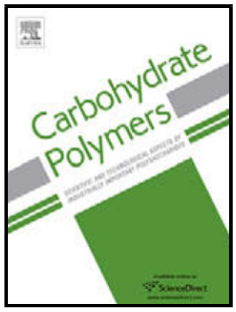

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PII: S0144-8617(17)31476-5
DOI: https://doi.org/10.1016/j.carbpol.2017.12.065
Reference: CARP 13127

To appear in:

Received date: 12-8-2017
Revised date: 11-12-2017
Accepted date: 22-12-2017

Please cite this article as: Wang, Junlong., Bao, Aijuan., Meng, Xinhua., Guo, Hongyun., Zhang, Yongdong., Zhao, Yali., Kong, Weibao., Liang, Junyu., Yao, Jian., & Zhang, Ji., An efficient approach to prepare sulfated polysaccharide and evaluation of anti-tumor activities in vitro.*Carbohydrate Polymers* https://doi.org/10.1016/j.carbpol.2017.12.065

R.1 Manuscript

<AT>An efficient approach to prepare sulfated polysaccharide and evaluation of anti-tumor activities in vitro

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<ABS-HEAD>Highlights► Bullet point (1): Microwave-assisted synthesis of sulfated polysaccharide was highly effective and characterized by time saving and high DS. ► Bullet point (2): Short reaction time minimized acid-catalyzed degradation of polysaccharide chains. ► Bullet point (3): M_W and molecular distribution had much greater influence on anti-tumor activities of SPAS against A549, HepG2 and Hela cells.

<ABS-HEAD>Abstract

<ABS-P> Use of microwave radiation is one of the most potential techniques in polysaccharide derivatives synthesis due to its advantages such as higher yields, milder reaction conditions and shorter reaction times. This study was aimed at producing sulfated polysaccharides by microwave irradiation using polar reagents and solvent. Six sulfated *Artemisia sphaerocephala* polysaccharide derivatives (SPAS) were obtained by using chlorosulfuric acid/pyridine method in the reaction duration range of 15-300 min at a fixed microwave power of 100W. Synthesis of SPAS under microwave filed was highly effective and characterized by time saving and high degrees of substitution (DS). The chemical structure of SPAS was confirmed by FT-IR and ^{13}C NMR that sulfation had occurred and the substitution position was mainly at C-6. Size-exclusion chromatograph combined with multi-angle laser photometer (SEC-MALLS) data indicated that short reaction time minimized acid-catalyzed degradation of polysaccharide chains. AFM observation demonstrated that low-M_W derivative exhibited aggregation of polysaccharide chain as irregular spherical lumps. In