



Bioactive polysaccharides from aerial parts of *Aconitum carmichaelii*

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Introduction

Aconitum carmichaelii Debeaux is one of two *Aconitum* plants officially recorded in the Chinese Pharmacopeia, of which the mother and lateral roots are used commonly for treatment of several diseases in China. The aerial parts of the plant, however, are seldom used, and are usually discarded. Also, compared to the well-studied alkaloids in the plant, the polysaccharides are relatively less studied.

Methods and results

Aconitum carmichaelii



Stems (AS) →
Leaves (AL) →
Whole aerial parts (AAP) →

Water extraction, ethanol-
precipitation, and dialysis

Anion Exchange Chromatography
(ANX Sepharose 4 Fast Flow)



Neutral Fractions ↓ Eluted by dH₂O

AS-N (from stems, 0.4%*, left)
AL-N (from leaves, 0.4%*, middle)
AAP-N (from aerial parts, 0.8%*, right)
* yields related to the dried plant materials



Structural
Information

Bioassay
Test

Table 1 Monosaccharide composition (mol%)

Analyzed by methanolysis and GC

	Ara	Rha	Fuc	Xyl	Man	Gal	Glc	GalA
AS-N	16.4	Trace	0.4	1.0	22.7	6.9	51.5	1.0
AL-N	11.0	0.4	2.0	11.0	25.9	10.0	38.6	1.1
AAP-N	11.9	0.1	0.8	2.6	24.0	5.3	53.5	1.8

Fraction **AS-N** and **AAP-N** were shown to be similar in monosaccharide composition.

The **AL-N**, however, consisted of 10 mol% and 5 mol% more of Xyl and Gal respectively, and around 10 mol% less Glc than AS-N and AAP-N.

The glycosidic linkage have been analyzed after methylation and GC-MS, and the NMR structural elucidation will be carried out.

Conclusions

Our study indicates that the aerial parts of *A. carmichaelii*, especially the leaves, could be another valuable source of immunomodulating substances. The variation in monosaccharide composition could be a potential reason for their activity difference in activity, and the detailed structure-activity relationship will be further studied.

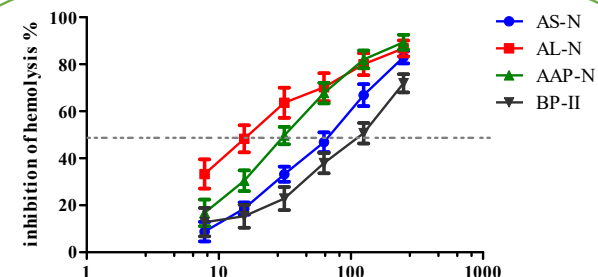


Figure 1 Complement fixation activity. The activity was expressed as % inhibition of hemolysis of sensitized sheep erythrocytes; BP-II; positive control; n=3.

Table 2 Inhibition of hemolysis (ICH₅₀)

Sample name	ICH ₅₀ µg/mL
AS-N	74.7±22.0 ^b
AL-N	18.3±9.0 ^a
AAP-N	34.5±8.4 ^{ab}
BP-II (Positive control)	126.5±36.4 ^c

Note: The different subscribed letters mean the statistical differences with $p < 0.05$.

The heteropolysaccharide from leaves, AL-N, showed a more potent complement fixation activity with an ICH₅₀ value of 18.3 µg/mL, compared to stems (ICH₅₀ of 74.7 µg/mL) and whole aerial parts (ICH₅₀ of 34.5 µg/mL). All neutral fractions showed higher activity than the positive control.