

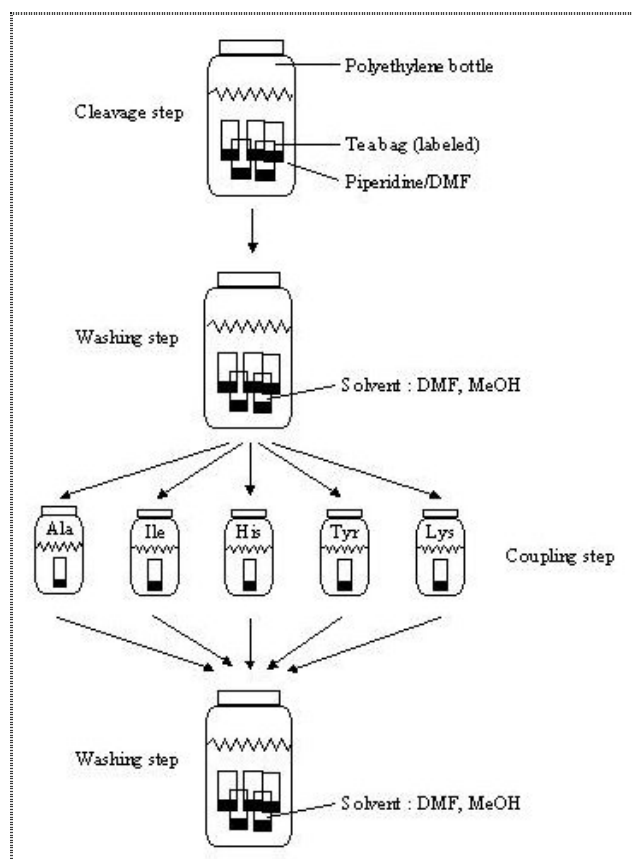
Topic: Tea-Bag**Synonyms:** /**Related Topics:** Combinatorial Chemistry, Solid Phase Peptide Synthesis**Definition:**

A polypropylene mesh bag, with dimensions of approximately 15 x 20 mm, filled with resin beads, sealed and labeled for a later identification, is known as a tea-bag, designed by Houghten (1985). The “tea-bag” mesh size is too small to allow resin beads to escape, but solvents and soluble reagents could readily enter. The principles of its use are to make multimilligram (up to 500 μ moles) quantities of a single peptide sequence in each packet, which is sufficient for full characterization and screening. To save time and work when making many peptides simultaneously, bags could be combined into the same reactors for common chemical steps.

For example, in the synthesis of 40 different peptides, all the bags are initially charged with resin beads bearing a Boc-protected amino acid, and the packets are combined for resin deprotection, washing, and neutralization steps. Then the bags are sorted into groups for the addition of the next amino acid. Then the bags could be combined again for deprotection, washing, and neutralization. After an appropriate number coupling steps, all the bags can then be treated with HF/anisole to cleave the peptides from the beads.

As the first intention was to speed up peptide synthesis, nowadays the tea-bag method is a classic example for combinatorial synthesis, its speed, and effectiveness.

Schematic overview of a typical group of steps carried out using the tea-bag procedure:

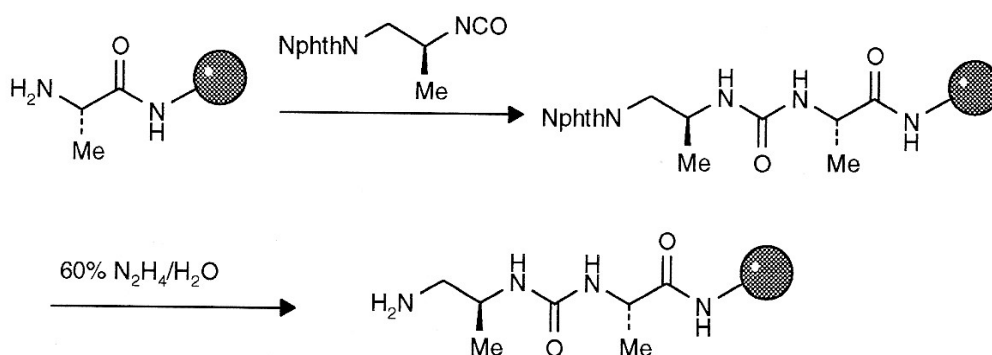


Some examples for the use of the tea-bag method:

- Characterization of the influenza haemagglutinin protein (HA1) and discovering the amino acid position that is critical important to the binding interaction (Houghten et al. (1986)) [1]
- Production of a small combinatorial library of urea analogues (Burgess et al. (1997)) [1]
- Rapid "tea-bag" peptide synthesis using 9-fluorenylmethoxycarbonyl (Fmoc) protected amino acids applied for antigenic mapping of viral proteins [2]
- Studies on the structural requirement for ligand binding to the neuropeptide Y (NPY) receptor from rat cerebral cortex [3]
- Peptide and peptidomimetic libraries. Molecular diversity and drug design [4]
- The use of tea-bag synthesis with paper discs as the solid phase in epitope mapping studies [5]
- Rate of swelling of sodium polyacrylate [6]

Structures:

Scheme 1: The Burgess Two-step cycle for the addition of a monomer in the synthesis of oligoureas – using “tea-bags” [1]



Publications:

- [1] **Kombinatorische Chemie**, Nicholas K. Terrett, 1. Auflage, 2000, Springer-Verlag Berlin Heidelberg
- [2] M. Sallberg, U. Ruden, L.O. Magnius, E. Norrby, B. Wahren, *Immunol Lett.*, 1991 Sep;30(1):58-69
- [3] C.R. Baeza, A. Unden, *FEBS Lett.*, 1990 Dec 17; 277(1-2):23-5
- [4] F. al-Obeidi, V.J. Hruby, T.K. Sawyer, *Mol. Biotechnol.*, 1998 Jun; 9(3):205-23
- [5] W. van 't Hof, M. van den Berg, R.C. Aalberse, *J. Immunol Methods*, 1993 May 26;161(2):177-86
- [6] I. Ogawa, H. Yamano, K. Miyagawa, *J. of Applied Polymer Science*, 1993, 47(2): 217-222, 1097-4628

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