic, lactonic and phenolic).
- ✓ The biochar from tobacco, vineyard or sweet corn cobs possessed merit for the improvement pollution removal from soil.